APPENDIX K

Survey and Manage Species Persistence Evaluation

Jordan Cove Natural Gas Liquefaction and Pacific Connector Gas Pipeline Project Draft EIS

Appendix K. Survey and Manage Species Persistence Evaluation

Pacific Connector Gas Pipeline

Coos Bay, Roseburg, Medford Districts and Klamath Falls Resource Area of the Lakeview District, BLM Oregon, and Umpqua, Rogue River and Winema National Forests

Final

Approved by:

U.S.D.A. Forest Service and U.S. Bureau of Land Management
for submission to the Federal Energy Regulatory Commission
FERC Docket PF12-17-000, BLM Case File OR-63542

Prepared by:

North State Resources, Inc.
5000 Bechelli Lane, Suite 203
Redding, California 96002
(530) 222-5347

April 2014

.

Summary

This report analyzes the impacts of the Pacific Connector Gas Pipeline Project (PCGP Project) on Survey and Manage (S&M) species on U.S. Bureau of Land Management (BLM) and National Forest System (NFS) lands in southern Oregon. The PCGP Project includes construction of a 230-mile-long, 36-inch diameter high pressure natural gas pipeline that would extend from interconnections with other interstate pipelines near Malin, Oregon to the Jordan Cove natural gas liquefaction and terminal at Coos Bay, Oregon. The purpose of this analysis is to determine if the PCGP Project would threaten the persistence of any S&M species within the range of the northern spotted owl (NSO) or otherwise not meet the persistence objectives in the 1994 Northwest Forest Plan Record of Decision (ROD) and 2001 S&M ROD. If the PCGP Project is certificated by the Federal Energy Regulatory Commission, the BLM and U.S. Department of Agriculture, Forest Service (Forest Service) are proposing an amendment to the respective land management plans to waive the Management Recommendations that require protection of known S&M species sites on lands directly affected by the PCGP Project in the Coos Bay, Roseburg, and Medford BLM Districts and the Klamath Falls Resource Area of the Lakeview BLM District and on the Umpqua, Rogue River, and Winema National Forests in order to make provision for the PCGP Project.

The analysis entailed background research on S&M species that could be affected by the PCGP Project; a review of survey reports prepared by others for the PCGP Project; and processing and analysis of spatial data obtained from the BLM, Forest Service, and other sources, including S&M species site data created using a Feature Manipulation Extract tool consistent with the guidance and definitions used in annual species reviews and other planning and analysis purposes over the past 12 years. The site data were used to describe the distribution patterns and abundance of S&M species in the NSO range, as well as at local (5th field watersheds) and project area scales, and to assess project-related effects on the species (i.e., their sites). Background information was used in combination with new information available as a result of surveys for the PCGP Project and recent surveys in other portions of the NSO range to discuss the currently known distribution of the species in the NSO range. Impacts to sites as a result of the PCGP Project were analyzed to determine if the species would continue to have a reasonable assurance of persistence in the NSO range following implementation of the PCGP Project, taking into consideration the status and distribution of the species and general habitat in the NSO range.

Based on the analyses presented in this report, the conclusions summarized below were made for the 78 S&M species from the 2001 S&M list that could be affected by the PCGP Project.

The species listed below appear to be more common than previously documented or are relatively common across the NSO range based on new information available from surveys for the PCGP Project and/or other sources since the species were listed in the 2001 S&M ROD. For these species, the PCGP Project would affect individuals or habitat at one or more sites and could affect site persistence, but the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence:

Fungi:

Albatrellus ellisii
Albatrellus flettii
Bondarzewia mesenterica
Cantharellus subalbidus
Chromosera cyanophylla
Clavariadelphus ligula
Clavariadelphus occidentalis
Clavariadelphus sachalinensis
Clavariadelphus truncatus
Collybia bakerensis
Cortinarius olympianus
Craterellus tubaeformis
Galerina vittaeformis
Gastroboletus subalpinus
Gomphus clavatus
Gomphus kauffmanii
Gyromitra esculenta
Gyromitra infula
Gyromitra melaleucoides
Gyromitra montana
Helvella maculata
Hydnum umbilicatum
Leucogaster citrinus
Mycena overholtsii
Neournula pouchetii
Nivatogastrium nubigenum
Otidea onotica
Phaeocollybia attenuata
Phaeocollybia fallax
Phaeocollybia kauffmanii
Phaeocollybia olivacea
Phaeocollybia piceae
Phaeocollybia sipei
Phaeocollybia spadicea
Pithya vulgaris
Plectania melastoma
Plectania milleri
Polyozellus multiplex
Ramaria araiospora
Ramaria celerivirescens
Ramaria rubrievanescens
Ramaria rubripermanens
Ramaria stuntzii
Rhizopogon truncatus
Sarcodon imbricatus
Sarcosphaera coronaria
Sparassis crispa
Spathularia flavida
Tremiscus helvelloides

Lichens:

Bryoria tortuosa
Calicium glaucellum
Calicium viride
Chaenotheca chrysocephala

Bryophyte:

Buxbaumia viridis

Vascular Plants:

Cypripedium fasciculatum

Chaenotheca ferruginea
Chaenotheca furfuracea
Chaenotheca subroscida
Dendriscocaulon intricatulum
Fuscopannaria saubinetii
Leptogium teretiusculum
Peltigera pacifica
Ramalina thrausta
Usnea longissima
Cypripedium montanum
Eucephalus vialis

Mollusk:

Monadenia chaceana

Vertebrates:

Arborimus longicaudus
Strix nebulosa

The species listed below are not necessarily more common than previously documented despite new information available from pre-disturbance surveys for the PCGP Project and/or other sources since the species were listed in the 2001 S&M ROD. For these species, the PCGP Project would affect individuals or habitat at one or more sites and could affect site persistence, but the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence:

Fungi:

Arcangeliella crassa
Boletus pulcherrimus
Collybia racemosa
Hygrophorus caeruleus
Phaeocollybia scatesiae

Mollusk:

Deroceras hesperium

The species listed below are not necessarily more common than previously documented despite new information available from pre-disturbance surveys for the PCGP Project and/or other sources since the species were listed in the 2001 S&M ROD. For these species, the PCGP Project would affect site persistence at one or more sites, and the remaining sites in the NSO range may not provide a reasonable assurance of species persistence. These species are known from a low number of sites within a part of the NSO range, have specialized or somewhat limited habitat requirements, and have a distribution pattern in which every site may be important for dispersal opportunities to ensure the persistence of the species in the NSO range:

Fungi:

Choiromyces alveolatus
Gymnomyces abietis
Sedecula pulvinata

Route modifications are recommended for the three species listed above that may not have a reasonable assurance of persistence following project implementation.

These conclusions will be used by the BLM and Forest Service to provide a recommendation to the decision-makers regarding the finding of species persistence for each S&M species evaluated in this report, and the findings will ultimately be documented in the BLM and Forest Service Records of Decision for the PCGP Project.

Table of Contents

Summary ..... **Summary-i**

Table of Contents ..... **i**

1.0 Introduction **1-1**
- 1.1 Purpose of This Document 1-1
- 1.2 Project Overview 1-1
- 1.3 Regulatory Background 1-4
- 1.4 Other Listing and Species Status Categories 1-7
- 1.5 Methodology for Persistence Evaluation 1-7
- 1.6 Agency Decisions 1-21

2.0 Fungi Species **2-1**
- 2.1 Albatrellus ellisii 2-1
- 2.2 Albatrellus flettii 2-13
- 2.3 Arcangeliella crassa 2-25
- 2.4 Boletus pulcherrimus 2-37
- 2.5 Bondarzewia mesenterica 2-51
- 2.6 Cantharellus subalbidus 2-63
- 2.7 Choiromyces alveolatus 2-75
- 2.8 Chromosera cyanophylla 2-87
- 2.9 Clavariadelphus ligula 2-99
- 2.10 Clavariadelphus occidentalis 2-111
- 2.11 Clavariadelphus sachalinensis 2-123
- 2.12 Clavariadelphus truncatus 2-135
- 2.13 Collybia bakerensis 2-147
- 2.14 Collybia racemosa 2-159
- 2.15 Cortinarius olympianus 2-171
- 2.16 Craterellus tubaeformis 2-183
- 2.17 Galerina vittaeformis 2-194
- 2.18 Gastroboletus subalpinus 2-206
- 2.19 Gomphus clavatus 2-218
- 2.20 Gomphus kauffmanii 2-229
- 2.21 Gymnomyces abietis 2-241
- 2.22 Gyromitra esculenta 2-254
- 2.23 Gyromitra infula 2-266
- 2.24 Gyromitra melaleucoides 2-277
- 2.25 Gyromitra montana 2-289
- 2.26 Helvella maculata 2-301
- 2.27 Hydnum umbilicatum 2-312
- 2.28 Hygrophorus caeruleus 2-324

2.29 Leucogaster citrinus 2-338
2.30 Mycena overholtsii 2-350
2.31 Neournula pouchetii 2-361
2.32 Nivatogastrium nubigenum 2-373
2.33 Otidea onotica 2-385
2.34 Phaeocollybia attenuata 2-397
2.35 Phaeocollybia fallax 2-409
2.36 Phaeocollybia kauffmanii 2-420
2.37 Phaeocollybia olivacea 2-432
2.38 Phaeocollybia piceae 2-444
2.39 Phaeocollybia scatesiae 2-456
2.40 Phaeocollybia sipei 2-468
2.41 Phaeocollybia spadicea 2-480
2.42 Pithya vulgaris 2-491
2.43 Plectania melastoma 2-503
2.44 Plectania milleri 2-515
2.45 Polyozellus multiplex 2-526
2.46 Ramaria araiospora 2-538
2.47 Ramaria celerivirescens 2-550
2.48 Ramaria rubrievanescens 2-562
2.49 Ramaria rubripermanens 2-574
2.50 Ramaria stuntzii 2-586
2.51 Rhizopogon truncatus 2-597
2.52 Sarcodon imbricatus 2-609
2.53 Sarcosphaera coronaria 2-621
2.54 Sedecula pulvinata 2-632
2.55 Sparassis crispa 2-644
2.56 Spathularia flavida 2-655
2.57 Tremiscus helvelloides 2-667

3.0 Lichen Species 3-1
3.1 Bryoria tortuosa 3-1
3.2 Calicium glaucellum 3-13
3.3 Calicium viride 3-24
3.4 Chaenotheca chrysocephala 3-36
3.5 Chaenotheca ferruginea 3-48
3.6 Chaenotheca furfuracea 3-60
3.7 Chaenotheca subroscida 3-72
3.8 Dendriscocaulon intricatulum 3-84
3.9 Fuscopannaria saubinetii 3-97
3.10 Leptogium teretiusculum 3-108
3.11 Peltigera pacifica 3-120
3.12 Ramalina thrausta 3-131

3.13 Usnea longissima 3-143

4.0 Bryophyte species 4-1
4.1 Buxbaumia viridis 4-1

5.0 Vascular Plants 5-1
5.1 Cypripedium fasciculatum 5-1
5.2 Cypripedium montanum 5-13
5.3 Eucephalus vialis 5-25

6.0 Mollusk Species 6-1
6.1 Deroceras hesperium 6-1
6.2 Monadenia chaceana 6-13

7.0 Vertebrate Species 7-1
7.1 Arborimus longicaudus 7-1
7.2 Strix nebulosa 7-13

8.0 References 8-1

List of Tables

Chapter 1 tables include:

Table INTRO-1 Fifth Field Watersheds and Land Allocations Crossed by the Pacific Connector Gas Pipeline on BLM and NFS Lands
Table INTRO-2 Survey and Manage Categories
Table INTRO-3 BLM and NFS Lands in Regional, Local, and Project Areas

Tables in species sections include:

Table SPECIES-1 Number of SPECIES Sites (2013 or 2014)
Table SPECIES-2 Distribution of SPECIES Across Federal, Private, and Other Lands
Table SPECIES-3 Distribution of SPECIES Across 1994 ROD Land Allocations
Table SPECIES-4 Extent of Forests that Could Provide Habitat for SPECIES on BLM and NFS Lands
Table SPECIES-5 Distribution of SPECIES in Local 5th Field Watersheds
Table SPECIES-6 Impacts to SPECIES Sites on BLM and NFS Lands in the Project Area
Table SPECIES-7 Site-Specific Overview of Impacts to SPECIES Sites (select species only)

Tables ALEL-1 through ALEL-6 ..... Section 2.1
Tables ALFL-1 through ALFL-6 ..... Section 2.2
Tables ARCR-1 through ARCR-6 ..... Section 2.3
Tables BOPU-1 through BOPU-7 ..... Section 2.4
Tables BOME-1 through BOME-6 ..... Section 2.5
Tables CASU-1 through CASU-6 ..... Section 2.6
Tables CHAL-1 through CHAL-6 ..... Section 2.7

Tables CHCY-1 through CHCY-6 ..... Section 2.8
Tables CLLI-1 through CLLI-6 ..... Section 2.9
Tables CLOC-1 through CLOC-6 ..... Section 2.10
Tables CLSA-1 through CLSA-6 ..... Section 2.11
Tables CLTR-1 through CLTR-6 ..... Section 2.12
Tables COBA-1 through COBA-6 ..... Section 2.13
Tables CORA-1 through CORA-6 ..... Section 2.14
Tables COOL-1 through COOL-6 ..... Section 2.15
Tables CRTU-1 through CRTU-6 ..... Section 2.16
Tables GAVI-1 through GAVI-6 ..... Section 2.17
Tables GASU-1 through GASU-6 ..... Section 2.18
Tables GOCL-1 through GOCL-6 ..... Section 2.19
Tables GOKA-1 through GOKA-6 ..... Section 2.20
Tables GYAB-1 through GYAB-6 ..... Section 2.21
Tables GYES-1 through GYES-6 ..... Section 2.22
Tables GYIN-1 through GYIN-6 ..... Section 2.23
Tables GYME-1 through GYME-6 ..... Section 2.24
Tables GYMO-1 through GYMO-6 ..... Section 2.25
Tables HEMA-1 through HEMA-6 ..... Section 2.26
Tables HYUM-1 through HYUM-6 ..... Section 2.27
Tables HYCA-1 through HYCA-7 ..... Section 2.28
Tables LECI-1 through LECI-6 ..... Section 2.29
Tables MYOV-1 through MYOV-6 ..... Section 2.30
Tables NEPO-1 through NEPO-6 ..... Section 2.31
Tables NINU-1 through NINU-6 ..... Section 2.32
Tables OTON-1 through OTON-6 ..... Section 2.33
Tables PHAT-1 through PHAT-6 ..... Section 2.34
Tables PHFA-1 through PHFA-6 ..... Section 2.35
Tables PHKA-1 through PHKA-6 ..... Section 2.36
Tables PHOL-1 through PHOL-6 ..... Section 2.37
Tables PHPI-1 through PHPI-5 ..... Section 2.38
Tables PHSC-1 through PHSC-6 ..... Section 2.39
Tables PHSI-1 through PHSI-5 ..... Section 2.40
Tables PHSP-1 through PHSP-5 ..... Section 2.41
Tables PIVU-1 through PIVU-6 ..... Section 2.42
Tables PLME-1 through PLME-6 ..... Section 2.43
Tables PLMO-1 through PLMO-6 ..... Section 2.44
Tables POMU-1 through POMU-6 ..... Section 2.45
Tables RAAR-1 through RAAR-6 ..... Section 2.46
Tables RACE-1 through RACE-6 ..... Section 2.47
Tables RARU5-1 through RARU5-6 ..... Section 2.48
Tables RARU6-1 through RARU6-6 ..... Section 2.49
Tables RAST-1 through RAST-6 ..... Section 2.50
Tables RHTR-1 through RHTR-6 ..... Section 2.51
Tables SAIM-1 through SAIM-6 ..... Section 2.52
Tables SACO-1 through SACO-6 ..... Section 2.53
Tables SEPU-1 through SEPU-6 ..... Section 2.54
Tables SPCR-1 through SPCR-6 ..... Section 2.55
Tables SPFL-1 through SPFL-6 ..... Section 2.56
Tables TRHE-1 through TRHE-6 ..... Section 2.57
Tables BRTO-1 through BRTO-6 ..... Section 3.1

Tables CAGL-1 through CAGL-6 ..... Section 3.2
Tables CAVI-1 through CAVI-5 ..... Section 3.3
Tables CHCH-1 through CHCH-6 ..... Section 3.4
Tables CHFE-1 through CHFE-6 ..... Section 3.5
Tables CHFU-1 through CHFU-6 ..... Section 3.6
Tables CHSU-1 through CHSU-6 ..... Section 3.7
Tables DEIN-1 through DEIN-6 ..... Section 3.8
Tables FUSA-1 through FUSA-6 ..... Section 3.9
Tables LETE-1 through LETE-6 ..... Section 3.10
Tables PEPA-1 through PEPA-6 ..... Section 3.11
Tables RATH-1 through RATH-6 ..... Section 3.12
Tables USLO-1 through USLO-6 ..... Section 3.13
Tables BUVI-1 through BUVI-6 ..... Section 4.1
Tables CYFA-1 through CYFA-6 ..... Section 5.1
Tables CYMO-1 through CYMO-6 ..... Section 5.2
Tables EUVI-1 through EUVI-6 ..... Section 5.3
Tables DEHE-1 through DEHE-6 ..... Section 6.1
Tables MOCH-1 through MOCH-6 ..... Section 6.2
Tables ARLO-1 through ARLO-6 ..... Section 7.1
Tables STNE-1 through STNE-6 ..... Section 7.2

List of Figures

Chapter 1 figures include:

Figure INTRO-1 Pacific Connector Gas Pipeline Route on BLM and National Forest System Lands
Figure INTRO-2 Typical Pipeline Construction Corridor with Temporary Extra Work Areas
Figure INTRO-3 Miles of PCGP Project Corridor by Watershed and Administrative Unit

Figures in species sections include:

Figure SPECIES-1 Regional Distribution of SPECIES
Figure SPECIES-2 Distribution of Forests that Could Provide Habitat for SPECIES
Figure SPECIES-3 Local Distribution of SPECIES
Figure SPECIES-4&5 Location of SPECIES in the Project Area (select species only)

Figures ALEL-1 through ALEL-3 ..... Section 2.1
Figures ALFL-1 through ALFL-3 ..... Section 2.2
Figures ARCR-1 through ARCR-4 ..... Section 2.3
Figures BOPU-1 through BOPU-5 ..... Section 2.4
Figures BOME-1 through BOME-3 ..... Section 2.5
Figures CASU-1 through CASU-3 ..... Section 2.6
Figures CHAL-1 through CHAL-4 ..... Section 2.7
Figures CHCY-1 through CHCY-3 ..... Section 2.8
Figures CLLI-1 through CLLI-3 ..... Section 2.9
Figures CLOC-1 through CLOC-3 ..... Section 2.10
Figures CLSA-1 through CLSA-3 ..... Section 2.11
Figures CLTR-1 through CLTR-3 ..... Section 2.12

Figures COBA-1 through COBA-3 ..... Section 2.13
Figures CORA-1 through CORA-4 ..... Section 2.14
Figures COOL-1 through COOL-3 ..... Section 2.15
Figures CRTU-1 through CRTU-3 ..... Section 2.16
Figures GAVI-1 through GAVI-3 ..... Section 2.17
Figures GASU-1 through GASU-3 ..... Section 2.18
Figures GOCL-1 through GOCL-3 ..... Section 2.19
Figures GOKA-1 through GOKA-3 ..... Section 2.20
Figures GYAB-1 through GYAB-4 ..... Section 2.21
Figures GYES-1 through GYES-3 ..... Section 2.22
Figures GYIN-1 through GYIN-3 ..... Section 2.23
Figures GYME-1 through GYME-3 ..... Section 2.24
Figures GYMO-1 through GYMO-3 ..... Section 2.25
Figures HEMA-1 through HEMA-3 ..... Section 2.26
Figures HYUM-1 through HYUM-3 ..... Section 2.27
Figures HYCA-1 through HYCA-5 ..... Section 2.28
Figures LECI-1 through LECI-3 ..... Section 2.29
Figures MYOV-1 through MYOV-3 ..... Section 2.30
Figures NEPO-1 through NEPO-3 ..... Section 2.31
Figures NINU-1 through NINU-3 ..... Section 2.32
Figures OTON-1 through OTON-3 ..... Section 2.33
Figures PHAT-1 through PHAT-3 ..... Section 2.34
Figures PHFA-1 through PHFA-3 ..... Section 2.35
Figures PHKA-1 through PHKA-3 ..... Section 2.36
Figures PHOL-1 through PHOL-3 ..... Section 2.37
Figures PHPI-1 through PHPI-3 ..... Section 2.38
Figures PHSC-1 through PHSC-4 ..... Section 2.39
Figures PHSI-1 through PHSI-3 ..... Section 2.40
Figures PHSP-1 through PHSP-3 ..... Section 2.41
Figures PIVU-1 through PIVU-3 ..... Section 2.42
Figures PLME-1 through PLME-3 ..... Section 2.43
Figures PLMO-1 through PLMO-3 ..... Section 2.44
Figures POMU-1 through POMU-3 ..... Section 2.45
Figures RAAR-1 through RAAR-3 ..... Section 2.46
Figures RACE-1 through RACE-3 ..... Section 2.47
Figures RARU5-1 through RARU5-3 ..... Section 2.48
Figures RARU6-1 through RARU6-3 ..... Section 2.49
Figures RAST-1 through RAST-3 ..... Section 2.50
Figures RHTR-1 through RHTR-3 ..... Section 2.51
Figures SAIM-1 through SAIM-3 ..... Section 2.52
Figures SACO-1 through SACO-3 ..... Section 2.53
Figures SEPU-1 through SEPU-4 ..... Section 2.54
Figures SPCR-1 through SPCR-3 ..... Section 2.55
Figures SPFL-1 through SPFL-3 ..... Section 2.56
Figures TRHE-1 through TRHE-3 ..... Section 2.57
Figures BRTO-1 through BRTO-3 ..... Section 3.1
Figures CAGL-1 through CAGL-3 ..... Section 3.2
Figures CAVI-1 through CAVI-3 ..... Section 3.3
Figures CHCH-1 through CHCH-3 ..... Section 3.4
Figures CHFE-1 through CHFE-3 ..... Section 3.5
Figures CHFU-1 through CHFU-3 ..... Section 3.6

Figures CHSU-1 through CHSU-3 ..... Section 3.7
Figures DEIN-1 through DEIN-3 ..... Section 3.8
Figures FUSA-1 through FUSA-3 ..... Section 3.9
Figures LETE-1 through LETE-3 ..... Section 3.10
Figures PEPA-1 through PEPA-3 ..... Section 3.11
Figures RATH-1 through RATH-3 ..... Section 3.12
Figures USLO-1 through USLO-3 ..... Section 3.13
Figures BUVI-1 through BUVI-3 ..... Section 4.1
Figures CYFA-1 through CYFA-3 ..... Section 5.1
Figures CYMO-1 through CYMO-3 ..... Section 5.2
Figures EUVI-1 through EUVI-3 ..... Section 5.3
Figures DEHE-1 through DEHE-4 ..... Section 6.1
Figures MOCH-1 through MOCH-3 ..... Section 6.2
Figures ARLO-1 through ARLO-3 ..... Section 7.1
Figures STNE-1 through STNE-3 ..... Section 7.2

List of Attachments

Attachment A 2001 S&M List

Attachment B Glossary

Attachment C Spatial Analysis Process for Persistence Evaluation

List of Acronyms/Abbreviations

Commonly Used:

2001 ROD	*Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*
BLM	U.S. Bureau of Land Management
feet msl	feet above mean sea level
FME	Feature Manipulation Engine
Forest Service	U.S. Department of Agriculture, Forest Service
GeoBob	Geographic Biotic Observations, a BLM geodatabase
GIS	geographic information systems
KOAC	Known Owl Activity Center
LSOG	late-successional and old-growth
LSR	Late Successional Reserve
NFS	National Forest System
Northwest Forest Plan or NWFP	*Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl* and *Standards and Guidelines for Management for Late-Successional and Old-Growth Related Species in the Range of the Northern Spotted Owl*
NRIS	Natural Resource Information System, a Forest Service geodatabase
NSO	northern spotted owl
ORBIC	Oregon Biodiversity Information Center
PCGP Project	Pacific Connector Gas Pipeline Project
POD	Plan of Development
ROD	Record of Decision
ROW	Right-of-Way
S&M	Survey and Manage
SEIS	Supplemental Environmental Impact Statement
TEWA	temporary extra work area
TMP	Transportation Management Plan
UCSA	uncleared storage area

Species Abbreviations:

ALEL	*Albatrellus ellisii*
ALFL	*Albatrellus flettii*
ARCR	*Arcangeliella crassa*
ARLO	*Arborimus longicaudus*
BOME	*Bondarzewia mesenterica*
BOPU	*Boletus pulcherrimus*
BRTO	*Bryoria tortuosa*
BUVI	*Buxbaumia viridis*
CAGL	*Calicium glaucellum*
CASU	*Cantharellus subalbidus*
CAVI	*Calicium viride*
CHAL	*Choiromyces alveolatus*
CHCH	*Chaenotheca chrysocephala*
CHCY	*Chromosera cyanophylla*
CHFE	*Chaenotheca ferruginea*
CHFU	*Chaenotheca furfuracea*
CHSU	*Chaenotheca subroscida*
CLLI	*Clavariadelphus ligula*
CLOC	*Clavariadelphus occidentalis*
CLSA	*Clavariadelphus sachalinensis*
CLTR	*Clavariadelphus truncatus*
COBA	*Collybia bakerensis*
CORA	*Collybia racemosa*
COOL	*Cortinarius olympianus*
CRTU	*Craterellus tubaeformis*
CYFA	*Cypripedium fasciculatum*
CYMO	*Cypripedium montanum*
DEHE	*Deroceras hesperium*
DEIN	*Dendriscocaulon intricatulum*
EUVI	*Eucephalus vialis*
FUSA	*Fuscopannaria saubinetii*
GASU	*Gastroboletus subalpinus*

Species Abbreviations, cont.:

GAVI	*Galerina vittaeformis*
GOCL	*Gomphus clavatus*
GOKA	*Gomphus kauffmanii*
GYAB	*Gymnomyces abietis*
GYES	*Gyromitra esculenta*
GYIN	*Gyromitra infula*
GYME	*Gyromitra melaleucoides*
GYMO	*Gyromitra montana*
HEMA	*Helvella maculata*
HYCA	*Hygrophorus caeruleus*
HYUM	*Hydnum umbilicatum*
LECI	*Leucogaster citrinus*
LETE	*Leptogium teretiusculum*
MOCH	*Monadenia chaceana*
MYOV	*Mycena overholtsii*
NEPO	*Neournula pouchetii*
NINU	*Nivatogastrium nubigenum*
OTON	*Otidea onotica*
PEPA	*Peltigera pacifica*
PHAT	*Phaeocollybia attenuata*
PHFA	*Phaeocollybia fallax*
PHKA	*Phaeocollybia kauffmanii*
PHOL	*Phaeocollybia olivacea*
PHPI	*Phaeocollybia piceae*
PHSC	*Phaeocollybia scatesiae*
PHSI	*Phaeocollybia sipei*
PHSP	*Phaeocollybia spadicea*
PIVU	*Pithya vulgaris*
PLME	*Plectania melastoma*
PLMI	*Plectania milleri*
POMU	*Polyozellus multiplex*
RAAR	*Ramaria araiospora*

Species Abbreviations, cont.:

RACE	*Ramaria celerivirescens*
RARU5	*Ramaria rubrievanescens*
RARU6	*Ramaria rubripermanens*
RAST	*Ramaria stuntzii*
RATH	*Ramalina thrausta*
RHTR	*Rhizopogon truncatus*
SACO	*Sarcosphaera coronaria*
SAIM	*Sarcodon imbricatus*
SEPU	*Sedecula pulvinata*
SPCR	*Sparassis crispa*
SPFL	*Spathularia flavida*
STNE	*Strix nebulosa*
TRHE	*Tremiscus helvelloides*
USLO	*Usnea longissima*

1.0 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This report analyzes the impacts of the Pacific Connector Gas Pipeline Project (PCGP Project) on Survey and Manage (S&M) species on U.S. Bureau of Land Management (BLM) and National Forest System (NFS) lands in southern Oregon. The information presented in this document will be used by:

- U.S. Department of Interior, BLM and U.S. Department of Agriculture, Forest Service (Forest Service) decision-makers to support findings concerning the persistence of S&M species affected by the PCGP Project,
- BLM and Forest Service decision-makers in consideration of possible amendments of land management plans related to S&M species, and
- The Federal Energy Regulatory Commission while preparing an Environmental Impact Statement in compliance with the National Environmental Policy Act for construction and operation of the PCGP Project.

The proposed Jordan Cove Liquefied Natural Gas project is not a part of the PCGP Project and would not be located on BLM or NFS lands. It is, therefore, not subject to the S&M Standards and Guidelines or BLM or Forest Service discretionary actions.

The purpose of this analysis is to determine if the PCGP Project would affect the persistence of any S&M species within the range of the northern spotted owl (NSO) or otherwise not meet the persistence objectives in the 1994 Northwest Forest Plan Record of Decision (ROD) and 2001 S&M ROD to provide reasonable assurance of species persistence. An overview of the PCGP Project, a discussion of relevant planning documents, and a description of the methodology used to conduct the analysis are presented in this chapter.

1.2 PROJECT OVERVIEW

The PCGP Project includes construction of a 230-mile-long, 36-inch diameter high pressure natural gas pipeline that would extend from interconnections with other interstate pipelines near Malin, Oregon to the Jordan Cove natural gas liquefaction and terminal at Coos Bay, Oregon. The proposed route is illustrated on Figure INTRO-1 (at the end of this chapter).

The standard construction corridor would be about 95 feet wide, with some locations narrower depending on the work being conducted. Figure INTRO-2 at the end of this chapter illustrates a typical pipeline construction corridor with a temporary extra work area (TEWA). These TEWAs would be needed in numerous locations to support pipeline installation and facility construction; these areas would be cleared of vegetation and may be graded, but would be restored to pre-disturbance conditions (e.g., similar contours, vegetation) upon completion of construction. Uncleared storage areas (UCSAs) would also be used during construction to store materials, such as downed logs, large boulders and rootwads. Understory vegetation and sapling sized trees may be removed in the UCSAs, but larger trees would not be cut except as needed for safety during construction operations. Upon completion of the construction phase, a 50-foot-wide permanent easement centered on the pipeline would be required for long-term access and maintenance; 30 feet of the permanent easement would be maintained in low growing herbaceous and shrub

vegetation to facilitate aerial inspections. Table INTRO-1 at the end of this chapter displays an overview of the extent of the PCGP Project on BLM and NFS lands and across 17 5th field watersheds, and Figure INTRO-3 at the end of this chapter portrays the number of miles of the project corridor in each watershed. The construction corridor and TEWAs (excluding associated storage areas and other facilities) contains approximately 610 acres of BLM lands and 460 acres of NFS lands. The project area, which encompasses all components of the project, contains approximately 990 acres of BLM lands and 590 acres of NFS lands.

The PCGP Project Right-of-Way (ROW) Grant application includes a Plan of Development (POD) which consists of 29 specific exhibits, including the Transportation Management Plan (TMP) that identifies necessary road improvements and maintenance activities to support construction activities and defines new temporary and permanent access roads. Some road improvements and construction would be necessary on federal lands. Road maintenance and improvement/reconstruction, such as spot rocking, grading to remove ruts, resurfacing, culvert replacement, clearing of vegetation, dust abatement, danger tree removal, drainage cleanout, road widening, and turnout construction, would be implemented on designated roads to accommodate pipe transportation and heavy construction equipment access to the corridor. These activities would involve a minimal amount of site disturbance and earthwork necessary to make the roads useable for construction access needs. More substantial work, such as surfacing or resurfacing of roads, may be necessary for roads used outside of the normal operating season. No maintenance or improvements will be allowed on any road not authorized for use or approved for improvements. For purposes of this analysis, the anticipated disturbance area associated with the TMP encompasses a 30-foot-wide corridor along the existing and proposed BLM and Forest Service road alignments, some of which fall within the PCGP Project corridor.

A number of exhibits with the POD include design measures developed in consultation with the BLM and Forest Service to reduce impacts to lands and resources and comprehensive mitigation plans that may benefit S&M species. Design measures from the POD and additional construction measures that would benefit S&M species include:

- Approximately 2,000 acres of land will be reallocated from the Matrix land allocation to the Late Successional Reserve (LSR) land allocation. This would benefit S&M species because lands allocated as LSR are managed for late-successional and old-growth (LSOG) habitat with which S&M species are typically associated.
- Extensive large woody debris will be placed in Riparian Reserves and managed stands (e.g., plantations) where this material was removed by past management and fuel reduction treatments. Large woody debris will also be placed back on the corridor as part of the overall construction effort. This may benefit S&M species over time because large woody debris is an important habitat element for many S&M species.
- Fuels reductions and fire suppression projects will be implemented along the corridor. Stand-replacement fire has been the primary threat to LSOG habitat on federal lands in the Pacific Northwest (Moeur et al. 2011). High intensity stand-replacement fire could adversely affect some S&M species. Fuels reduction and fire suppression projects reduce the probability that high-intensity stand-replacement fire will occur in areas where these activities are implemented.

- Approximately 80 miles of road decommissioning are proposed on BLM and NFS lands within the 5th field watersheds affected by the PCGP Project. Road decommissioning may benefit LSOG habitat and a number of S&M species over time by re-establishing native vegetation and decreasing habitat fragmentation.
- Precommercial and commercial thinning will be implemented along the corridor. Reducing stand density in overstocked stands may benefit S&M species by accelerating the development of LSOG habitat, particularly with respect to accelerating late-successional stand characteristics, such as larger trees, snags, and a multi-layered canopy.
- Dead and downed woody debris greater than 16 inches in diameter, unmerchantable woody debris, slash (greater than 16 inches in diameter), and large rocks and boulders that are removed from the construction corridor will be stored nearby in UCSAs or TEWAs and used for restoration efforts in temporary disturbance areas to maintain or enhance upland habitat diversity.
- Prior to vegetation clearing activities, snags and large diameter trees on the edge of the removal area will be flagged and protected in place to preserve green tree recruitment and existing and potential snag habitat, where feasible.
- Known locations of populations or individuals of S&M species will be flagged and avoided in UCSAs and other temporary disturbance areas that do not require vegetation removal to avoid removal of the species.
- To minimize impacts to trees within UCSAs, the contractor will leave as much space between the stored material, spoils, or equipment/vehicle and the trees as practical. Operators will be informed about proper placement of materials and equipment in storage areas, such that placement and retrieval of these materials and equipment minimize soil compaction, bark damage, and other disturbance to protected trees.
- In upland forests, the contractor will limit stump removal to the trenchline and areas where grading is necessary to construct a safe level working plane. Minimizing stump removal in upland areas would minimize soil disturbance and erosion potential, increase soil strength by maintaining soil root structure, and provide substrate for fungi and other species.
- In isolated, rugged topographic areas with poor access, helicopter logging may be used. Cable and helicopter logging methods would minimize the potential for soil compaction. When log skidding is used, low-ground pressure vehicles will be used as much as possible, and soil duff layer removal will be avoided. Designated skid trails will be used to restrict soil compaction to a smaller area of the corridor.
- Rutting, compaction, and structural damage will be minimized by scheduling the majority of construction activities during the dry season, from May through October.
- Temporary erosion control devices will be installed immediately after initial disturbance (clearing) and will be properly maintained throughout construction. The devices will be reinstalled as necessary until replaced by permanent erosion control devices or restoration is complete.
- Equipment and vehicles will be cleaned prior to moving them onto the construction corridor to prevent the import and spread of weeds. Also, vegetation clearing and

grading equipment will be cleaned if they pass through known noxious weed infestation areas. Pressure washing may be used to clean equipment, if deemed necessary.

- Temporary disturbed areas will be restored to pre-disturbance contours and conditions, to the extent practicable, including replanting of trees and replacement of woody debris, slash, and other woody materials and rocks removed from the area during construction.

1.3 REGULATORY BACKGROUND

1.3.1 Agency Land Management Plans

The 1994 *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl* and *Standards and Guidelines for Management for Late-Successional and Old-Growth Related Species in the Range of the Northern Spotted Owl* (Northwest Forest Plan; NWFP ROD) amended or was incorporated into BLM and Forest Service land management plans to require certain actions for rare amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropods that occupy late-successional and old-growth forests (USDA and USDI 1994). These rare species were identified in Section C of Attachment A to the NWFP ROD collectively as "Survey and Manage" species. The NWFP ROD also established protection buffers on matrix lands for certain species (i.e., protection buffer species) that were not on the 1994 S&M list and required that those buffers be managed as part of the LSR network.

Four survey strategies were developed to guide management of S&M species:

- Manage known sites
- Survey prior to ground-disturbing activities
- Conduct extensive surveys
- Conduct general regional surveys

The NWFP ROD also established overall objectives for managing S&M species populations that were referred to as "persistence objectives." These objectives were based on the Forest Service viability provision in the 1982 National Forest System Land and Resource Management Planning Regulation for the National Forest Management Act of 1976. This provision is targeted toward vertebrate species, but was also applied to non-vertebrate species, to the extent practicable, as described in the NWFP ROD. It generally states that the Forest Service shall manage habitat "to maintain viable populations of existing native and desired non-native vertebrate species in the planning area" (36 CFR 219.19). Although the viability standard is part of the Forest Service planning regulations, the protections for S&M species were also applied to BLM lands in the NWFP ROD with a goal of protecting long-term health and sustainability of all federal forests within the range of the NSO and the species that inhabit them. Because of the uncertainty associated with the continued persistence of species due to natural factors, the NWFP ROD noted that compliance with the planning regulations is not subject to precise numerical interpretations and cannot be fixed at any single threshold; rather, "as in any administrative field, common sense and agency expertise must be applied" (NWFP ROD, p. 44).

In 2001, the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001 ROD; USDA and USDI 2001) modified the management direction provided in the NWFP ROD

for S&M and protection buffer species and amended BLM and Forest Service land management plans in the range of the NSO accordingly. For the S&M Standards and Guidelines, the major elements were retained with some restructuring for clarity, and criteria and processes for changing species assignments in the future were developed. The list of S&M species was also modified to remove 72 species in all or part of their ranges because new information indicated they were secure or otherwise did not meet the basic criteria for S&M. Species remaining on the list were assigned to one of six categories (A-F) (see Table INTRO-2), which was based on their level of relative rarity, the ability to reasonably and consistently locate occupied sites during surveys prior to habitat disturbing activities, and the level of information known about the species or group of species. The 2001 ROD also removed the direction specific to protection buffer species, but some of these species were included in the S&M Standards and Guidelines. As part of the 2001 Standards and Guidelines, objectives, criteria, and management direction were defined for each category. Specific criteria were also established to add, remove, or change species categories based on new information and as part of the annual species review processes. Although some species covered by the S&M Standards and Guidelines also occur on non-federal lands and outside the NSO range, the requirements of the 1994 NWFP and 2001 RODs apply only to lands managed by the BLM and Forest Service within the range of the NSO.

Table INTRO-2

Survey and Manage Categories

Relative Rarity	Pre-Disturbance Surveys Practical	Pre-Disturbance Surveys Not Practical	Status Undetermined
Rare	Category A - Manage all known sites - Pre-disturbance surveys practical - Strategic surveys necessary	Category B - Manage all known sites - Strategic surveys necessary	Category E - Manage all known sites - Pre-disturbance surveys not applicable - Strategic surveys necessary
Uncommon	Category C - Manage high-priority sites - Pre-disturbance surveys practical - Strategic surveys necessary	Category D - Manage high-priority sites - Strategic surveys necessary	Category F - Management of known sites is not required - Pre-disturbance surveys not applicable - Strategic surveys necessary
Source: USDA and USDI 2001			

1.3.2 Litigation and Settlement Agreement Modifications

In 2004 and again in 2007, the BLM and Forest Service issued a ROD to eliminate the S&M requirements of the 2001 ROD and to provide protection for species on the S&M lists by managing them under the agencies' special-status species programs. As a result of litigation (Conservation Northwest v Rey. Case No. C08-1067-JCC (W.D. Wash. Dec. 17, 2009)) the requirements of the 2001 S&M ROD were reinstated. As a result of a court-mandated settlement agreement in litigation on the 2007 ROD (Conservation Northwest v Sherman Case No. C08-1067-JCC (W.D. Wash. July 5, 2011), modifications to the S&M Standards and Guidelines were again made; however, the 2011 Settlement Agreement was set aside by the Ninth Circuit Court of Appeals in 2013, and the 2001 ROD was reinstated. The judges in this case made no ruling regarding the Annual Species Reviews previously completed in 2001, 2002, and 2003.

As a result of the 2013 Court decision, this assessment was completed using the Survey and Manage Standards and Guidelines and species list of the 2001 ROD. The 2001 list is included as

Attachment A and identifies the species considered in this report, based on their documented presence in or near the PCGP Project corridor and associated roads and work areas.

1.3.3 Forest Trends and Effectiveness Monitoring of the Northwest Forest Plan

Based on an analysis of forest trends conducted by Strittholt et al. (2006), old-growth forests (a component of LSOG forests) have experienced a decline over the past couple of centuries as a result of timber harvesting and other activities that have removed old and mature trees. Old-growth forests (defined as forests greater than 150 years old by Strittholt et al. 2006; note that this definition deviates slightly from the 2001 ROD definition for old-growth) encompassed an estimated 16.1 million hectares in the Pacific Northwest during the 1800s. By 2000, the extent of old-growth forests had declined by an estimated 70 percent, totaling approximately 4.7 million hectares. Since the inception of the Northwest Forest Plan and based on a similar analysis of forest trends conducted by Moeur et al. (2011), LSOG forests (defined as medium and large older forest with greater than 10 percent canopy cover and conifer trees with diameters larger than 20 inches by Moeur et al. 2011; note that this definition was generally based on the LSOG definition in the 2001 ROD) have declined by less than 2 percent on federal-managed lands and less than 10 percent on other land ownerships (Moeur et al. 2011). These declines are primarily a result of wildfire on federal-managed lands and a result of timber harvest on other lands. An estimated 10.6 million acres of LSOG forests existed in the NSO range in 2006–2007, with 67 percent of this acreage on federal-managed lands and 75 percent of the total in reserve land allocations (based on estimates in Moeur et al. 2011). These analyses of forest trends generally demonstrate that older, mature forests have declined across the Pacific Northwest over the past 200 years, with a slower decline in LSOG forests since 1994.

1.3.4 Management Recommendations

Jointly, the BLM and Forest Service have developed management recommendations for most S&M species or groups of species, and additional research on many species has generated useful background information on the species to aid in management decisions. In addition, conservation assessments have been prepared for many species to update information and management recommendations for the species. Management recommendations are documents developed by taxa experts and land managers that provide guidance about conserving S&M species and direction on managing known sites. The documents describe what is known about the habitat or life history requirements of the species and discuss management recommendations that correspond with the level of protection intended in the Standards and Guidelines of the respective agency's land management plans. The management recommendations identify management goals and objectives and general or specific direction or requirements for species, depending on the amount of information known about the species. For some species, specific information may be identified on sizes (e.g., width) of buffers to be applied to a known location of a species and what management activities are appropriate for maintaining one or more habitat components. Some recommendations may also allow loss of some individuals, areas, or elements not affecting continued site occupancy. In many cases, the need for more information and research is identified to further refine the management recommendations, support management of known sites, identify high-priority sites, and identify survey priorities.

1.3.5 Proposed Amendment of Land Management Plans

Management recommendations for S&M species generally require protection of known sites. Because of construction requirements and the linear nature of pipelines (see Figure INTRO-1), it is not possible for the PCGP Project to comply with the agency's land management plans as proposed in the draft ROW Grant application. Therefore if the PCGP Project is certificated by the Federal Energy Regulatory Commission, the BLM and Forest Service are proposing an amendment to the respective land management plans to waive the Management Recommendations that require protection of known S&M species sites within the PCGP Project corridor in the Coos Bay, Roseburg, and Medford BLM Districts and the Klamath Falls Resource Area of the Lakeview BLM District and on the Umpqua, Rogue River, and Winema National Forests in order to make provision for the PCGP Project. This proposed amendment is specific to the actions that could be authorized by BLM under a ROW Grant and would not remove or change species to which the S&M Standards and Guidelines apply or change species categories. The proposed amendments to the respective land management plans would not exempt the agencies from the requirements of the 2001 S&M ROD to maintain species persistence within the range of the NSO. If a reasonable assurance of species persistence is not maintained, the agencies would require avoidance of sites where the species is found or would decline to adopt the land management plan amendment.

1.4 OTHER LISTING AND SPECIES STATUS CATEGORIES

In addition to the S&M status, the state (Oregon), federal, and global listing statuses of each species was reviewed to assist with the discussion on the rarity of each species in support of the persistence evaluation. In Oregon, the Oregon Department of Fish and Wildlife maintains a list of native fish and wildlife species that meet the state requirements for listing as threatened and endangered (OAR 635-100-0105), and the Oregon Department of Agriculture maintains a list of threatened and endangered plant species (ORS 564.105 and OAR 603-073). The U.S. Fish and Wildlife Service maintains lists of threatened and endangered plant and wildlife species that are protected under the Endangered Species Act (50 CFR 17.11 and 17.12). The BLM and Forest Service also have lists of species considered "sensitive" on their lands, which are managed in accordance with Section 2670 of the Forest Service Manual and Section 6840 of the BLM Manual. NatureServe and local natural heritage or conservation centers also identify state and global rankings for species based on their known ranges and distributions and information provided by state and federal agencies. The Oregon Biodiversity Information Center (ORBIC) evaluates the NatureServe ranks and further refines the data for state application by placing species on their Lists 1 to 4. List 1 species are threatened with extinction; List 2 species are threatened with extirpation; List 3 species require more information; and List 4 species are of conservation concern. The BLM and Forests Service use these lists to identify Sensitive and Strategic species; List 1 and 2 species are considered Sensitive, and List 3 species are considered Strategic. Definitions of the state and global ranking systems and the list categories are available on the ORBIC website (http://orbic.pdx.edu/rte-defs.html). None of the species on the S&M list are listed under the Endangered Species Act, but several species are considered Sensitive or Strategic species by the BLM or Forest Service.

1.5 METHODOLOGY FOR PERSISTENCE EVALUATION

This section presents an overview of the species evaluations and summarizes the methodology used to evaluate the effects of the PCGP Project on S&M species and determine if the PCGP

Project would threaten species persistence of each affected species in the NSO range. The S&M species considered in this report are listed in Attachment A; these species have sites documented within the analysis areas used for the persistence evaluation (additional details on the analysis areas are provided in Section 1.5.5 below). Key terms used throughout this report are defined in the Glossary in Attachment B. Additional information on the spatial analysis processes and geographic information systems (GIS) data used to conduct the analysis is provided in Attachment C.

1.5.1 Format of Species Sections

Each S&M species considered in this report has its own section that consists of the following subsections (each subsection serves a specific purpose to support the evaluation, as noted below):

- **Regulatory Status and Ranking**: presents the S&M status of the species, as well as global and state (Oregon) rankings and other agency statuses that help demonstrate how rare or common the species appears to be.
- **Background Information**: includes descriptions of the species' life history, known range, population status, habitat requirements, threats, and management recommendations; this information captures what has been published or previously documented about the species, including recent survey results specific to the PCGP Project, and presents the previously known information (or information available prior to conducting the analyses).
- **Persistence Evaluation**: discusses the distribution of the species using the most current information on sites, evaluates impacts to sites from the PCGP Project, and summarizes the information on distributions and impacts to support the determinations made for each species; the distribution information, in combination with the background information, was used to determine the need for a more focused analysis.
- **Conclusions**: presents a determination regarding whether remaining sites (i.e., those not affected by the PCGP Project and that would persist in or near the project area following project implementation) would provide a reasonable assurance of species persistence in the NSO range; when applicable, recommendations for avoiding or minimizing disturbance in sites are presented to protect sites that may be needed to provide a reasonable assurance of species persistence.

1.5.2 Data Sources

Background research was conducted on each species considered in this analysis to describe its known range, habitat requirements, life history, threats, population status, and other relevant information. The type of information collected was based on evaluation criteria presented in the 2001 ROD for assessing the level of concern or relative rarity of a species. This information was presented in the "Background Information" section for each species. The primary sources of information include agency handbooks, species factsheets, management recommendations, conservation assessments, and annual species reviews for S&M species; journal articles; ORBIC species accounts; and other species descriptions available on the Internet. Much of the information presented in the species descriptions was compiled from previous work done by Pacific Connector (the project applicant).

The 2001 ROD, BLM and Forest Service Sensitive species lists, and ORBIC website were reviewed to determine current regulatory status and rankings of each species. Each species' status and ranking were presented in the "Regulatory Status and Ranking" section and used to discuss how rare or common the species is.

GIS data were also compiled from BLM and Forest Service geodatabases (NRIS and GeoBob) to discuss the distribution of each species for the "Persistence Evaluation" section. These data are based on the results of surveys conducted over the past 20-plus years and include new information on species locations that was not available during annual species reviews. It should be noted, however, that the data only include observations that have been recorded and entered into the geodatabases and are not intended to provide information on the population status of the species. For example, observations of some species may have been made incidentally or outside of formal surveys (e.g., by mushroom collectors or enthusiasts) and are not necessarily included in the geodatabases. Also, surveys have not been conducted extensively across the NSO range for most species, and detectability of some species (e.g., fungi, lichens) can affect observations of the species, even with formal surveys. Specific survey limitations for fungi result from the species not necessarily fruiting each year and the deviations in seasons when the various S&M fungi may fruit, requiring surveys throughout the year and over the course of several years to obtain the best information on their locations. Pre-disturbance surveys for many species were also not required prior to 2011 (for fungi) and 2006 (for bryophytes and lichens). The geodatabase data only reflect where observations of species have been recorded, and it is likely that many species may be found in other previously unsurveyed locations or even where surveys have been conducted, but at the wrong time.

The agency geodatabase data were converted into sites using a GIS-based tool, as discussed in Section 1.5.4 Spatial Analyses. Additional GIS data were used to map forests and evaluate the distribution of the species across different land ownerships and land use allocations on BLM and NFS lands (see Attachment C for list of key data used). This information was also presented in the "Persistence Evaluation" section.

1.5.3 Project Surveys

The project proponent retained Siskiyou BioSurvey LLC to conduct surveys for S&M species on federal lands in the PCGP Project area between 2007–2008 and 2010–2012. Surveys were conducted by qualified botanists and biologists, trained in the taxonomy and identification of the species being surveyed for, and vouchers or specimens of the observed species were submitted to the agencies for verification. These surveys were based on the S&M lists and survey requirements in effect at the time of the survey, and incidental observations of species not requiring surveys were also recorded. After the 2011 S&M list became available through the settlement agreement, surveys included any new species that required surveys. All surveys were consistent with the 2001 S&M list and established protocol. An overview of the methodology for surveys for each group of species is presented below, and additional details on the survey areas and other details are available in the reports prepared by Edge Environmental (2011, 2013) and Siskiyou BioSurvey LLC (2008, 2011a-c, 2012a-b). Results of the surveys are presented as part of the discussion of population status in the "Background Information" section for each species in this report, and the observations resulting from these surveys were compiled in agency geodatabases, after verification of the species observations by the agencies, and converted to sites for use in the "Persistence Evaluation" section. Agency botanists, biologists, and specialists

in S&M species provided direction on the survey protocol and reviewed the results of the surveys.

Fungi

Surveys for one Category A fungus (*Bridgeoporus nobilissimus*) were conducted, along with surveys for vascular and non-vascular plants, between spring of 2007 and the fall of 2008 on approximately 1,331 acres within the Coos Bay and Roseburg BLM Districts (Siskiyou BioSurvey LLC 2008). Between 2010–2012, 2-year equivalent effort surveys were conducted for Category B fungi in old-growth coniferous forest to satisfy the requirements of the 2001 ROD (Siskiyou BioSurvey LLC 2012a). Surveys in 2010 and spring 2011 targeted Category B species identified in the 2001 ROD; after implementation of the 2011 Settlement Agreement, surveys targeted Category B species on the revised S&M list, but continued to record or document species that were removed from the 2001 list. Fungi surveys in 2010–2012 were conducted according to the protocols described in *Sporocarp Survey Protocol for Macrofungi, Version 1.0* (for 2007–2008 surveys) and *Survey & Manage Category B Fungi Equivalent-Effort Survey Protocol, Version 1.0* (for 2010–2012 surveys) (Van Norman et al. 2008, 2012). Two survey visits were conducted during each spring and fall season during two consecutive years. Surveys were conducted within old-growth stands in the PCGP Project area and within a 100-foot buffer of the project corridor, creating a survey unit width that ranged generally from 250 to 300 feet. Old-growth stands were defined as those stands equal to or older than 180 years that have met the generally accepted definition of "old-growth" forest found in the 2001 ROD. Approximately 565 acres within about 43 survey units were surveyed: 15 acres within Coos Bay District, 156 acres within Roseburg District, 180.7 acres within Umpqua National Forest, 9.7 acres within Medford District, 146.3 acres within Rogue River-Siskiyou National Forest, and 57.3 acres within the Fremont-Winema National Forest. Surveys were initiated in 2011 on approximately 12.9 acres within a 100-foot buffer along access roads identified in the TMP to be improved or widened.

Additional persistence surveys were conducted for fungus species that were determined to be rare at a watershed level or were determined to be rare within the range of the NSO. Persistence surveys included several levels, ranging from 100-meter evaluations around identified "rare" fungi to extensive surveys in LSRs to augment information about selected species. Persistence surveys were conducted in 44 areas adjacent to the project area, on LSR lands near the project area, and in the Cascade-Siskiyou National Monument.

Lichen

Surveys for Category A, B, and C lichen from the 2004 list were conducted between spring 2007 and the end of 2008 on approximately 7,900 acres (Siskiyou BioSurvey LLC 2008). Additional surveys were conducted in 2010 on approximately 288.7 acres to survey the modified areas of the PCGP Project area not previously surveyed, to verify locations of previously recorded occurrences, and to conduct persistence surveys for some species, as done for the fungi (Siskiyou BioSurvey LLC 2011a). Surveys were conducted according to *Survey Protocols for Survey and Manage Category A & C Lichens in the Northwest Forest Plan Area, Version 2.1* (Derr et al. 2003). Full coverage complete surveys were conducted within the PCGP Project area, and the intuitive-controlled method was used in suitable habitat within 200 feet on either side of the PCGP Project corridor and 50 feet on either side of proposed TMP access roads. The persistence

surveys were conducted for certain species (i.e., those that were determined to be locally or regionally rare) in suitable habitat within 0.25-mile around the documented population or observation in the survey area.

Bryophytes

Surveys for bryophyte species were conducted on approximately 7,900 acres in the PCGP Project area, focusing on BLM and Forest Service Sensitive species, but also targeting S&M bryophyte species (Siskiyou BioSurvey LLC 2008). Surveys were conducted in suitable habitat within 200 feet on either side of the PCGP Project corridor and 50 feet on either side of proposed TMP access roads. No bryophytes on the 2001 S&M list were found in the surveyed areas.

Vascular Plants

Surveys for special-status vascular plants, including S&M plants on the 2004 list, were conducted on approximately 7,900 acres between spring 2007 and the end of 2008 (Siskiyou BioSurvey LLC 2008). Additional surveys were conducted in 2010 on approximately 288.7 acres to survey the modified areas of the PCGP Project area not previously surveyed, to verify locations of previously recorded occurrences, and to conduct persistence surveys for wayside aster (*Eucephalus vialis*) within 0.25 mile of the previously documented occurrence (Siskiyou BioSurvey LLC 2011a). Surveys were conducted according to *Survey Protocols for Survey and Manage Strategy 2 Vascular Plants (Version 2.0)* (Whitaker et al. 1998). Full coverage complete surveys were conducted within the PCGP Project area, and the intuitive-controlled method was used in suitable habitat within 200 feet on either side of the PCGP Project area and 50 feet on either side of proposed access roads.

Mollusks

Surveys for Category A and B mollusks from the 2004 list were conducted on approximately 1,561 acres in 2007, including one spring visit and one fall visit (Siskiyou BioSurvey LLC 2008). Additional surveys were conducted in areas modified in the PCGP Project area in 2010 on approximately 290 acres in 17 survey units (Siskiyou BioSurvey LLC 2011b). The surveys were conducted within 100 feet on either side of the PCGP Project corridor in accordance with the *Survey Protocol for Survey and Manage Terrestrial Mollusk Species from the Northwest Forest Plan, Version 3.0* (Duncan et al. 2003).

Great Gray Owl

Surveys for great gray owls were conducted in suitable habitat in the PCGP Project area in accordance with the *Survey Protocol for the Great Gray Owl within the Range of the Northwest Forest Plan, Version 3.0* (Quintana-Coyer et al. 2004). Within the PCGP Project area, suitable habitat generally occurs east of the Coos County/Douglas County border. Six visits were conducted each year for two years, between March 24 and July 15, 2007 and March 21 and July 9, 2008, within 22 survey areas on approximately 4,442 acres (Siskiyou BioSurvey LLC 2008). Additional surveys were conducted in 2010 and 2011 on approximately 131 acres (two survey units) in suitable habitat associated with modified portions of the PCGP Project area that were not previously surveyed (Siskiyou BioSurvey LLC 2011c). Surveys in 2010 were initiated too late in the season (June); therefore, only three visits between May 15 and July 15 were conducted. The 2011 Settlement Agreement identified a revised survey protocol for great gray

owls that only required six visits for one year, rather than two years; thus, the 2011 surveys consisted of six visits within each unit to complete the survey effort.

Red Tree Vole

Surveys for red tree voles were conducted in 2007 in the xeric biological zone in the PCGP Project area and within a 150-foot buffer of the project corridor, generally between milepost 109.9 and 121.6, on approximately 314 acres in the Medford BLM District and on the Umpqua National Forest (Siskiyou BioSurvey LLC 2008). Surveys were conducted in accordance with the *Survey Protocol for the Red Tree Vole, Version 2.1* (Biswell et al. 2002). Version 2.2 of the survey protocol was completed in 2003, and it released six watersheds from pre-disturbance requirements; these watersheds are not crossed by the PCGP Project corridor. The purpose of the surveys was to identify active and inactive nests in and near the project area (Siskiyou BioSurvey LLC 2012b). Where potential nest sites were identified in trees during ground survey efforts, the trees were climbed to verify the status of the nest (i.e., active, inactive, other). Surveys for the "mesic biological zone" were initiated in the PCGP Project area and within a 150-foot buffer in 2010 after the S&M litigation (December 2009) required red tree vole surveys in the mesic zone. Surveys in the mesic biological zone were conducted between September 2010 and June 2012, generally between milepost 27.1 and 109.6, on approximately 825 acres within 43 survey units in the Coos Bay and Roseburg BLM Districts and on the Umpqua National Forest.

1.5.4 Spatial Analysis

The BLM and Forest Service maintain geodatabases of recorded S&M species observations in California, Oregon, and Washington (geodatabases are referred to as GeoBob and NRIS, respectively). The BLM spatial data include point files of collections (for flora) and observations (for fauna) and polygon files of buffered observations (for flora) and nest sites or other important areas (for fauna). The Forest Service spatial data include polygon files for flora and fauna species observations, based on a buffer around a recorded observation (generally 10 meters to account for spatial accuracy). These data were standardized for use in this analysis by converting the original observation data into a polygon geodatabase feature to establish sites using a Feature Manipulation Engine (FME) tool; additional details on this process can be obtained from the agencies upon request. Within each site, multiple points or observations may have been recorded, and the converted polygon accounts for those observations that are near each other. The sizes of sites vary based on the proximity and size of the original observation data and the buffer distance around the original data, which is consistent with the buffers used in annual species reviews and other planning and analysis purposes over the past 12 years. These buffers include 50 meters (164 feet) around original data for fungi, lichens, bryophytes, plants, and red-tree vole; 36 meters (120 feet) for amphibians; and no buffer for mollusks and great gray owl. Overlapping buffers were dissolved or combined using the tool to create a single site for observations within the overlapping polygons. Using this method, the sizes and shapes of sites vary for each species and depend on the proximity of observations to one another.

For all species except red tree vole, the resulting polygon site data (FME sites) were used for the persistence evaluation and were further queried or refined using other available GIS data, such as land allocations, reserve boundaries, ownership, project data, and vegetation/forest cover layers. The FME sites for red tree vole were further modified according to the management

recommendations for the species (Forest Service and BLM 2001). Those sites within 100 meters of the project area were modified to establish habitat areas around active and inactive nest sites using the original observation data from NRIS and GeoBOB. Guidance from the management recommendations on how to define habitat areas was used to create new polygons, which were then used for the analysis of impacts on red tree vole sites.

Land use allocation data were obtained from the BLM and Forest Service Regional Ecosystems Office using derived from a GIS dataset that was developed in 2009 and included land allocations consistent with the NWFP ROD for federal lands in the NSO range. Although more recent data are available for some BLM and NFS lands, the 2009 regional data provide sufficient representation of the different land allocations for purposes of this analysis and represent the best information available to the agencies that is applicable at the scales used in the analysis (i.e., regional, local, analysis, project, as defined below) and consistent with the NWFP ROD allocations.

The land use allocation data were used to identify reserve lands, which were defined as BLM and NFS lands with allocations of "Congressionally Reserved" (e.g., Wilderness) or "Late Successional Reserve" (including occupied marbled murrelet stands [LSR3] and known owl activity centers [KOAC, LSR4]), as recognized and defined in the 1994 ROD, in combination with the National Hydrography Dataset from the U.S. Geological Survey, which was used to map Riparian Reserves across the NSO range. Regional datasets of Riparian Reserves were not available from BLM or Forest Service for this analysis, although each BLM and Forest Service management unit has a unique GIS layer used to portray Riparian Reserves; albeit at various scales and degrees of field verification. For consistency at multiple scales, and across the various BLM and Forest Service management units, this analysis used the National Hydrography Dataset to determine locations of Riparian Reserves; this dataset was clipped to only cover those lands in the "Other/Matrix" allocation of the regional land allocation dataset. Using this approach, the extent of Riparian Reserves is likely underestimated across the region.

Original vegetation data from the Landscape Ecology, Modeling, Mapping, and Analysis team (Forest Service and Oregon State University staff) were used to map and estimate the extent of forests across the NSO range. These data had been used for the Northwest Forest Plan Effectiveness Monitoring 15-year report to map LSOG forests (Moeur et al. 2011) and provided a consistent dataset for mapping forests across the NSO range. Because each S&M species has narrower habitat requirements, the extent and distribution of forests that could provide habitat for the species using the vegetation data is much greater than where the species' habitat is likely found. Regional data were not available to accurately map or estimate all types of potential habitat or specific microsite conditions that are preferred by S&M species, such as moist understories, closed or open canopies, or wet areas. Digital elevation models from the U.S. Geological Survey were also used to obtain elevation information about the locations of sites in the NSO range and to map and estimate the extent of forests at different elevation ranges, depending on the species' general habitat requirements. A list of key datasets used for the analysis is included in Attachment C, and a complete list of GIS data used for the analysis is part of the Project Record.

1.5.5 Evaluation of Persistence

This report is intended to present the facts, evaluate the evidence, and draw conclusions on the impacts of the PCGP Project with respect to the persistence objectives for S&M species defined in the 2001 ROD. The BLM and Forest Service will use the information provided in this report to make a persistence finding for each species potentially affected by the PCGP Project in their decision documents. The intent of this evaluation is to determine the extent of the PCGP Project's effects on S&M species, specifically through the quantification of the number of sites and acreage of forests affected by project-related activities and the effects on the distribution of the species and potential habitat within the NSO range. The extent of impacts to sites and the species found within those sites was considered in combination with background and new information on the species to determine if remaining sites (i.e., those not affected by the PCGP Project and that would persist in or near the project area following project implementation) would provide a reasonable assurance of species persistence in the NSO range.

Evaluation Factors

The 2001 ROD outlines criteria to consider during annual species reviews and regional reviews of the status of species to assess the level of concern for persistence of a species and the relative rarity of a species for which a concern has been identified. Although the criteria themselves support a different purpose, they were used as guidance to present applicable information in support of the conclusions made for each species regarding the reasonable assurance of species persistence. The 2001 ROD does not provide a clearly defined process to analyze project-level impacts on species persistence, nor could a project-level analysis develop the type of information needed to address those criteria in the ROD at their intended scale. This analysis seeks to determine whether sites of S&M species affected by the PCGP Project would continue to provide a reasonable assurance of persistence in the NSO range if the PCGP Project is constructed. Accordingly, the BLM and Forest Service adapted the criteria from the ROD to address that question at the project scale. It is important to note that this persistence evaluation is not intended to lead to a change in category for any species or the removal of any species from the S&M list. Although new information available for this evaluation (e.g., survey results, sites generated by the FME tool) may demonstrate that a species appears to be more common than when it was last addressed in an annual species review, additional assessment and determinations through an annual species review process would be necessary to modify the species' S&M status.

The 2001 ROD criteria used to assess the concern for persistence include:

- Criteria indicating a concern for persistence[1]:
    - Low-to-moderate number of likely extant known sites/records in all or part of a species range.
    - Low-to-moderate number of individuals.
    - Low-to-moderate number of individuals at most sites or in most populations.

[1] Per the 2001 ROD, one or more of the criteria, which are to be considered in the context of the reserve system and other standards and guidelines of the Northwest Forest Plan, may indicate a concern for species persistence. The criteria must be considered aside from the Survey and Manage provisions and must apply within the Northwest Forest Plan area.

  - Very-limited to somewhat-limited range.
  - Very-limited to somewhat-limited habitat.
  - Distribution within habitat is spotty or unpredictable in at least part of its range.
- Criteria indicating little or no concern for persistence[2]:
  - Moderate-to-high number of likely extant sites/records.
  - High proportion of sites and habitat in reserve land allocations; or limited number of sites within reserves, but the proportion or amount of potential habitat within reserves is high and there is a high probability that the habitat is occupied.
  - Sites are relatively well distributed within the species range.
  - Matrix Standards and Guidelines or other elements of the NWFP (e.g., LSR and Riparian Reserves Standards and Guidelines) provide a reasonable assurance of species persistence.

The 2001 ROD criteria used to assess relative rarity include:

- A species may be "rare" if it has:
  - A limited distribution,
  - A low number of sites (or individuals per site),
  - Highly specialized habitat requirements,
  - Declining habitat or population trends,
  - Reproductive characteristics that limit population growth rates,
  - Restricted distribution pattern relative to range or potential habitat, and/or
  - Narrow ecological amplitude.
- A species may be "uncommon" if it has:
  - A more widespread distribution,
  - A higher number of sites,
  - A low-to-high number of individuals per site,
  - More stable populations or habitats,
  - Less restricted distribution pattern relative to range or potential habitat, and
  - Moderate-to-broad ecological amplitude.

To support the project-level analysis of species persistence for the PCGP Project, background and current information on each S&M species that could be affected by the project was compiled and presented to address the following factors derived from the above criteria:

- Range of the species, in terms of being locally endemic or found globally;

[2] Per the 2001 ROD, usually, most of the criteria need to be met to indicate that a concern for persistence does not exist. These criteria must apply within the Northwest Forest Plan area.

- Rarity status or rankings across its range within the NSO range as well as globally and across Oregon;
- Relative distribution of the species across its known range based on agency geodatabases;
- Current range or distribution compared with known information on historic range or distribution;
- Distribution patterns across the range of the NSO, locally, and in and near the project area, in terms of being well distributed or spotty and unpredictable;
- Locations of sites on Matrix versus reserve lands (i.e., proportion of sites in reserves) and on federally managed versus private or other lands at different scales (regional, local, project);
- Stability of known populations and normal fluctuation patterns;
- Risk factors or threats to populations; and
- Extent of forests that could provide habitat across different scales (regional, local, project) and proportion of those forests in reserve land allocations[3].

Incomplete or Unavailable Information

This analysis was conducted using the best available information and data on S&M species for the factors listed in the previous section. Council on Environmental Quality regulations 40 CFR 1502.22 require a discussion of incomplete or unavailable information. Information was unavailable for:

- **Total populations of S&M species beyond those represented in the geodatabases of the agencies used in this report.** Although a statistically reliable region-wide survey has been done for most of the S&M species, the results of those surveys have not been biologically interpreted, and the results have not yet been published. In absence of a published interpretation of the results of those regional surveys, this assessment relies on the known sites of affected species that have been inventoried and recorded in the known site geodatabases of the BLM and Forest Service. This data constitutes "best available information" for populations of S&M species.
- **Total acres of the specialized microsites and habitats used by certain S&M species.** This analysis was completed using geodatabase records of observations (i.e., "known sites"), regionally available vegetation inventory data, and evaluation criteria developed from the 2001 ROD. In many cases, S&M species rely on specialized habitats that may not be catalogued in agency geodatabase records or vegetation inventories. This is one of the reasons why pre-project surveys are required for S&M species. Habitat requirements for each of the species considered are discussed in detail in each species' section, to the extent the information is available from previous literature. In this assessment, estimates are provided of the general forests where specialized habitats may be found, but these should not be interpreted as the actual acres of available specialized habitats; the actual

[3] Data, such as microsite-level habitat conditions, were not available at the regional scale to accurately map or estimate the extent of habitat for each species. The best available regional data of forest cover were used to map general habitat or forests that could provide habitat for the species, which overestimates the extent of potential habitat.

acres of available specialized habitats are typically a fraction of the general forest description. For example, some mollusks rely on moist microsites found in late-successional coniferous forests. A regional inventory of late-successional coniferous forests is available, but a regional inventory of moist microsites is not; many, many more acres of late-successional forests exist than acres of moist microsites within those forests. This assessment identifies sites and broad habitat classifications such as "late-successional coniferous forests below 6,000 feet" where specialized habitats and the species in question may be found, but makes no estimates of, nor does the analysis rely on, estimates of specialized habitats that may exist within those broad vegetation categories.

- **Recovery of occupied sites after disturbance.** S&M species are by definition associated with LSOG forests. The construction corridor and TEWAs will be reforested and replanted with native vegetation similar to what occupied the project area prior to disturbance. It will be at least 80 years before those areas provide late-successional habitat. A 30-foot-wide maintenance corridor centered along the pipeline would be maintained in low growing brush and grass vegetation (no trees) for the life of the project. When the project is decommissioned, it would be an additional 80 years before this strip provides late-successional stand characteristics. Information is not generally available as to how quickly, or if the affected S&M species will, reoccupy these areas. This analysis presumes that if the "site" is within the construction clearing or TEWAs, the project would result in a long-term loss of that site. This analysis does not speculate on when or if the affected species may recoccupy the site.

Areas Used for Analysis

The regional area discussed in this report for purposes of analyzing the distribution patterns of each species and forests that could provide habitat on BLM and NFS lands is the range of the NSO, which encompasses approximately 58.2 million acres (23.6 million hectares), including 24 million acres of BLM and NFS lands, in western Washington, western Oregon, and northwestern California (see Table INTRO-3 for overview of areas). The focus of the regional distribution is on the currently known species' range, which is generally where sites have been documented, within the NSO range. The local area includes the following 5th field watersheds that overlap the PCGP Project area (presented alphabetically in this report): Big Butte Creek, Coos Bay Frontal, East Fork Coquille River, Elk Creek-South Umpqua, Klamath River-John C. Boyle Reservoir, Lake Ewauna-Upper Klamath River, Little Butte Creek, Lower Coquille River, Lower Lost River, Middle Fork Coquille River, Middle South Umpqua River, Myrtle Creek, North Fork Coquille River, Olalla Creek-Lookingglass Creek, Rogue River-Shady Cove, South Umpqua River, Spencer Creek, Trail Creek, Upper Cow Creek. The local area encompasses approximately 2.1 million acres, of which approximately 655,720 acres are BLM and NFS lands.

An analysis area was established to identify S&M species that may be directly or indirectly affected by the PCGP Project. This area was established by creating a buffer around the PCGP Project area. The PCGP Project area includes the project corridor, associated work areas, and the access roads subject to improvements or modifications pursuant to the TMP. For analysis purposes for most S&M species (fungi, lichens, bryophytes, plants, and mollusks), a 50-meter buffer was established around the project area to identify sites that could be affected by the PCGP Project. The sites for fungi, lichens, bryophytes, and plants also include a 50-meter buffer

around the recorded observation of the species using the FME tool, which ensures that any observations of these species up to 100 meters away from the project area are addressed in the analysis. This is a conservative approach to analyzing potential effects. Management recommendations for great gray owl and red tree vole provided guidance for the analysis areas for those species. A 1-mile buffer around potential blasting areas and a 0.25-mile buffer around other project activities were established as the analysis area for great gray owl. The red tree vole analysis area encompassed 100 meters around the PCGP Project area based on the site potential tree distance (approximately 150–250 feet in the project vicinity) and buffers used for other species (to maintain consistency).

The analysis area for the non-vertebrate species encompasses approximately 5,220 acres of BLM and NFS lands, and the PCGP Project area encompasses approximately 1,580 acres of BLM and NFS lands (see Table INTRO-3). The great gray owl analysis area encompasses approximately 199,980 acres, including 73,180 acres of BLM and NFS lands. The red tree vole analysis area encompasses approximately 29,960 acres, including 8,740 acres of BLM and NFS lands.

Table INTRO-3

BLM and NFS Lands in Regional, Local, and Project Areas

Lands	Regional Area	Local Area	Analysis Area*	Project Area
BLM	2,848,620	441,940	3,250	990
NFS	19,704,740	213,780	1,970	590
Total BLM and NFS Lands	**22,553,360**	**655,720**	**5,220**	**1,580**
Total All Lands	**58,231,600**	**2,071,500**	**18,240**	**8,230**

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Note: Areas are presented in acres.
*Analysis area is the 50-meter buffer of the project area used for fungi, lichens, bryophytes, plants, and mollusks.

Analysis Process

The general assessment of each species included a literature review and Internet research to compile background information on the species; a review of the site data generated from the spatial analysis process described above; a discussion of the regional, local, and analysis/project area distributions; mapping of general habitat for each species using the data described above; and an evaluation of the PCGP Project's impacts on the S&M sites on BLM and NFS lands within the range of the NSO. For many species, limited information is available on their ranges, life histories, and habitat requirements, and published and agency source documents were compiled and reviewed to describe this information to the level of detail available. The distribution patterns of the species at different scales were described based on the GIS data (FME sites) and required additional spatial analyses to present the number of sites in different land allocations, land ownerships, and agency boundaries across the three scales (regional, local, and analysis/project areas) and to estimate the extent of forests that could provide habitat in the regional, local, and project areas. This information was used to describe the general distribution of the species in terms of sites being isolated or clustered and scattered/spotty/sparse or well-distributed, as well as the potential for other sites to exist in the NSO range. Information on general habitat (i.e., forests that could provide habitat) for the species across the three scales was also presented using GIS data. All of this information was used to assess the effects of the PCGP Project on persistence of the species and support the conclusions made for each species using the factors listed under "Evaluation Criteria" above.

The final level of review entailed an evaluation of impacts on the sites and forests as a result of the PCGP Project. For each species, an initial analysis was conducted to quantify the extent of project-related impacts on sites using the GIS data. The methods used for this initial analysis included:

- Identify sites, as produced by the FME tool, that could be affected by the PCGP Project, either directly or indirectly, by selecting those sites that fall within, either partially or entirely, the analysis area for the species.
- Compare the number of potentially affected sites for each species to the number of sites in the NSO range and assess other factors presented in the Background Information and Species Distribution discussions for each species to determine if a more focused analysis of impacts is necessary.
- Quantify anticipated effects to the sites based on the proximity of those sites to the project area using a spatial intersect in GIS.
- Quantify and generally discuss the anticipated effects to forests that could provide habitat for the species using the GIS data and information on the species' habitat requirements.
- If a more focused analysis was determined not to be necessary, a discussion of the types of impacts expected in the sites was provided based on the results of the spatial intersect noted above.

If this initial analysis provided sufficient evidence to support a determination that the persistence objectives of the NWFP would be met for the species in question (i.e., remaining sites would provide a reasonable assurance of species persistence in the NSO range), a more focused analysis was determined not to be needed. This level of analysis was considered adequate to assess project impacts using a conservative approach (i.e., if a site fell within the analysis area, it was generally assumed that site persistence would not be maintained following project implementation) if project-related effects on the sites would not substantially alter the distribution of the species across the NSO range (e.g., the species would still be well distributed or locally abundant in the vicinity of the project area). The analysis used GIS data (e.g., FME sites, PCGP Project data) and is reproducible in that the same methods could be applied to any project using similar datasets to evaluate impacts. This is a conservative interpretation of potential effects on the species and likely overstates the impacts of the PCGP Project.

However, if this initial analysis identified that the extent of PCGP Project impacts on the site or sites could reduce the number of remaining sites such that they may not provide a reasonable assurance of species persistence or that insufficient evidence was available to support a determination that the persistence objectives of the NWFP would be met for the species, a closer evaluation of the effects on each site was conducted to further assess impacts of the project. The intent of the more focused analysis was to determine if site persistence would be maintained at any of the sites following project implementation or if measures were needed to protect or avoid the site(s). The analysis entailed a closer look at the effects of the PCGP Project on the sites and the original observations of the species within the sites (from the FME original data and/or the NRIS and GeoBOB databases). This evaluation employed professional judgment to determine whether the site in question was likely to persist after project implementation. The methods used for the more focused analysis included:

- Review the site and original observation data in GIS and determine the potential for direct impacts on the actual observations. If the only observation(s) of a species within a site were within the corridor or a TEWA, site persistence was not likely to be maintained following ground disturbance activities. If some observations were outside the corridor or TEWAs, the potential for indirect effects was evaluated.
- Evaluate indirect effects to the site and observations using aerial photographs, contour lines, forest cover data, land use and ownership data, and background on the species' habitat requirements. Professional judgment was used to determine the extent of impacts (i.e., how far out from the observation an impact would be anticipated) and potential for the species to survive near the project area. If the anticipated indirect effects associated with habitat or microclimate alterations were expected to be hostile to the species in question, the species was not likely to survive at the site. If the anticipated indirect effects were considered neutral or beneficial to the species in question, the species was likely to survive at the site after project implementation. For some species, a closer evaluation of the sites confirmed that topography, distance, or other factors reduced the potential for indirect effects (and no direct effects were anticipated), and site persistence would be maintained after project implementation.

The analysis resulted in the following general conclusions:

- Upon a closer evaluation of impacts to sites, site persistence was expected to be maintained at one or more of the sites in the analysis area. For some species, all sites were expected to persist, and the PCGP Project would, therefore, not affect the distribution of the species in the NSO range. For other species, some sites were expected to persist, while others would not likely persist, but the remaining sites in the NSO range would provide a reasonable assurance of species persistence, and the PCGP Project was not expected to affect the distribution of the species in the NSO range.
- The PCGP Project would directly affect one or more sites of a species, and those sites were determined to be important to the species for dispersal opportunities or other reasons. For these species, the PCGP Project could substantially affect the distribution of the species in the local vicinity of the project area or in the NSO range. In these cases, remaining sites may not provide a reasonable assurance of species persistence, and recommendations were developed to avoid impacts to the site(s) by re-routing the corridor away from the site(s).

1.5.6 Effects Conclusions

Based on the information compiled and analyzed for each species, a conclusion was made to state that with implementation of the PCGP Project, remaining sites (i.e., those not affected by the PCGP Project and that would persist in or near the project area following project implementation) either "would provide a reasonable assurance of species persistence" or "may not provide a reasonable assurance of species persistence." To support this conclusion, the evaluation factors listed above were addressed for each species, considering pre- and post-project site distributions and other factors, to make one of the following three conclusions:

- For species that are not necessarily more common than previously documented despite new information available from pre-disturbance surveys for the PCGP Project and/or other sources since the species were listed in the 2001 ROD, the PCGP Project would

affect site persistence of the species at one or more sites, and the remaining sites in the NSO range may not provide a reasonable assurance of species persistence. For these species, the PCGP Project could substantially alter the distribution of the species in the local vicinity of the project area or in the NSO range.

- For species that are not necessarily more common than previously documented despite new information available from pre-disturbance surveys for the PCGP Project and/or other sources since the species were listed in the 2001 ROD, the PCGP Project would affect site persistence of the species at one or more sites, but the remaining sites in the NSO range would provide a reasonable assurance of species persistence. For these species, the PCGP Project would not substantially alter the distribution of the species in the local vicinity of the project area or in the NSO range.
- For species that appear to be more common than previously documented based on new information available from surveys for the PCGP Project and/or other sources since the species were listed in the 2001 ROD, the PCGP Project would affect site persistence of the species at one or more sites, but the remaining sites in the NSO range would provide a reasonable assurance of species persistence. For these species, the PCGP Project would not substantially alter the distribution of the species in the local vicinity of the project area or in the NSO range.

1.6 AGENCY DECISIONS

The BLM and Forest Service will review the analyses contained in this report and provide a recommendation to the decision-makers regarding the finding of persistence for each S&M species evaluated in this report. The findings will ultimately be documented in the BLM and Forest Service Records of Decision for the PCGP Project.

This page intentionally left blank.

Figure INTRO-1: Pacific Connector Gas Pipeline Route on BLM and National Forest System Lands

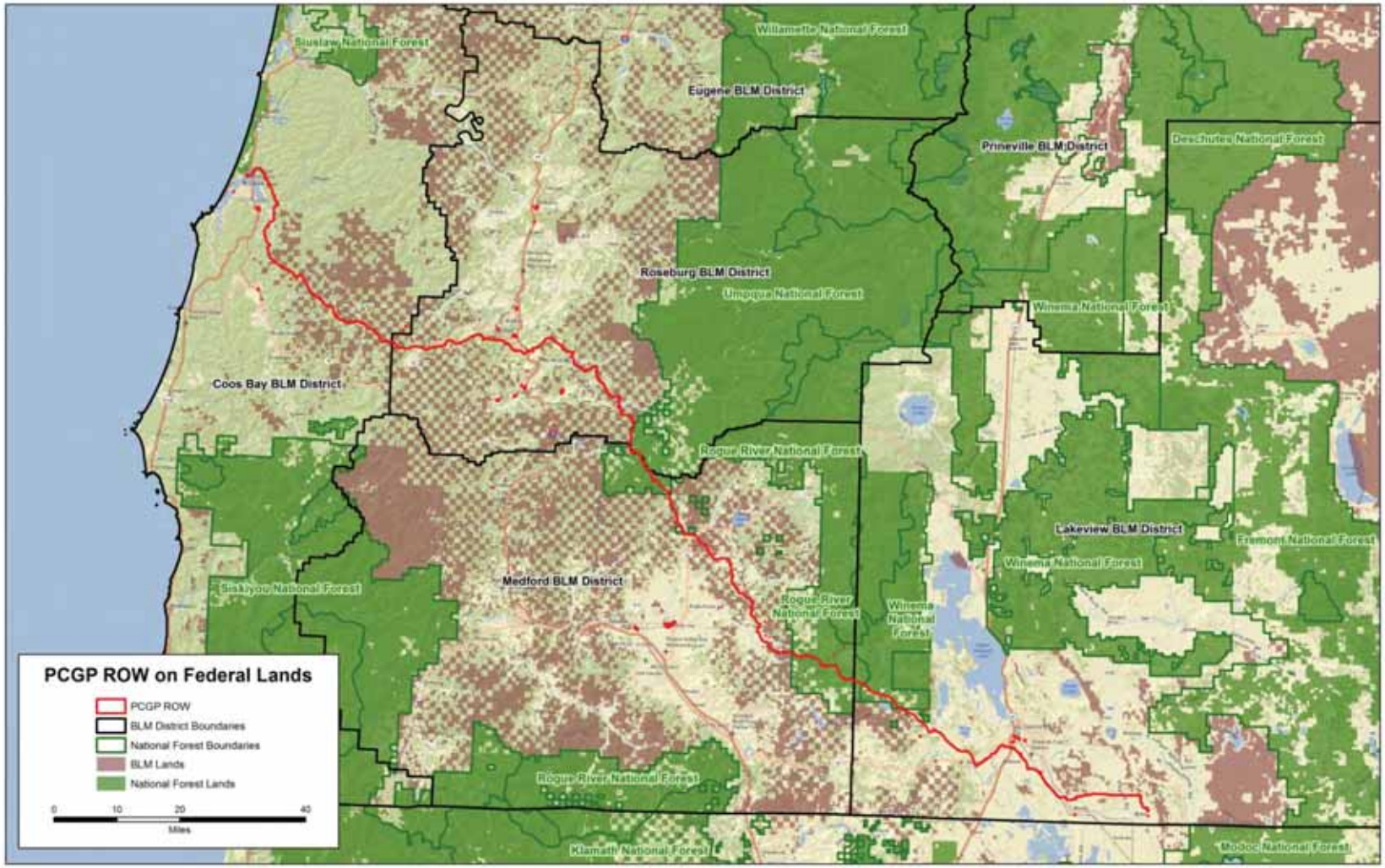


Figure INTRO-2: Typical Pipeline Construction Corridor with Temporary Extra Work Areas

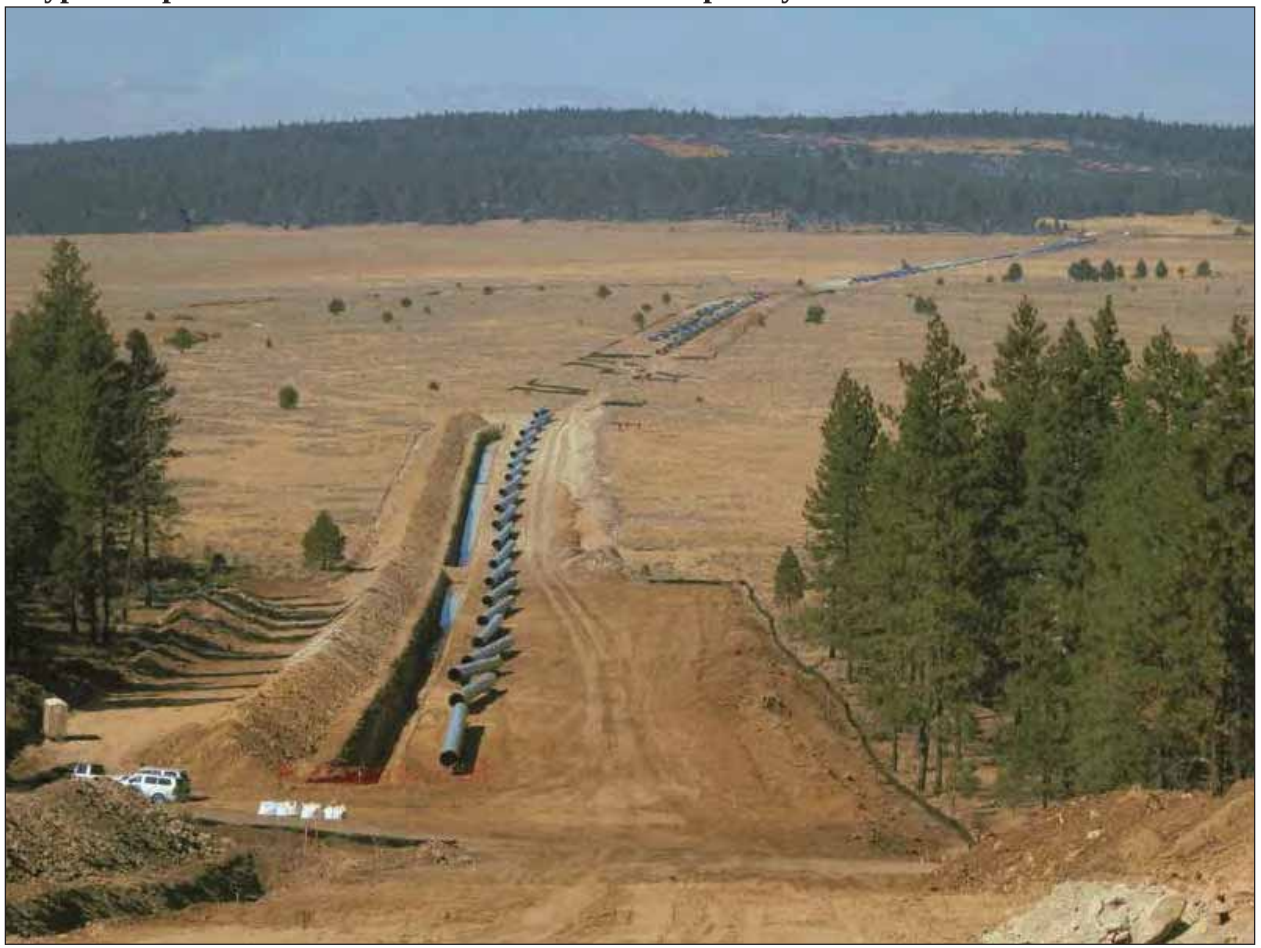


Table INTRO-1

Fifth Field Watersheds and Land Allocations Crossed by the Pacific Connector Gas Pipeline on BLM and NFS Lands

Unit	Agency	Federal Land Allocation															
		LSR				Matrix				Riparian Reserves2				All Allocations3			
		Project Area (acres)		% of Total LSR in Unit		Project Area (acres)		% of Total Matrix in Unit		Project Area (acres)		% of Total Riparian Reserves in Unit		Project Area (acres)		% of Total Allocations in Unit	
		Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified
South Oregon Coast Basin																	
Coos Bay Frontal	BLM	0.00	0.00	0.00	0.00	3.19	0.00	0.06	0.00	0.43	0.00	0.02	0.00	3.19	0.00	0.07	0.00
	NFS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**3.19**	**0.00**	**0.03**	**0.00**	**0.43**	**0.00**	**0.01**	**0.00**	**3.19**	**0.00**	**0.03**	**0.00**
Coquille River	BLM	0.00	0.00	0.00	0.00	1.37	0.00	0.05	0.00	1.21	0.00	0.11	0.00	1.37	0.00	0.05	0.00
	NFS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**1.37**	**0.00**	**0.05**	**0.00**	**1.21**	**0.00**	**0.11**	**0.00**	**1.37**	**0.00**	**0.05**	**0.00**
North Fork Coquille River	BLM	0.00	0.00	0.00	0.00	41.92	0.00	0.20	0.00	16.55	0.00	0.09	0.00	41.92	0.00	0.11	0.00
	NFS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**41.92**	**0.00**	**0.20**	**0.00**	**16.55**	**0.00**	**0.09**	**0.00**	**41.92**	**0.00**	**0.11**	**0.00**
East Fork Coquille River	BLM	18.40	3.34	0.08	0.01	20.91	1.04	0.10	0.00	3.81	0.73	0.02	0.00	39.31	4.38	0.09	0.00
	NFS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**18.40**	**3.34**	**0.08**	**0.01**	**20.91**	**1.04**	**0.10**	**0.00**	**3.81**	**0.73**	**0.02**	**0.00**	**39.31**	**4.38**	**0.09**	**0.01**
Middle Fork Coquille River	BLM	28.35	18.57	0.17	0.11	67.05	9.73	0.16	0.02	14.19	1.57	0.34	0.04	95.40	28.30	0.16	0.05
	NFS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**28.35**	**18.57**	**0.17**	**0.11**	**67.05**	**9.73**	**0.16**	**0.02**	**14.19**	**1.57**	**0.03**	**0.00**	**95.40**	**28.30**	**0.16**	**0.05**
Subtotal South Coast Subbasin	BLM	46.75	21.91	0.08	0.04	134.44	10.77	0.14	0.01	36.19	2.30	0.05	0.00	139.27	32.79	0.09	0.02
	FS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**46.75**	**21.91**	**0.08**	**0.04**	**134.44**	**10.77**	**0.14**	**0.01**	**36.19**	**2.30**	**0.05**	**0.00**	**139.27**	**32.79**	**0.09**	**0.02**
South Umpqua River Subbasin																	
Olalla-Lookingglass	BLM	3.11	0.94	0.02	0.01	15.59	4.84	0.11	0.03	0.00	0.00	0.00	0.00	18.70	5.78	0.07	0.02
	NFS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**3.11**	**0.94**	**0.02**	**0.01**	**15.59**	**4.84**	**0.11**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**18.70**	**5.78**	**0.07**	**0.02**
Clark Branch S. Umpqua	BLM	0.00	0.00	0.00	0.00	8.19	3.03	0.11	0.04	0.01	0.10	0.00	0.00	8.19	3.13	0.11	0.04
	NFS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**8.19**	**3.03**	**0.11**	**0.04**	**0.01**	**0.10**	**0.00**	**0.00**	**8.19**	**3.13**	**0.11**	**0.04**
Myrtle Creek	BLM	0.00	0.00	0.00	0.00	40.30	46.60	0.13	0.15	0.41	3.83	0.00	0.03	40.30	46.60	0.13	0.15

Table INTRO-1

Fifth Field Watersheds and Land Allocations Crossed by the Pacific Connector Gas Pipeline on BLM and NFS Lands

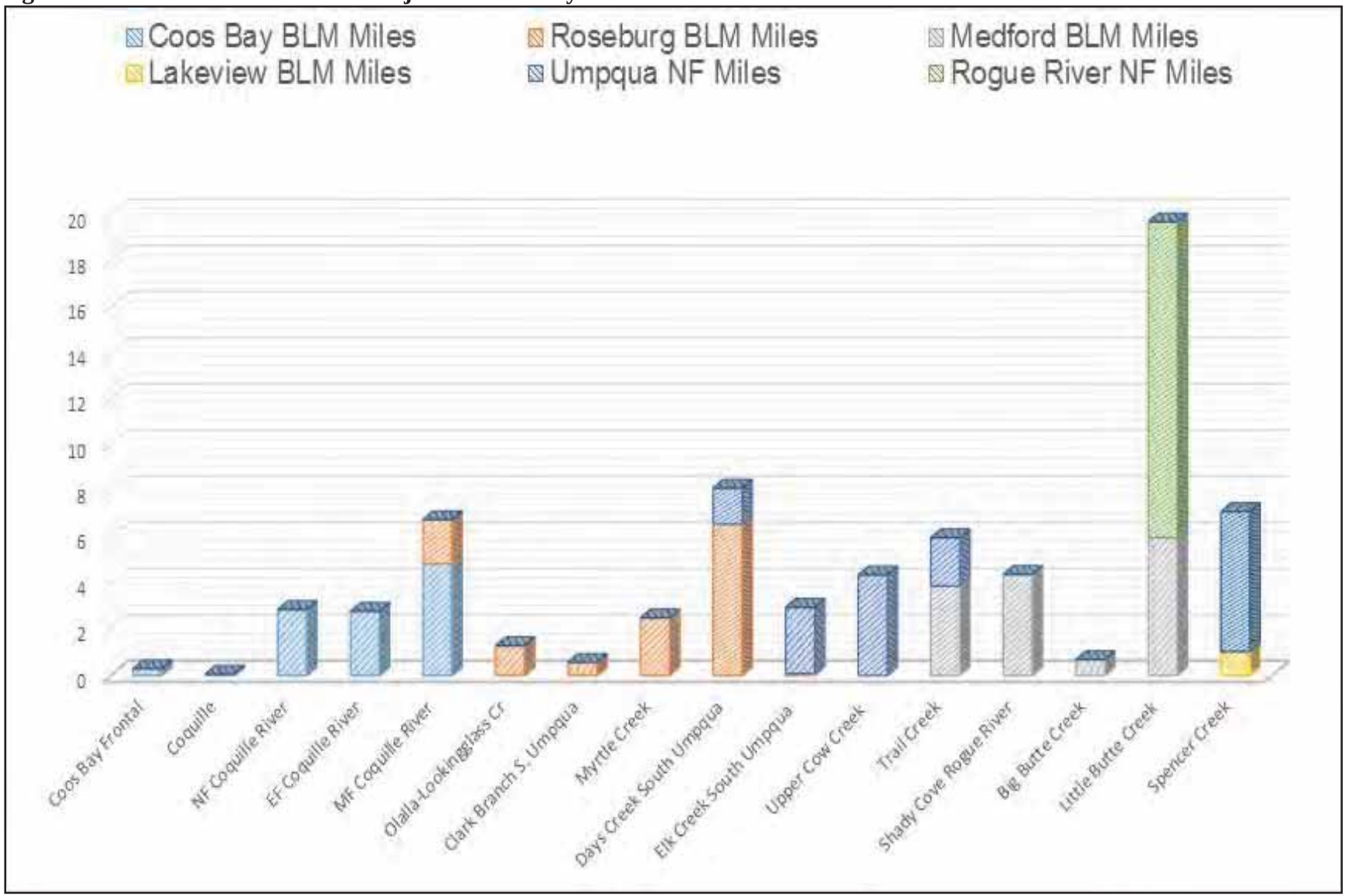
Unit	Agency	Federal Land Allocation															
		LSR				Matrix				Riparian Reserves2				All Allocations3			
		Project Area (acres)		% of Total LSR in Unit		Project Area (acres)		% of Total Matrix in Unit		Project Area (acres)		% of Total Riparian Reserves in Unit		Project Area (acres)		% of Total Allocations in Unit	
		Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified
	NFS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**40.30**	**46.60**	**0.13**	**0.15**	**0.41**	**3.83**	**0.00**	**0.03**	**40.30**	**46.60**	**0.13**	**0.15**
Days Cr. S. Umpqua	BLM	41.19	16.26	0.17	0.07	79.10	50.09	0.23	0.15	4.54	4.32	0.02	0.02	120.29	66.35	0.21	0.11
	NFS	10.56	20.81	0.44	0.86	17.96	24.72	4.61	6.35	0.00	0.00	0.00	0.00	28.52	45.53	1.02	1.62
	Total	**51.75**	**37.07**	**0.19**	**0.14**	**97.06**	**74.81**	**0.28**	**0.22**	**4.54**	**4.32**	**0.02**	**0.02**	**148.81**	**111.88**	**0.24**	**0.18**
Elk Cr. South Umpqua	BLM	1.87	0.56	2.77	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.87	0.56	0.51	0.15
	NFS	21.45	0.00	0.15	0.00	8.72	1.75	0.04	0.00	0.00	0.00	0.00	0.00	30.17	1.75	0.09	0.01
	Total	**23.32**	**0.56**	**0.16**	**0.00**	**8.72**	**1.75**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**32.04**	**2.31**	**0.09**	**0.01**
Upper Cow Creek	BLM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NFS	38.63	0.00	1.64	0.00	36.98	0.00	0.17	0.00	10.83	0.00	0.09	0.00	75.61	0.00	0.31	0.00
	Total	**38.63**	**0.00**	**0.35**	**0.00**	**36.98**	**0.00**	**0.16**	**0.00**	**10.83**	**0.00**	**0.07**	**0.00**	**75.61**	**0.00**	**0.22**	**0.00**
Subtotal South Umpqua River Subbasin	BLM	46.17	17.76	0.10	0.04	143.18	104.56	0.16	0.12	4.96	8.25	0.01	0.02	189.35	122.42	0.14	0.09
	FS	70.64	20.81	0.37	0.11	63.66	26.47	0.15	0.00	10.83	0.00	0.04	0.00	134.30	47.28	0.22	0.08
	Total	**116.81**	**38.57**	**0.18**	**0.06**	**206.84**	**131.03**	**0.16**	**0.10**	**15.79**	**8.25**	**0.02**	**0.01**	**323.65**	**169.70**	**0.17**	**0.09**
Upper Rogue River Subbasin																	
Trail Creek	BLM	0.00	0.00	0.00	0.00	57.38	16.84	0.39	0.11	2.92	0.20	0.09	0.01	57.38	16.84	0.39	0.11
	NFS	0.00	0.00	0.00	0.00	41.28	8.96	0.95	0.21	0.00	0.00	0.00	0.00	41.28	8.96	0.95	0.21
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**98.66**	**25.80**	**0.52**	**0.14**	**2.92**	**0.20**	**0.07**	**0.00**	**98.66**	**25.80**	**0.52**	**0.14**
Shady Cove Rogue River	BLM	0.00	0.00	0.00	0.00	69.31	6.23	0.31	0.03	4.60	0.20	0.07	0.00	69.31	6.23	0.31	0.00
	NFS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**69.31**	**6.23**	**0.31**	**0.03**	**4.60**	**0.20**	**0.07**	**0.00**	**69.31**	**6.23**	**0.31**	**0.00**
Big Butte Creek	BLM	0.00	0.00	0.00	0.00	11.66	0.03	0.04	0.00	6.91	0.00	0.14	0.00	11.66	0.03	0.01	0.00
	NFS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**11.66**	**0.03**	**0.01**	**0.00**	**6.91**	**0.00**	**0.05**	**0.00**	**11.66**	**0.03**	**0.01**	**0.00**
Little Butte Creek	BLM	0.00	0.00	0.00	0.00	96.76	11.10	0.18	0.02	7.56	0.81	0.15	0.00	96.76	11.10	0.18	0.00
	NFS	209.07	70.44	0.40	0.13	0.00	0.00	0.00	0.00	7.64	1.09	0.14	0.02	209.07	70.45	0.35	0.12
	Total	**209.07**	**70.44**	**0.40**	**0.13**	**96.76**	**11.10**	**0.18**	**0.02**	**15.20**	**1.90**	**0.14**	**0.02**	**305.83**	**81.55**	**0.27**	**0.07**

Table INTRO-1

Fifth Field Watersheds and Land Allocations Crossed by the Pacific Connector Gas Pipeline on BLM and NFS Lands

Unit	Agency	Federal Land Allocation															
		LSR				Matrix				Riparian Reserves2				All Allocations3			
		Project Area (acres)		% of Total LSR in Unit		Project Area (acres)		% of Total Matrix in Unit		Project Area (acres)		% of Total Riparian Reserves in Unit		Project Area (acres)		% of Total Allocations in Unit	
		Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified	Cleared	Modified
Subtotal Upper Rogue River Subbasin	BLM	0.00	0.00	0.00	0.00	235.11	34.20	0.19	0.00	21.99	1.21	0.11	0.01	235.11	34.20	0.19	0.03
	NFS	209.07	70.44	0.38	0.13	41.28	8.96	0.06	0.01	7.64	1.09	0.05	0.01	250.35	79.41	0.20	0.00
	Total	**209.07**	**70.44**	**0.38**	**0.13**	**276.39**	**43.16**	**0.15**	**0.00**	**29.63**	**2.30**	**0.08**	**0.01**	**485.46**	**113.61**	**0.20**	**0.05**
Upper Klamath Subbasin																	
Spencer Creek	BLM	0.00	0.00	0.00	0.00	14.86	0.00	0.17	0.00	2.11	0.00	1.01	0.00	12.96	0.00	0.15	0.00
	NFS	0.00	0.00	0.00	0.00	81.61	11.22	0.48	0.00	6.95	0.08	1.30	0.01	81.61	11.22	0.37	0.05
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**96.47**	**11.22**	**0.37**	**0.00**	**9.06**	**0.08**	**1.22**	**0.01**	**94.57**	**11.22**	**0.30**	**0.04**
Total All Watersheds																	
	BLM	92.92	39.67	0.09	0.04	512.73	149.53	0.16	0.05	63.14	11.76	0.04	0.01	563.73	189.41	0.14	0.05
	NFS	279.71	91.25	0.35	0.12	186.55	46.65	0.14	0.04	25.42	1.17	0.06	0.00	466.26	137.91	0.22	0.06
	Total	**372.63**	**130.92**	**0.21**	**0.07**	**714.14**	**196.18**	**0.16**	**0.04**	**90.67**	**12.93**	**0.05**	**0.01**	**1042.95**	**327.32**	**0.17**	**0.00**

Figure INTRO-3: Miles of PCGP Project Corridor by Watershed and Administrative Unit



2.0 FUNGI SPECIES

2.1 ALBATRELLUS ELLISII

Albatrellus ellisii is an ecto-polypore fungus in the Albatrellaceae family (formerly in Scutigeraceae) and is commonly known as greening goat's foot.

2.1.1 Regulatory Status and Ranking

The 2001 Record of Decision (ROD) identifies *A. ellisii* as a Category B (rare) species. The ORBIC evaluated *A. ellisii* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be not rare and apparently secure globally, but with cause for long-term concern (G4) and was rare, uncommon, or threatened, but not immediately imperiled, in Oregon (S3). The species is on the ORBIC List 4. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.1.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *A. ellisii*. It is an annual polypore fungus and is most easily detected in late summer and fall (Castellano et al. 2003). The fruit bodies tend to be large and conspicuous, and the species may appear locally common during heavy fruiting of a single population (Holthausen et al. 1994). Other ecto-polypore species in genus *Albatrellus* (e.g., *A. avellaneuus* and *A. caeruleoparus*) are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997), and the same may be true of *A. ellisii*. Based on the presumed dispersal capability, extirpated populations may become re-established through natural recolonization and may recover from decreased abundance over a period of several years (ORBIC 2004).

Range

A. ellisii is endemic to North America and has been documented in 10 states from New Jersey south to Alabama and from Colorado west to the Pacific Northwest, where it has been found from British Columbia to northern California (ORBIC 2004). In the Pacific Northwest, the mushroom has been found most often in the Cascade Range. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been

affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC reported *A. ellisii* from less than 200 element occurrences[1] across the species' range in 2004. In the Pacific Northwest, Oregon had the highest numbers of occurrences at more than 20 in 2004, and California and Washington had less than five occurrences each (ORBIC 2004). According to ORBIC (2004), *A. ellisii* was considered to be uncommon with a sporadic distribution across the NSO range in 2004. Populations of the species appeared to be stable in western North America, although their status in eastern North America was unknown. The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 34 new sites of *A. ellisii* in the NSO range between 1998–2006, and 48 total sites were documented by 2006, including 16 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 46 sites on federal lands and 48 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys[2] were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *A. ellisii,* and resulted in 13 new observations of individuals or populations of *A. ellisii*. Additional persistence surveys for *A. ellisii* in LSRs in nearby areas resulted in five additional observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by about 40 percent. Based on the increased number of sites since 1998 with increased surveys (more than 3-fold increase between 1998–2006 per Molina 2008 records) and considering the species is fairly conspicuous, more survey effort would be expected to locate additional populations within the NSO range, particularly in the Cascade Range where most observations have been reported. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

A. ellisii occurs as solitary sporocarps or small clusters on the soil surface in coniferous or mixed hardwood-coniferous forests (Castellano et al. 2003, Holthausen et al. 1994). Based on data available in 1994, *A. ellisii* was primarily found in old-growth coniferous stands in Oregon and Washington and mixed coastal coniferous and hardwood stands in California (Holthausen et al. 1994). Reported observations of *A. ellisii* in Portland, Eugene, Everett, and Berkeley have been in urban park settings, indicating the species may not be dependent on old-growth forest conditions (Trappe, pers. comm. 2013). Based on data available in 2007, recorded observations were found between about 550–6,000 feet msl (Cushman and Huff 2007). *A. ellisii* may prefer

[1] An element occurrence is different than a site, as defined in the 2001 ROD. The ORBIC used element occurrences in accordance with the NatureServe definition, and one occurrence could consist of multiple sites or observations and usually contains a subpopulation, population, or metapopulation.

[2] Chapter 1 provides summaries of the survey methods for each group of species for the PCGP Project, and the cited survey reports provide additional details.

specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *Albatrellus* species are presumably those actions that disrupt stand conditions necessary for its survival, particularly damage to host trees and disturbance of soil occupied by host tree roots (Castellano and O'Dell 1997). Typical threats in coniferous forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). Invasive plants can also disrupt or displace the fungus by affecting its mycorrhizal association with its host plant, which could lead to mortality (Shohet et al. 2008). Like other *Albatrellus* species, the mushroom may be harvested for food, but is rarely harvested commercially (Holthausen et al. 1994). Harvest of coastal forests has eradicated many populations of this species.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *A. ellisii*:

- As a mycorrhizal species, *A. ellisii* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.1.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *A. ellisii* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites[3] according to the methodology described in Chapter 1. Table ALEL-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 143 observations from BLM and Forest Service geodatabases were converted into 85 sites in the NSO range (region). Table ALEL-2 presents the total number of sites on BLM and NFS land

[3] The term site is used in the persistence evaluation throughout this document to represent the polygon created by buffering observation data from NRIS and GeoBOB by a specified buffer for each taxonomic group (refer to Chapter 1 for details) and combining polygons that overlap. Using this method, one or more observations may fall within a single site.

and other land ownerships across the regional, local, and analysis areas. Table ALEL-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure ALEL-1 displays the regional distribution of the species across BLM and NFS lands, and Figure ALEL-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE ALEL-1

Number of *Albatrellus ellisii* Sites (2013)

Location*	Number of Sites
Regional Area	85
Local Area	33
Analysis Area (Project Area)	9 (9)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE ALEL-2

Distribution of *Albatrellus ellisii* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	18	13	1
Forest Service	63	20	8
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	7	4	2

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE ALEL-3

Distribution of *Albatrellus ellisii* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	15	-	-
Congressionally Reserved (CR)	**3**	**-**	**-**
Late Successional Reserve (LSR)	**27**	**11**	**3**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	41	23	7
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

A. ellisii is widely distributed across nine physiographic provinces in Washington (Western and Eastern Cascades, Olympic Peninsula), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Klamath and Coast) (see Figure ALEL-1). Most sites are found along the eastern and western Cascade Range in Oregon, with scattered sites in other outlying areas in Washington and California. Several sites are clustered and near other known sites in the Cascade Range and Klamath Mountains, whereas several apparently isolated sites occur in the rest of the species' range. The largest cluster of sites is in the southern Cascade Range in Oregon, where the species appears to be locally abundant. *A. ellisii* does not, however, appear to be well distributed within its range in the NSO range.



Figure ALEL-1.
Regional Distribution of *Albatrellus ellisii*

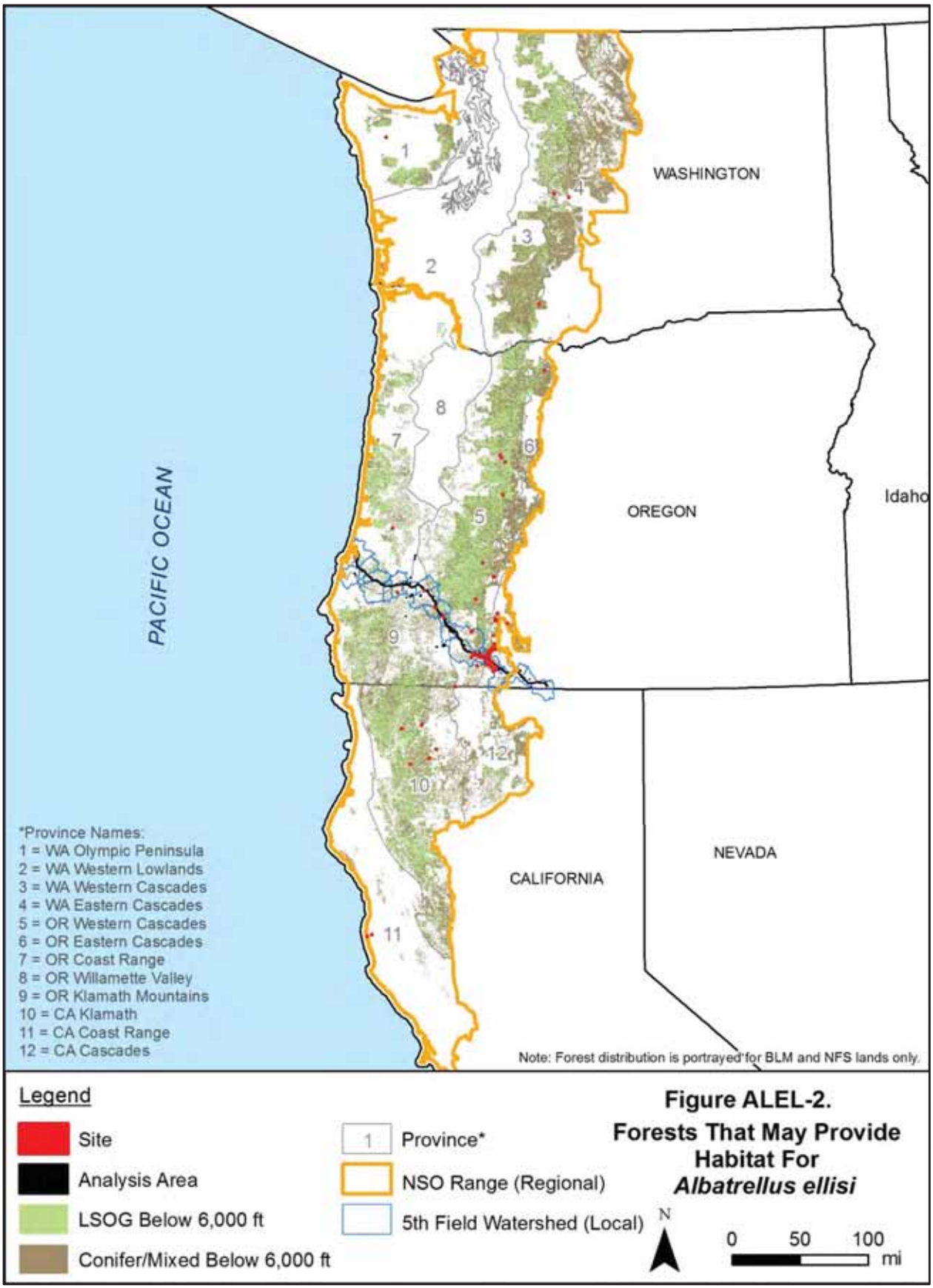


Figure ALEL-2.
Forests That May Provide Habitat For *Albatrellus ellisi*

Seven of 85 sites are located on private, state, or other lands (at least partially); one site is on NPS land (Olympic National Park); and 81 sites are on BLM and NFS lands (at least partially). Sites managed by the BLM Districts that encompass the project area include 10 sites in the Klamath Falls Resource Area of the Lakeview District, one site in the Coos Bay District, five sites in the Medford District, and two sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include 36 sites on the Winema National Forest, 11 sites on the Rogue River National Forest, and four sites on the Umpqua National Forest. Sites managed by other National Forests include four sites on the Willamette National Forest, five sites on the Klamath National Forest, one site on the Six Rivers National Forest, one site on the Mt. Hood National Forest, one site on the Wenatchee National Forest, and one site on the Gifford Pinchot National Forest.

Across the NSO range, 30 sites are located on reserve lands[4] managed by BLM and the Forest Service, including 27 in LSRs and three in Congressionally Reserved areas. This represents 37 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

A. ellisii is primarily found in LSOG forests based on available data (73 of 85 total sites are in LSOG), but it has been found in urban park settings, too. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below 6,000 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, within this range could provide habitat for *A. ellisii* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the region, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table ALEL-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure ALEL-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE ALEL-4

Extent of Forests that Could Provide Habitat for *Albatrellus ellisii* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

[4] See Chapter 1 for the definition and mapping of reserves for this report. Riparian Reserves are not consistently mapped at the regional scale and may be underrepresented.

Local Distribution

Within the local area, *A. ellisii* is distributed across 10 5th field watersheds that overlap the project area (see Table ALEL-5 and Figure ALEL-3). Most sites appear clustered and near one another in the Cascade Range, but sites in the Myrtle Creek/South Umpqua River, Olalla Creek-Lookingglass Creek, and Elk Creek-South Umpqua/Upper Cow Creek watersheds appear more isolated. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas based on the proximity of other sites in the region. Within the Cascade Range, several regional sites are located within 10 miles.

All of the 33 sites in the local area are on BLM or NFS lands, including 13 on BLM-managed lands and 20 on Forest Service-managed lands. These sites are located on lands designated as Other (Matrix) and LSR. Four sites are partially on private lands. Of the 33 sites in the local area, 11 sites are on reserve lands, representing 33 percent of the sites. All of the sites in the Little Butte Creek and Olalla Creek-Lookingglass Creek watersheds are in reserves (LSRs).

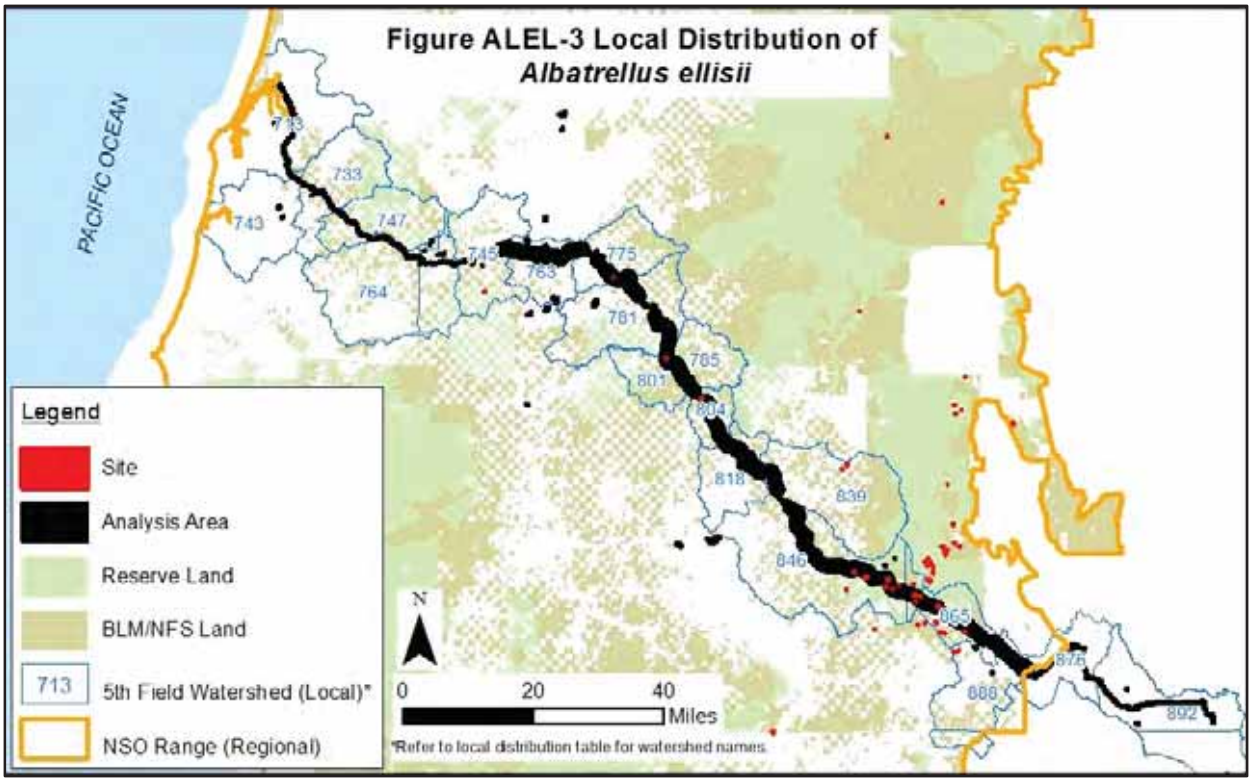
Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures ALEL-2 and ALEL-3).

TABLE ALEL-5

Distribution of *Albatrellus ellisii* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	3	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	1*	-
Klamath River-John C Boyle Reservoir (888)	3	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	10**	10
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	1***	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1***	-
Spencer Creek (865)	13**	-
Trail Creek (804)	2	-
Upper Cow Creek (801)	1*	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*One site is in both Elk Creek-South Umpqua and Upper Cow Creek watersheds.
**One site is in both Little Butte Creek and Spencer Creek watersheds; the portion of the site in Spencer Creek is not in a reserve.
***One site is in both Myrtle Creek and South Umpqua watersheds.



Analysis/Project Area Distribution

The analysis and project areas contain nine sites of *A. ellisii*, all of which are at least partially on BLM or NFS lands. One site is on BLM-managed lands in the Roseburg District, and eight sites are on Forest Service-managed lands on the Rogue River, Winema, and Umpqua National Forests. Two sites are partially on private lands. The analysis area sites are distributed across six 5th field watersheds in the eastern portion of the analysis area. Sites in the Cascade Range are more clustered than sites in the Klamath Mountains. Many sites are also located within the immediate vicinity of the analysis area in the Cascade Range (see Local Distribution discussion above), including several on BLM and NFS lands within 10 miles.

The sites on BLM and NFS lands in the analysis area are located on lands designated as Other (Matrix) and LSR. Of the nine sites in the analysis area, three sites are on reserve lands.

Surveys for the PCGP Project resulted in 23 total observations of the species in 18 locations in or near the project area (Siskiyou BioSurvey LLC 2012a). An estimated 18 of these recorded observations comprise the nine sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, six sites are between mileposts (MP) 162.5 and 173.6, and one site is located near each of the following MPs: 82.9, 102.8, and 112.8.

Project Impacts

Analysis

The PCGP Project would affect[5] nine sites out of the 81 sites on BLM- and Forest Service-managed lands in the region, representing approximately 11 percent of the sites (or nine out of 85 total sites on all lands in the NSO range). Table ALEL-6 presents an overview of the features of the PCGP Project that would affect the *A. ellisii* sites. The construction corridor and associated work and storage areas would affect approximately 14 acres within the sites (about 30 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *A. ellisii* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 9.6 acres of vegetation and soil within nine sites and could result in the removal of *A. ellisii* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1.3 acres within five sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *A. ellisii* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species, although this species has been found in park-like settings and may be somewhat resilient to open canopies and edge effects. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 3.1 acres of understory habitat in six sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE ALEL-6

Impacts to *Albatrellus ellisii* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	9	9.6 ac
Temporary Extra Work Area (TEWA)	5	1.3 ac
Uncleared Storage Area (UCSA)	6	3.1 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

[5] All impacts discussed in this document are focused on sites or portions of sites on BLM and NFS lands, unless otherwise specified. Impacts on other lands are not subject to management direction from BLM or Forest Service and are not considered in the persistence evaluation of each S&M species.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *A. ellisii*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the nine sites as a result of the PCGP Project, 24 sites of *A. ellisii* would remain on BLM and NFS lands in the local area, including eight in reserves, and 72 sites, including 27 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 27 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 38 percent of the remaining *A. ellisii* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *A. ellisii* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *A. ellisii* has a wide, but somewhat scattered, distribution across nine physiographic provinces and three states in the region and a moderate-high number of overall sites (81 on BLM and NFS lands). The species is fairly common in the Cascade Range, but less abundant in other areas. The currently known number of sites on BLM and NFS lands is an increase of 37 sites on BLM and NFS lands since 2007, with many sites documented during the PCGP Project surveys.
    - An estimated 37 percent of the sites (30 sites) are in reserves, which is an increase of about 14 sites in reserves since 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *A. ellisii*.
- The PCGP Project would affect nine of 81 BLM- and Forest Service-managed sites of *A. ellisii*, representing approximately 11 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the nine sites, a moderate-high number of sites (72) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (24 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across six 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at three sites in LSRs, and the percentage of sites in reserves would be about the same (38 percent). Of the remaining sites, 24 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are in Congressionally Reserved areas where management activities that may adversely affect *A. ellisii* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *A. ellisii*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.1.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *A. ellisii* at nine sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 72 sites would remain on BLM and NFS lands across the region, and 24 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *A. ellisii* at nine sites, these sites are part of a large cluster of sites in the Cascade Range in southern Oregon where the species is locally abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *A.*

ellisii would persist in the region without considering the nine sites as part of the population.

- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *A. ellisii* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the nine *A. ellisii* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *A. ellisii* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.2 ALBATRELLUS FLETTII

Albatrellus flettii is an annual ecto-polyphore fungus in the Albatrellaceae family (formerly in Scutigeraceae). It does not have a common name.

2.2.1 Regulatory Status and Ranking

The 2001 ROD identifies *A. flettii* as a Category B (rare) species. The ORBIC evaluated *A. flettii* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, both globally and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. *A. flettii* is not a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.2.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation

in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *A. flettii*. It is an annual polypore fungus and is most easily detected in fall and winter, fruiting August through November (Castellano et al. 2003, Cushman and Huff 2007). The fruit bodies tend to be large and conspicuous, and the species may appear locally common during heavy fruiting of a single population and indicate that populations are long-lived (Holthausen et al. 1994). Other ecto-polypore species in genus *Albatrellus* (e.g., *A. avellaneuus* and *A. caeruleoparus*) are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997), and the same may be true of *A. flettii*. Based on the presumed dispersal capability, extirpated populations may become re-established through natural recolonization and may recover from decreased abundance quickly (less than 5 years or two generations) or over a period of several years (5-20 years or 2-5 generations) (ORBIC 2004).

Range

A. flettii is endemic to western North America and has been documented in seven states and two provinces from Alaska along the Pacific coast south to California and east to New Mexico and Wyoming (ORBIC 2004). In the Pacific Northwest, the fungus has been found most often in the Cascade Range. The currently known range of the species within the NSO range based on 2014 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across western North America. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under the Threats section below.

Population Status

The ORBIC reported *A. flettii* from 62 element occurrences across the NSO range in 2004. In the Pacific Northwest, Oregon had the highest number of occurrences at 34 in 2004. Washington had about 24 occurrences, and California had about four occurrences (ORBIC 2004). According to ORBIC (2004), *A. flettii* was considered to be uncommon with a spotty distribution across its range in 2004. Populations of the species appeared to be stable throughout most of its range in the Pacific Northwest, although stability of eastern populations was unknown. The species was detected in two locations in Oregon and Washington during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 55 new sites of *A. flettii* in the NSO range between 1998–2006, and 84 total sites were documented by 2006, including 43 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 112 sites on federal lands and 126 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2011 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys

targeted all Category B species, including *A. flettii*, and resulted in one new observation of a population of the species. Based on the increased number of sites since 1998 with increased surveys (nearly a 3-fold increase between 1998–2006 per Molina 2008 records) and considering the species is fairly conspicuous, more survey effort would be expected to locate additional populations within the NSO range, particularly in the Cascade Range where most observations have been reported. The current estimated number of sites and distribution of the species based on 2014 data are presented below under the Species Distribution discussion.

Habitat

A. flettii occurs as scattered or gregarious sporocarps or small clusters in coniferous or mixed hardwood-coniferous forests (Castellano et al. 2003, Holthausen et al. 1994). Based on data available in 1994, *A. flettii* was primarily found in old-growth coniferous stands in Oregon and Washington and mixed coastal coniferous and hardwood stands in California (Holthausen et al. 1994). According to ORBIC 2004, *A. flettii* appears restricted to fairly complex habitats. A. flettii may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *Albatrellus* species are presumably those actions that disrupt stand conditions necessary for its survival, particularly damage to host trees and disturbance of soil occupied by host tree roots (Castellano and O'Dell 1997). Typical threats in coniferous forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). Like other *Albatrellus* species, the mushroom may be harvested for food, but is rarely harvested commercially (Holthausen et al. 1994). Harvest of coastal forests has likely eradicated many populations of this species.

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *A. flettii*:

- As a mycorrhizal species, *A. flettii* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.2.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *A. flettii* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table ALFL-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 89 observations from BLM and Forest Service geodatabases were converted into 82 sites in the NSO range (region). Table ALFL-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table ALFL-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure ALFL-1 displays the regional distribution of the species across BLM and NFS lands, and Figure ALFL-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE ALFL-1

Number of *Albatrellus flettii* Sites (2014)

Location*	Number of Sites
Regional Area	82
Local Area	2
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, April 7, 2014
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE ALFL-2

Distribution of *Albatrellus flettii* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	-	-	-
Forest Service	74	1	1
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	6	1	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE ALFL-3

Distribution of *Albatrellus flettii* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	-	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	17	-	-
Congressionally Reserved (CR)	**14**	**-**	**-**
Late Successional Reserve (LSR)	**9**	**1**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	43	-	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure ALFL-1.
Regional Distribution of *Albatrellus flettii*

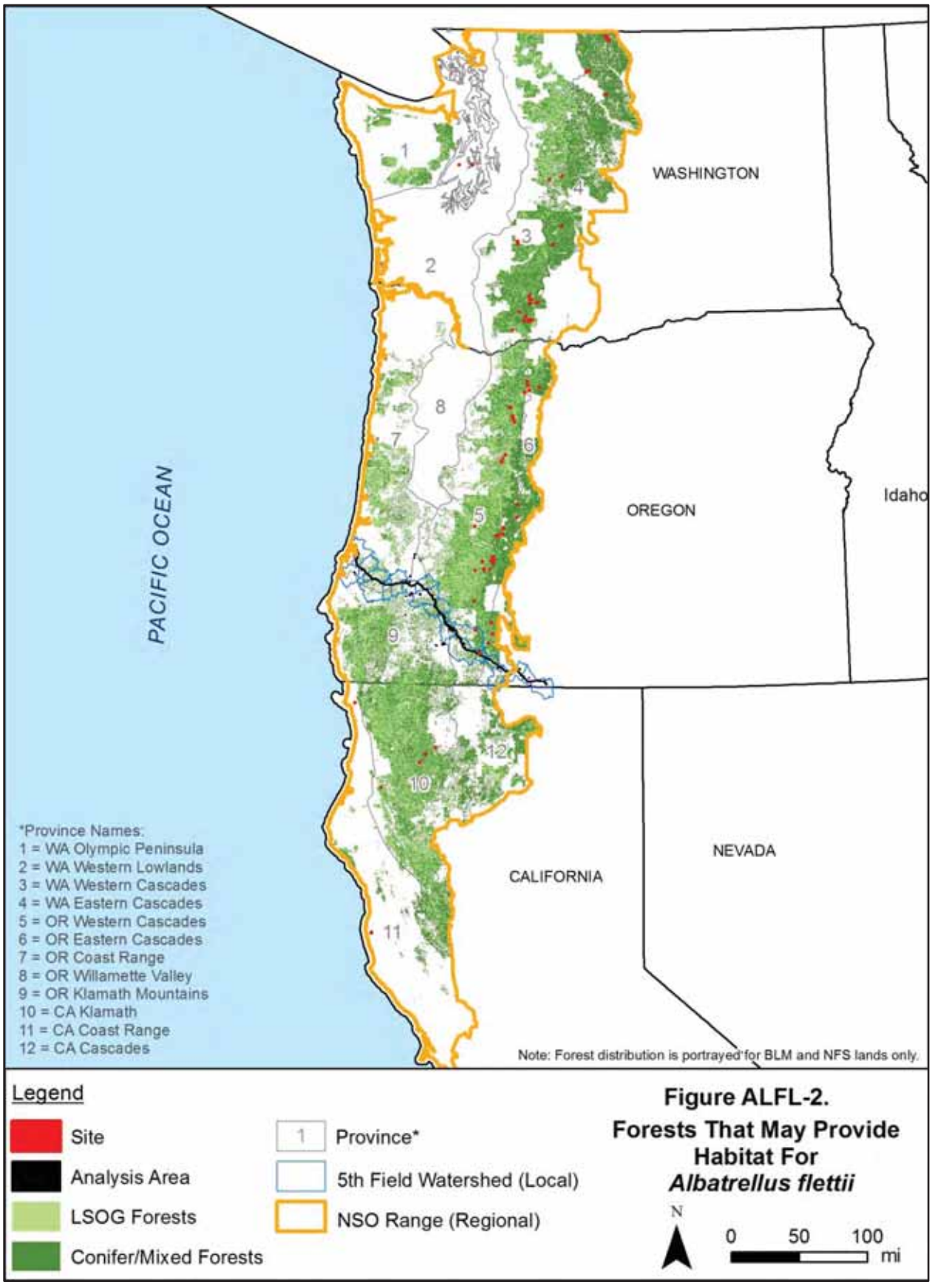


Figure ALFL-2.
Forests That May Provide Habitat For *Albatrellus flettii*

Regional Distribution

A. flettii is somewhat widely distributed across seven physiographic provinces in Washington (Western and Eastern Cascades and Eastern Lowlands), Oregon (Cascades West and East), and California (Coast and Klamath). Sites are distributed along the Cascade Range in Oregon and Washington, and many sites are clustered or relatively close to one another in groups. Scattered sites are located in other outlying areas, including the Western Lowlands in Washington and the Coast Range in California. *A. flettii* appears to be well distributed in the Cascade Range in Oregon and Washington based on the proximity of sites to one another, which provides opportunities for dispersal, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Six of 82 sites are located on private, state, or other lands; three sites are at least partially on NPS lands (Mt. Rainier and North Cascades National Parks); and 74 sites are on NFS lands across the region (at least partially). Sites managed by the National Forests that encompass the project area include 11 sites on the Umpqua National Forest, two sites on the Winema National Forest, and three sites on the Rogue River National Forest. The remaining 66 sites on NFS lands are on the Gifford Pinchot, Deschutes, Klamath, Mt. Hood, Okanogan, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 24 sites are located on reserve lands managed by the Forest Service, including nine in LSRs, one in a Known Owl Activity Center, and 14 in Congressionally Reserved areas. This represents 32 percent of the total Forest Service-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

A. flettii is more commonly found in LSOG forests based on available data (57 of 82 total sites are in LSOG), but it is also somewhat common in non-LSOG forests. It may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range and has been documented in much of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *A. flettii* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table ALFL-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure ALFL-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE ALFL-4

Extent of Forests that Could Provide Habitat for *Albatrellus flettii* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *A. flettii* is found in two 5th field watersheds (Big Butte Creek and Little Butte Creek) that overlap the project area (see Table ALFL-5 and Figure ALFL-3). One site is in an LSR on NFS land managed by the Rogue River National Forest in the Little Butte Creek watershed. The second site is on private land in the Big Butte Creek watershed. The two sites are distant from one another (more than 10 miles apart); however, several scattered sites are located in the regional area, approximately 10 miles to the north in the Cascade Range. Connectivity may be available between the local sites and the other site sites in the Cascade Range based on the extent of forests that may provide suitable habitat. In addition, distribution patterns of the regional sites indicate that dispersal opportunities likely exist between sites in the Cascade Range.

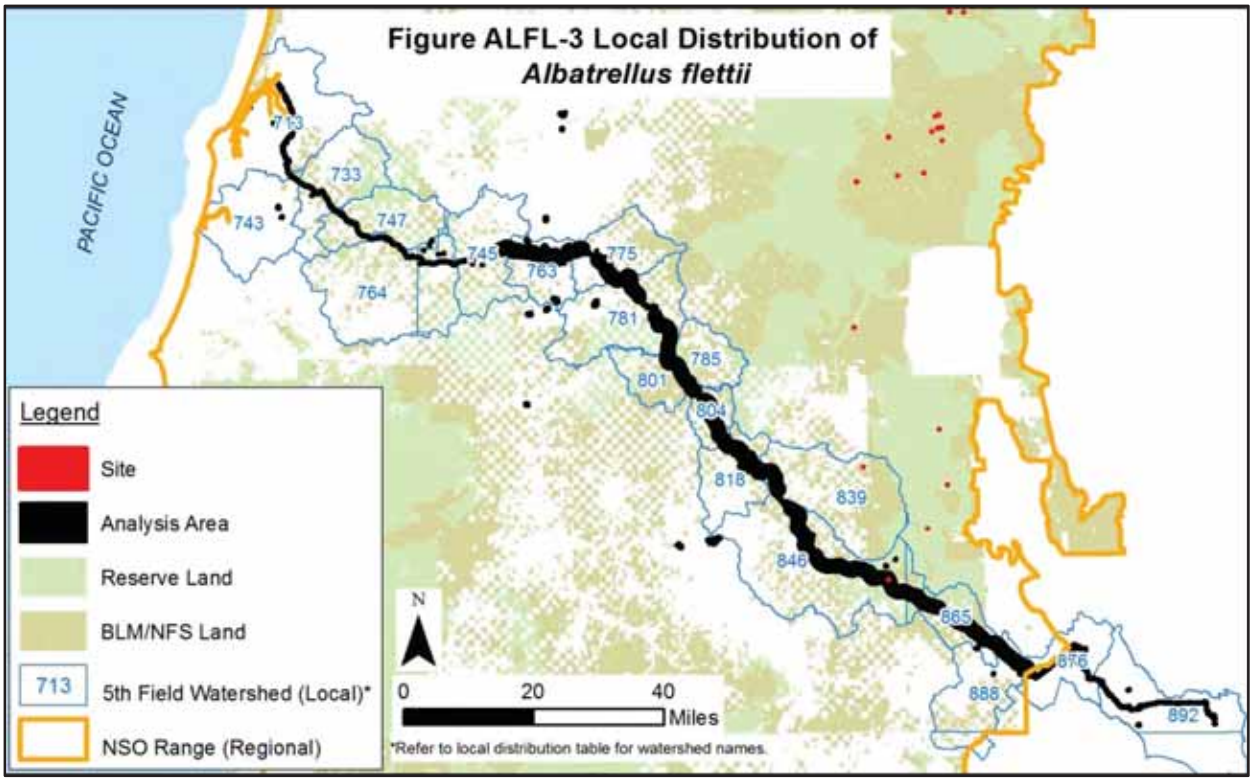
Coniferous and mixed hardwood-coniferous forests encompass approximately 1.3 million acres on BLM and NFS lands in the local area, including 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures ALFL-2 and ALFL-3).

TABLE ALFL-5

Distribution of *Albatrellus flettii* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	1	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	1	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, April 7, 2014; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *A. flettii*. This site is in the Little Butte Creek watershed, as described above in the Local Distribution discussion. The nearest site is located approximately 10 miles to the northeast of the site.

Surveys for the PCGP Project resulted in one observation of the species in one location near the project area between 2010–2012 (Siskiyou BioSurvey LLC 2012a). The one observation comprises the single site in the analysis area. The site is between MPs 162.4 and 162.6.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 74 sites on Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 82 total sites on all lands in the NSO range). Table ALFL-6 presents an overview of the features of the PCGP Project that would affect the *A. flettii* site. The construction corridor and associated work and storage areas would affect approximately 1.2 acres within the site (about 32 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *A. flettii* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.8 acre of vegetation and soils within the site and could remove individuals of *A. flettii*.

Disturbance in a TEWA would result in similar impacts on 0.4 acre of the site. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and host trees and disturbance to soil could negatively affect *A. flettii* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWA could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.02 acre of understory habitat in the site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE ALFL-6

Impacts to *Albatrellus flettii* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.8 ac
Temporary Extra Work Area (TEWA)	1	0.4 ac
Uncleared Storage Area (UCSA)	1	0.02 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *A. flettii*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, no sites would remain on NFS lands in the local area, and 73 sites, including 23 in reserves, would remain on NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 23 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 32 percent of the remaining *A. flettii* sites on NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *A. flettii* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines in Oregon via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M. The species remained on the list as Category B in Washington and California.
    - *A. flettii* has a somewhat wide distribution across seven physiographic provinces and three states in the region and a moderate-high number of overall sites (74 on NFS lands). The species is well distributed in the Cascade Range in Oregon and Washington. The currently known number of sites on NFS lands is actually a decrease in the number of sites recorded in 2007, but is still moderate-high.
    - An estimated 32 percent of the sites (24 sites) are in reserves, which is actually a decrease in the number of sites and the proportion of sites reported in reserves in 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and several sites are found in the Coast Range in California. A subcomponent of these forests likely provides habitat for *A. flettii*.
- The PCGP Project would affect one of 74 Forest Service-managed sites of *A. flettii*, representing approximately 1 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (73) would continue to be documented on NFS lands in the region with a somewhat wide distribution across the NSO range. Although, no sites would remain on NFS lands in the local vicinity of the analysis area, several sites are found nearby in the Cascade Range. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in an LSR, and the percentage of sites in reserves would remain the same (32 percent). Of the remaining sites, nine are

at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 14 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *A. flettii* are unlikely.

- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of the forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *A. flettii*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.2.1 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *A. flettii* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 73 sites would remain on NFS lands across the region. Although the PCGP Project would affect site persistence of *A. flettii* at one site, this site is in the eastern Cascade Range in Oregon, where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *A. flettii* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of coniferous and mixed forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *A. flettii* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *A. flettii* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *A. flettii* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific

protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.3 ARCANGELIELLA CRASSA

Arcangeliella crassa is a sequestrate mushroom and false truffle species in the Russulaceae family and does not have a common name.

2.3.1 Regulatory Status and Ranking

The 2001 ROD identifies *A. crassa* as a Category B (rare) species. The ORBIC evaluated *A. crassa* in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be between imperiled because of rarity or other factors that make it vulnerable to extirpation and not rare and apparently secure, but with cause for long-term concern, within its global range (G2G4). In Oregon, it was considered critically imperiled because of its extreme rarity or because it is somehow especially vulnerable to extinction or extirpation (S1). The species is on the ORBIC List 3. It is not considered a BLM or Forest Service Sensitive species in Oregon, but it is a Strategic species.

2.3.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *A. crassa*. It forms sporocarps just under the surface of the soil near fir or pine trees (Castellano et al. 1999). Fruiting has been documented from June through October. It is presumed to be ectomycorrhizal, forming symbiotic associations with conifer trees for translocation of minerals, water, and nutrients (Castellano and O'Dell 1997). As with other sequestrate fungi, spore dispersal is presumed to depend on mycophagy or consumption of fungi and spores by animals, particularly small mammals (Holthausen et al. 1994).

Range

A. crassa was believed to be endemic to California (Castellano et al. 1999), but it was recently found in Oregon during surveys between 2002 and 2012, including those for the PCGP Project (Siskiyou BioSurvey LLC 2012a). In California, it has been found from the Sierra Nevada Range in Fresno County north to the southern Cascade Range and Siskiyou Mountains (ORBIC 2004). This species is locally abundant in Fresno County, but its abundance across the Pacific Northwest is unknown. The species may be found in more locations with more survey efforts. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

Within California, Castellano and O'Dell (1997) reported *A. crassa* from five populations in 1997, including two populations in the NSO range (one on the Klamath National Forest and one on the Shasta-Trinity National Forest). The ORBIC (2004) reported the species from more than 10 element occurrences in California, where the species was thought to be endemic. Prior to 2002, the species had not been reported in Oregon, but surveys conducted since then have documented the species in multiple locations, including two observations on the Winema National Forest that were recorded during surveys conducted for the PCGP Project in October 2011 (Siskiyou BioSurvey LLC 2012a). The species was found in one location during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented one new site of *A. crassa* in the NSO range between 1998–2006, which may have been from the Random Multi-Species surveys, and four total sites were documented by 2006, including two in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the Forest Service and BLM reported two sites on all lands; these sites were in California and Oregon.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *A. crassa*, and resulted in two new observations of *A. crassa* on the Winema National Forest. *A. crassa* has not been found in high numbers during past survey efforts, although limited fungi surveys have been conducted across the NSO range, and more survey effort may locate additional populations of the species. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

Based on data available prior to 1999, *A. crassa* was found in mixed coniferous forests above 6,000 feet msl (Castellano and O'Dell 1997, Castellano et al. 1999) and in upper montane fir forests in northern California (Holthausen et al. 1994). It has been found in association with the roots of mountain hemlock (*Tsuga mertensiana)* at mid to high elevations (Holthausen et al. 1994) and with various Pinaceae trees, such as white fir (*Abies concolor*), red fir (*A. magnifica*), ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*P. jeffreyii*), and lodgepole pine (*P. contorta*) (Castellano et al. 1999). It may require abundant coarse woody debris along the forest floor (Holthausen et al. 1994).

Threats

Threats to *A. crassa* are those that affect its host tree and disturb the soil, such as road and trail construction, logging and fire management activities, and recreational activities (Castellano and

O'Dell 1997). Fire is a lower threat to this species because it is commonly found in cool, wet habitats that are less susceptible to fire. The removal of coarse woody debris on the forest floor can also affect the species (Holthausen et al. 1994). Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *A. crassa* with several other species (Group 3 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites, which will maintain viable populations of the species until additional information on the effects of various management activities can be obtained and evaluated. Populations on federal land should be managed to maintain population viability. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *A. crassa*:

- As a mycorrhizal species, *A. crassa* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.3.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *A. crassa* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table ARCR-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 21 observations from BLM and Forest Service geodatabases were converted into 18 sites in the NSO range (region). Table ARCR-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table ARCR-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure ARCR-1 displays the regional distribution of the species across BLM and NFS lands, and Figure ARCR-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests between 2,000–7,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE ARCR-1

Number of *Arcangeliella crassa* Sites (2013)

Location*	Number of Sites
Regional Area	18
Local Area	2
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE ARCR-2

Distribution of *Arcangeliella crassa* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	1	1	-
Forest Service	17	1	1
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	1	1	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE ARCR-3

Distribution of *Arcangeliella crassa* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	-	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	6	-	-
Congressionally Reserved (CR)	**-**	**-**	**-**
Late Successional Reserve (LSR)	**1**	**1**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	12	1	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0.
Bolded allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

A. crassa has a somewhat limited distribution across four physiographic provinces in Oregon (Coast Range, Cascades East and West) and California (Klamath) and a low overall number of sites (see Figure ARCR-1). Most sites are found along the Cascade Range, with scattered sites in the Coast Range and Klamath Mountains. A group of sites is found in the eastern Cascade Range in Oregon, but other sites appear isolated. *A. crassa* does not appear to be well distributed within its range in the NSO range.

All 18 sites are at least partially on BLM or NFS lands, including one site on BLM-managed land in the Coos Bay District and 17 sites on NFS lands across the region. One site is partially on private land. Sites managed by the National Forests that encompass the project area include one site on the Winema National Forest and one site on the Umpqua National Forest. Sites managed by other National Forests include 13 sites on the Deschutes National Forest, one site on the Mt. Hood National Forest, and one site on the Klamath National Forest.



Figure ARCR-1.
Regional Distribution of *Arcangeliella crassa*



Figure ARCR-2.
Forests That May Provide Habitat For *Arcangeliella crassa*

Across the NSO range, one site is in an LSR managed by BLM. This represents 6 percent of the total sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

A. crassa is primarily found in LSOG forests based on available data (16 of 18 total sites are in LSOG) and may be restricted to specific microclimate conditions of these forests. Based on current site locations, the species is found in coniferous forests between 2,000–6,000 feet msl and has only been documented in Oregon and California. LSOG coniferous forests within this range could provide habitat for *A. crassa* and support additional sites. These forests encompass an estimated 2.9 million acres on BLM and NFS lands (see Figure ARCR-2 and Table ARCR-4), including 1.6 million acres in reserve land allocations (56 percent of the forests). LSOG coniferous forests between 2,000–7,000 feet msl are a somewhat limited habitat in Oregon and California and are primarily found along the Cascade Range and the Klamath Mountains. Younger coniferous forests may provide habitat for the species as they mature and develop suitable habitat conditions over time, and these forests are more widespread across Oregon and California (see Figure ARCR-2 and Table ARCR-4).

TABLE ARCR-4

Extent of Forests that Could Provide Habitat for *Arcangeliella crassa* on BLM and NFS Lands*

Location	Coniferous Forests between 2,000–7,000 feet		LSOG Conifer between 2,000–7,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	8,648,530	5,244,960	2,911,830	1,641,730
Local Area	327,160	111,330	104,910	42,580
Project Area	790	400	230	130

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for Oregon and California only, which is the extent of the species' currently known range.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *A. crassa* is found in two 5th field watersheds, Little Butte Creek and Spencer Creek, that overlap the project area (see Table ARCR-5 and Figure ARCR-3). The sites are in the eastern Cascade Range and Coast Range and appear isolated from one another and others in the region. The nearest site is more than 60 miles north of the easternmost local site in the eastern Cascade Range. Limited connectivity appears available between the local sites and other sites in the region based on the distance between the sites, although animals could transport spores across suitable habitat within the local area.

One site in the local area is located on land designated as Other (Matrix) on the Winema National Forest, and the other site is in an LSR in the Coos Bay District. One site is partially on private land.

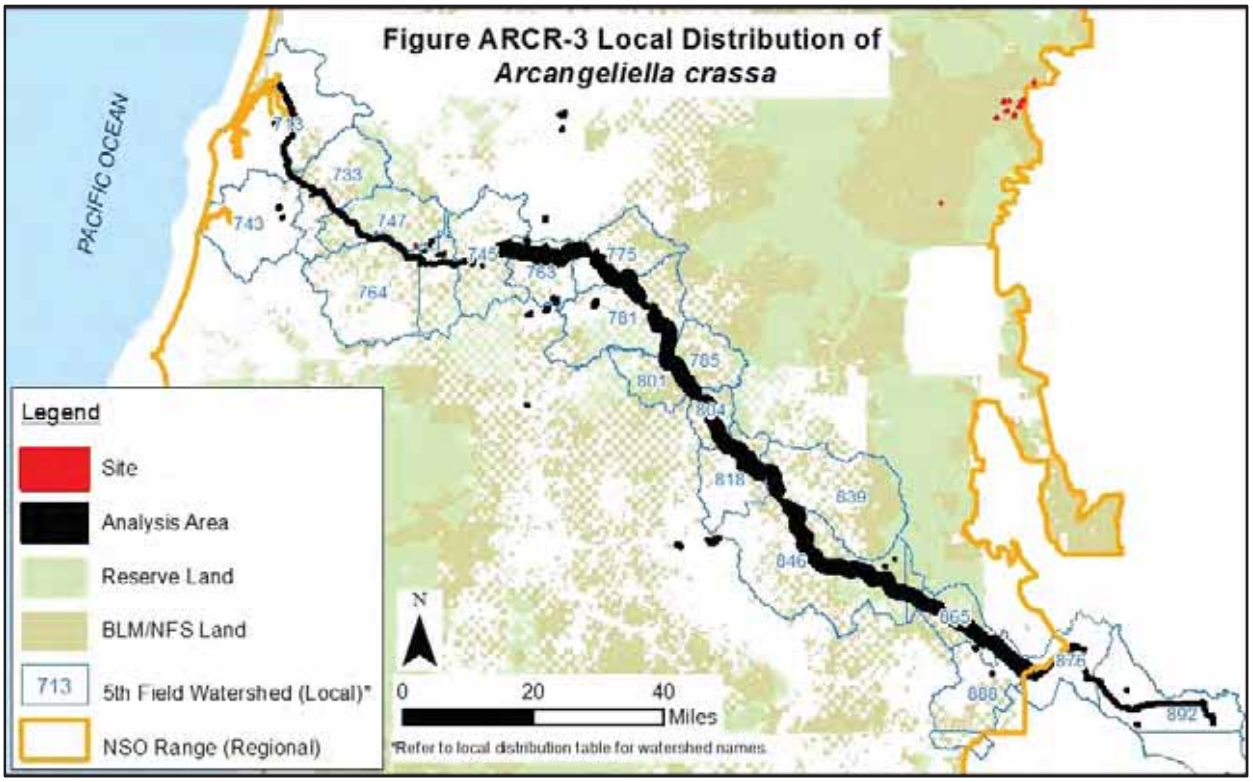
LSOG coniferous forests between 2,000–7,000 feet msl encompass approximately 104,910 acres on BLM and NFS lands in the local area, including 42,580 acres in reserve land allocations (41 percent of the forests). Forests that may provide suitable habitat are primarily found in the Cascade Range (see Figure ARCR-2), and other sites may be located in the mountain range in areas that have not been previously surveyed.

TABLE ARCR-5

Distribution of *Arcangeliella crassa* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	1	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	1	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *A. crassa*. This site is on the Winema National Forest in the Spencer Creek watershed, as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in two observations of *A. crassa* in the survey area during fall 2011 (Siskiyou BioSurvey LLC 2012a). These recorded observations were near MP 173.2 and comprise the single site in the analysis area.

Project Impacts

Analysis

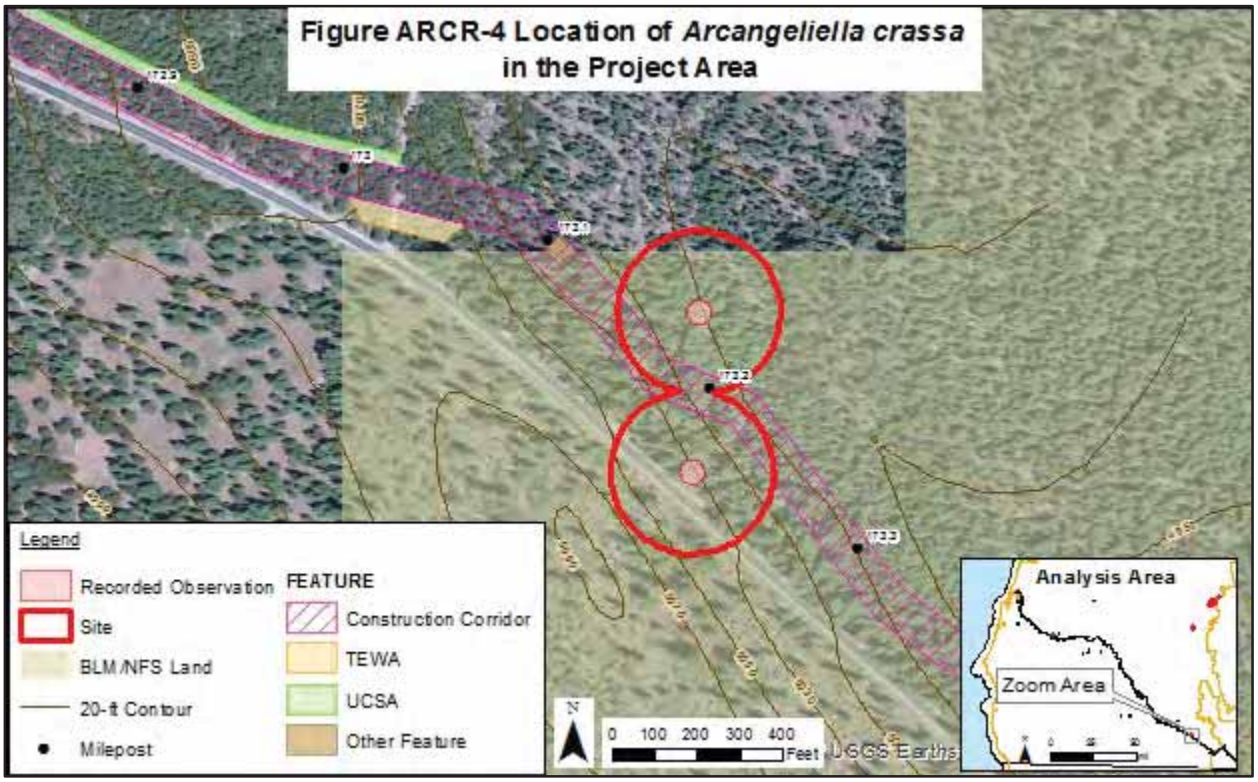
The PCGP Project would affect one site out of the 18 sites on BLM- and Forest Service-managed lands in the region, representing approximately 6 percent of the sites (all sites are on BLM or NFS lands). Table ARCR-6 presents an overview of the features of the PCGP Project that would affect the *A. crassa* site. The construction corridor would affect approximately 0.8 acre (15 percent) of the site (the site is approximately 5.4 acres), and the corridor would cross through the central portion of the site (see Figure ARCR-4). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *A. crassa* in and near the project area. Due to the low number of overall sites of *A. crassa*, the effects on one site could potentially alter the distribution of the species in the NSO range if site persistence is affected. This discussion presents a detailed analysis of the features of the PCGP Project that could affect site persistence.

TABLE ARCR-6

Impacts to *Arcangeliella crassa* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.8 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres



The PCGP Project would result in ground disturbance and vegetation removal across the central portion of the site near MP 173.2. The recorded observations of the species are just south and just north of the project area (see Figure ARCR-4). Both observations would likely be avoided by activities within the corridor. The species could be subject to indirect effects associated with the PCGP Project based on the proximity of project activities to the observations.

Establishment of the construction corridor would disturb vegetation and soils within about 100 feet from the observations within the site. The site is mostly forested, and a paved road crosses through the southern portion of the site, just south of the southern observation. Based on the proximity of the road to the observation, the species may be somewhat resilient to edge effects in the site. The establishment of the corridor could adversely modify microclimate conditions around the southern observation, but the species is expected to persist within the site in forested areas that are not disturbed by the PCGP Project. The removal of forests and host trees and disturbance to soil could negatively affect *A. crassa* by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees, but individuals outside the corridor would be expected to persist despite nearby changes to the species' habitat. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

Based on this analysis, *A. crassa* is likely to persist at the site following project implementation. This site is one of the two sites in the local area and is the southernmost site in Oregon. It may be important for dispersal of the species between other sites to the north in the Cascade Range and sites to the southwest in the Klamath Mountains in California. Despite impacts to habitat in the site, *A. crassa* would still be found in the Cascade Range in Oregon, and opportunities for dispersal into the southern portion of the NSO range would still be possible.

Across the project area, the PCGP Project would remove an estimated 170 acres of LSOG coniferous forests between 2,000–7,000 feet msl. These impacts would result in a reduction of habitat that may be suitable for *A. crassa*. Within this impact area, about 120 acres (71 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, but the restored areas would not return to LSOG conditions for more than 80 years and would not likely provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would also remain across the project area and would not provide habitat for the species. The permanent loss of LSOG coniferous forests between 2,000–7,000 feet msl represents less than 1 percent of the total estimated area of these forests in Oregon and California.

Discussion

Assuming site persistence is maintained at the one site in the project area despite impacts to individuals and habitat within the site as a result of the PCGP Project, two sites of *A. crassa* would remain on BLM and NFS lands in the local area, including one site in a reserve on BLM land, and 18 sites, including one in a reserve, would remain on BLM and NFS lands in the NSO range. The sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and management recommendations for the species with regard to agency-related actions. The one site in a reserve

is assumed to have additional protections by the NWFP Standards and Guidelines in place for the land allocation. Based on these site counts, approximately 6 percent of the *A. crassa* sites on BLM and NFS lands in the NSO range would continue to be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species. The preceding discussions present this evaluation, as summarized below:

- *A. crassa* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that more information on the species' distribution is available, as noted below:
    - *A. crassa* has a somewhat limited distribution across four physiographic provinces and two states in the region, and the total number of sites is low (18 on BLM and NFS lands). *A. crassa* does not appear to be well distributed in any part of its range because sites are scattered and its distribution is spotty. However, the currently known number of sites is an increase of 16 sites on BLM and NFS lands since 2007, and new sites have been documented in Oregon since 2002.
    - An estimated 6 percent of the sites (one site) are in reserves, which is a reduction in the proportion of sites in reserves since 2006 per Molina (2008).
- LSOG coniferous forests between 2,000–7,000 feet msl (general habitat for the species) have a somewhat limited distribution across Oregon and California and encompass approximately 2.9 million acres on BLM and NFS lands with an estimated 56 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. *A. crassa* is likely restricted to a subcomponent of LSOG coniferous forests based on available information on its habitat and life history requirements.
- The PCGP Project would affect one of 18 BLM- and Forest Service-managed sites of *A. crassa*, representing approximately 6 percent of the sites on BLM and NFS lands in the NSO range. However, the species is expected to persist at the site based on the analysis. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be the same as the currently documented distribution and range.
- The one site in a reserve would not be affected by the PCGP Project, and the percentage of sites in reserves (6 percent) would not change. The site in a reserve is in an LSR where management actions are restricted to those activities that benefit LSOG forests.
- The PCGP Project would result in a permanent loss of approximately 170 acres of LSOG coniferous forests between 2,000–7,000 feet msl (less than 1 percent of the total acreage

in the species' range). An estimated 1.6 million acres of LSOG coniferous forests between 2,000–7,000 feet msl would remain in reserves in Oregon and California. Suitable habitat for *A. crassa* includes a subcomponent of these forests, which may be limited based on the limited distribution of the species.

- The remaining forests could support additional populations of *A. crassa*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites may exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.3.4 Conclusions

If implemented as proposed, the PCGP Project would affect habitat for *A. crassa* at one site, but *A. crassa* is expected to persist at the site, and the PCGP Project would not modify the distribution of the species in the NSO range. The remaining sites would continue to provide a reasonable assurance of species persistence because:

- With project implementation, the number of sites on BLM and NFS lands across the region (18 sites) and on BLM lands in the local area (two sites) would not change. Although the PCGP Project would affect individuals of *A. crassa* at one site, site persistence is not expected to be affected. The species' distribution and range within the NSO range would be the same as its currently known distribution and range.
- The PCGP Project would remove approximately 170 acres of LSOG coniferous forest between 2,000–7,000 feet msl (a negligible amount of the forests). Although an estimated 71 percent of these forests would be restored following project implementation, they would not likely provide habitat for the species during the life of the project. About 1.6 million acres of LSOG coniferous forests between 2,000–7,000 feet msl would remain in reserves (negligible change with project implementation). Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Cascade Range, some other sites are scattered across the region and are less likely to be collectively affected by a single event.

The PCGP Project would not be able to avoid impacts to the *A. crassa* site in the analysis area, but individuals within the site are expected to persist following project implementation. Based on the above conclusions, avoidance of the *A. crassa* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *A. crassa* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the site and adjacent habitat over the long term, as specified by the agency

responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.4 BOLETUS PULCHERRIMUS

Boletus pulcherrimus is a bolete mushroom species in the Boletaceae family and is commonly known as red pored bolete.

2.4.1 Regulatory Status and Ranking

The 2001 ROD identifies *B. pulcherrimus* as a Category B (rare) species. The ORBIC evaluated *B. pulcherrimus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010), and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2010, the species was considered to be rare, uncommon, or threatened, but not immediately imperiled, within its global range (G3) and was imperiled because of rarity or other factors that make it vulnerable to extirpation in Oregon (S2). In 2013, the species was considered to be too common and was removed from the ORBIC Lists. It is a BLM and Forest Service Sensitive species in Oregon.

2.4.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *B. pulcherrimus*. As a presumed ectomycorrhizal species, mycorrhiza of *B. pulcherrimus* form symbiotic associations with host plant roots, particularly roots of Pinaceae species (Castellano and O'Dell 1997). Spores of *B. pulcherrimus* are assumed to disperse by wind and possibly by animal (arthropod) vectors. In California, fruiting has been documented from late fall to early winter (The Fungi of California 2010), but elsewhere in its range, the species has been noted to fruit from July through December (Castellano et al. 1999).

Range

B. pulcherrimus is endemic to the Pacific Northwest, where it has been found from Canada south to California (Holthausen et al. 1994). Based on data available in 2004, *B. pulcherrimus* was found in Oregon in the lower eastern half of the Willamette Valley foothills and in the Ashland area (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other

environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *B. pulcherrimus* from an estimated 45 element occurrences in the Pacific Northwest in 2004. Most of these occurrences were in Oregon (6), with fewer in California (3) and Washington (2) (ORBIC 2004). In 2004, population trends across the species' range in the Pacific Northwest were unknown, but some populations appeared to have good viability based on the recurrence of observations at the same locations. The species was not found during Random Multi-Species surveys across the NSO range between 2001–2004 (USDA and USDI 2007). Molina (2008) documented 15 new sites of *B. pulcherrimus* in the NSO range between 1998–2006, and 44 total sites were documented by 2006, including 14 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 20 sites on federal lands and 26 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *B. pulcherrimus*, and resulted in nine new observations of individuals or populations of the species between 2010–2011. Additional persistence surveys for *B. pulcherrimus* in LSRs in nearby areas resulted in three additional observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by about 20 percent. Based on the increased number of sites since 1998 with increased surveys (more than 50 percent increase between 1998–2006 per Molina 2008 records) and the conspicuous nature of the species' fruiting bodies, more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

B. pulcherrimus grows in humus in association with the roots of mixed conifers (e.g., Douglas-fir and grand fir) and hardwoods (e.g., tanoak) in coastal forests (Castellano et al. 1999). Sporocarps are usually found solitary or in scattered areas, but not in groups. It has primarily been found in low- to mid-elevation old-growth coniferous forests, generally below 6,000 feet (Holthausen et al. 1994, Cushman and Huff 2007). Prior to 1994, this species had not been observed in forests that were disturbed (Holthausen et al. 1994). However, it has more recently been reported from open mixed hardwood stands with young conifers and along roadsides (Trappe, pers. comm. 2013). *B. pulcherrimus* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions because it is also found in open stands and disturbed settings.

Threats

Threats to *B. pulcherrimus* include disruption of stand conditions, particularly from disturbance to host trees, soil, litter, and duff (Castellano and O'Dell 1997). Logging of LSOG forests is the

most serious threat. *B. pulcherrimus* is not collected for food because it is toxic (The Fungi of California 2010).

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *B. pulcherrimus* with two other species (Group 1 of Castellano and O'Dell 1997). The primary guidance is to maintain current habitat and microclimatic conditions at all known sites. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *B. pulcherrimus*:

- As a mycorrhizal species *B. pulcherrimus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.4.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *B. pulcherrimus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table BOPU-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 107 observations from BLM and Forest Service geodatabases were converted into 44 sites in the NSO range (region). Table BOPU-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table BOPU-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure BOPU-1 displays the regional distribution of the species across BLM and NFS lands, and Figure BOPU-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE BOPU-1

Number of *Boletus pulcherrimus* Sites (2013)

Location*	Number of Sites
Regional Area	44
Local Area	14
Analysis Area (Project Area)	7 (5)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE BOPU-2

Distribution of *Boletus pulcherrimus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	5	-	-
Forest Service	31	14	7
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	8	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011

TABLE BOPU-3

Distribution of *Boletus pulcherrimus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	2	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	11	-	-
Congressionally Reserved (CR)	**2**	**-**	**-**
Late Successional Reserve (LSR)	**17**	**10**	**4**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	6	4	3
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Bolded allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

B. pulcherrimus has a wide, but scattered, distribution across eight physiographic provinces in Washington (Western Lowlands and Western Cascades), Oregon (Willamette Valley, Cascades East and West, and Klamath Mountains), and California (Klamath and Coast). A large cluster of sites is found in the southern Cascade Range in Oregon, where the species appears to be locally abundant; however, other sites are scattered across the NSO range and appear to be somewhat isolated. *B. pulcherrimus* does not appear to be well distributed within its range in the NSO range.

Eight of the 44 sites in the region are on private, state, or other lands; and 36 sites are on BLM and NFS lands. Sites managed by the BLM Districts that encompass the project area include four sites in the Medford District and one site in the Roseburg District. Sites managed by the National Forests that encompass the project area include 20 sites on the Winema National Forest and eight sites on the Rogue River National Forest. Sites managed by other National Forests include one site on the Klamath National Forest, one site on the Six Rivers National Forest, and one site on the Mt. Baker-Snoqualmie National Forest.



Figure BOPU-1. Regional Distribution of *Boletus pulcherrimus*

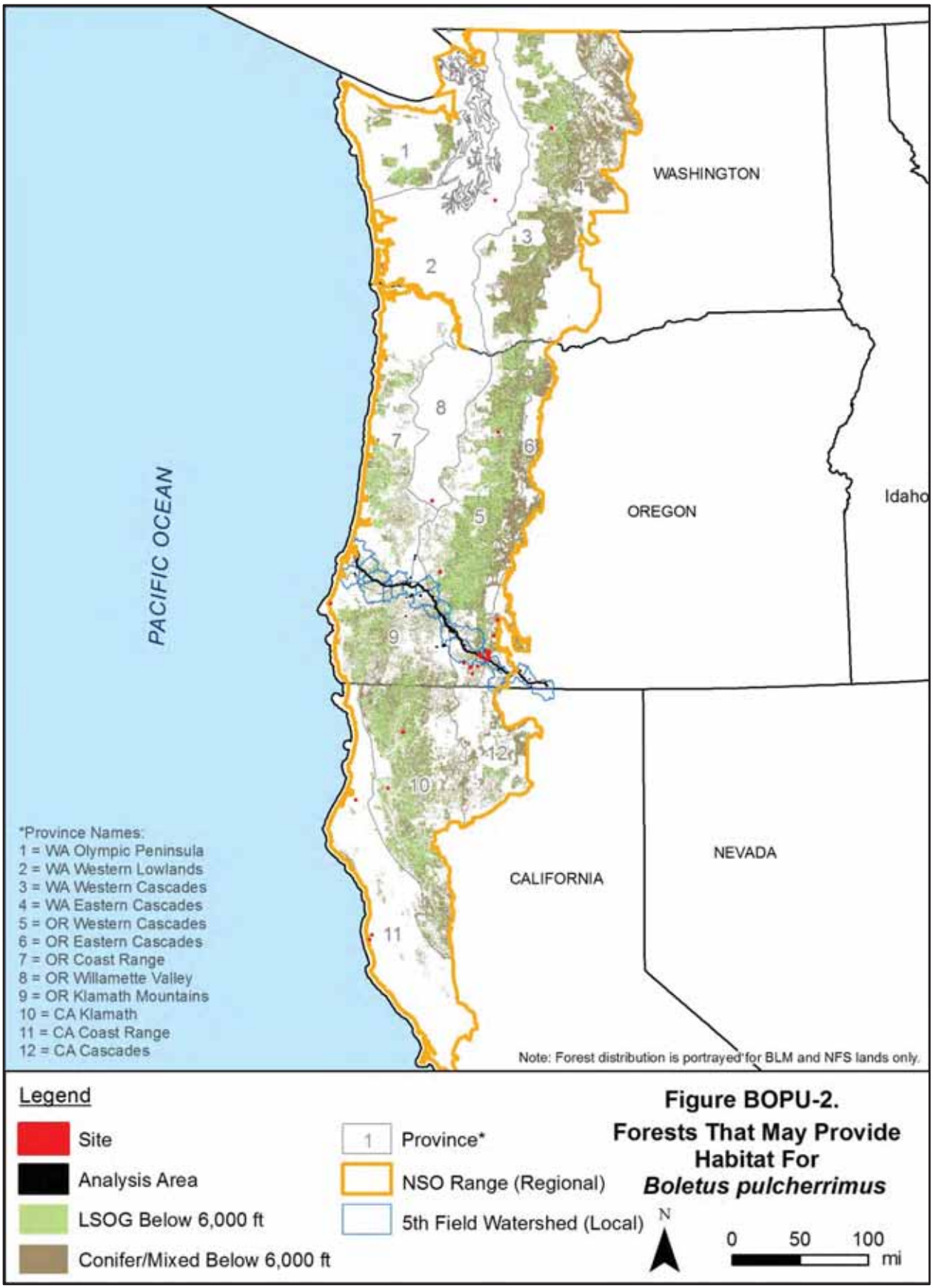


Figure BOPU-2.
Forests That May Provide Habitat For *Boletus pulcherrimus*

Across the NSO range, 20 sites are located on reserve lands managed by BLM and the Forest Service, including 18 sites in LSRs and two sites in Congressionally Reserved areas. This represents 56 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

B. pulcherrimus is primarily found in LSOG forests based on available data (41 of 44 total sites are in LSOG) and may prefer certain microclimate conditions of these forests, but it has also been found in open stands and along roadsides. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl, including the LSOG component of these forests, within this range could provide habitat for *B. pulcherrimus* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the NSO range, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table BOPU-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure BOPU-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE BOPU-4

Extent of Forests that Could Provide Habitat for *Boletus pulcherrimus* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *B. pulcherrimus* is found in two 5th field watersheds, Little Butte Creek and Spencer Creek, that overlap the project area (see Table BOPU-5 and Figure BOPU-3). The sites are relatively close to one another in the Cascade Range. Several sites are located to the north and south in the regional vicinity, and dispersal opportunities appear to be available between the local sites and other sites in the region. The cluster of sites in the local area is part of the largest abundance of sites in the region (the southern Cascade Range in Oregon).

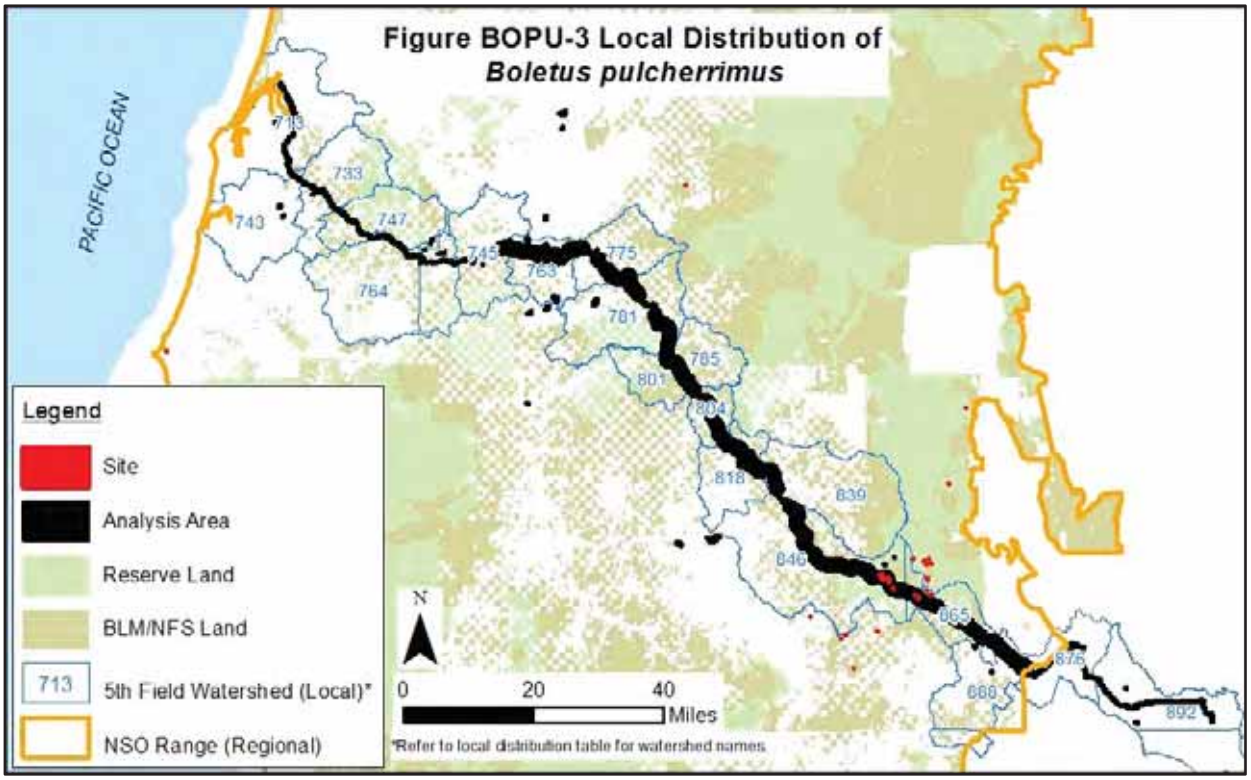
All sites (14) in the local area are on Forest Service-managed lands on the Rogue River and Winema National Forests. Ten of these sites are in LSRs, including all of the sites in the Little Butte Creek watershed and two sites in the Spencer Creek watershed.

TABLE BOPU-5

Distribution of *Boletus pulcherrimus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	8	8
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	6	2
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also exist in the Cascade Range in the local area where surveys have not been completed, based on the number of sites concentrated in the mountain range in the local and nearby regional areas and the extent of forests that may provide suitable habitat (see Figures BOPU-2 and BOPU-3).

Analysis/Project Area Distribution

The analysis area contains seven sites of *B. pulcherrimus*, and the project area contains five sites. The sites are in the Little Butte Creek and Spencer Creek 5th field watersheds on land managed by the Rogue River and Winema National Forests. The sites are near one another and relatively close to other sites in the local vicinity, all of which are on Forest Service-managed lands (see Local Distribution discussion above). Four of the sites are in LSRs, and the other three sites are on lands designated as Other (Matrix).

Surveys for the PCGP Project resulted in 18 total observations of *B. pulcherrimus* in 15 locations in or near the project area during 2010–2011 (Siskiyou BioSurvey LLC 2012a). An estimated 14 of these recorded observations comprise the seven sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, five sites are between MPs 161 and 168.

Project Impacts

Analysis

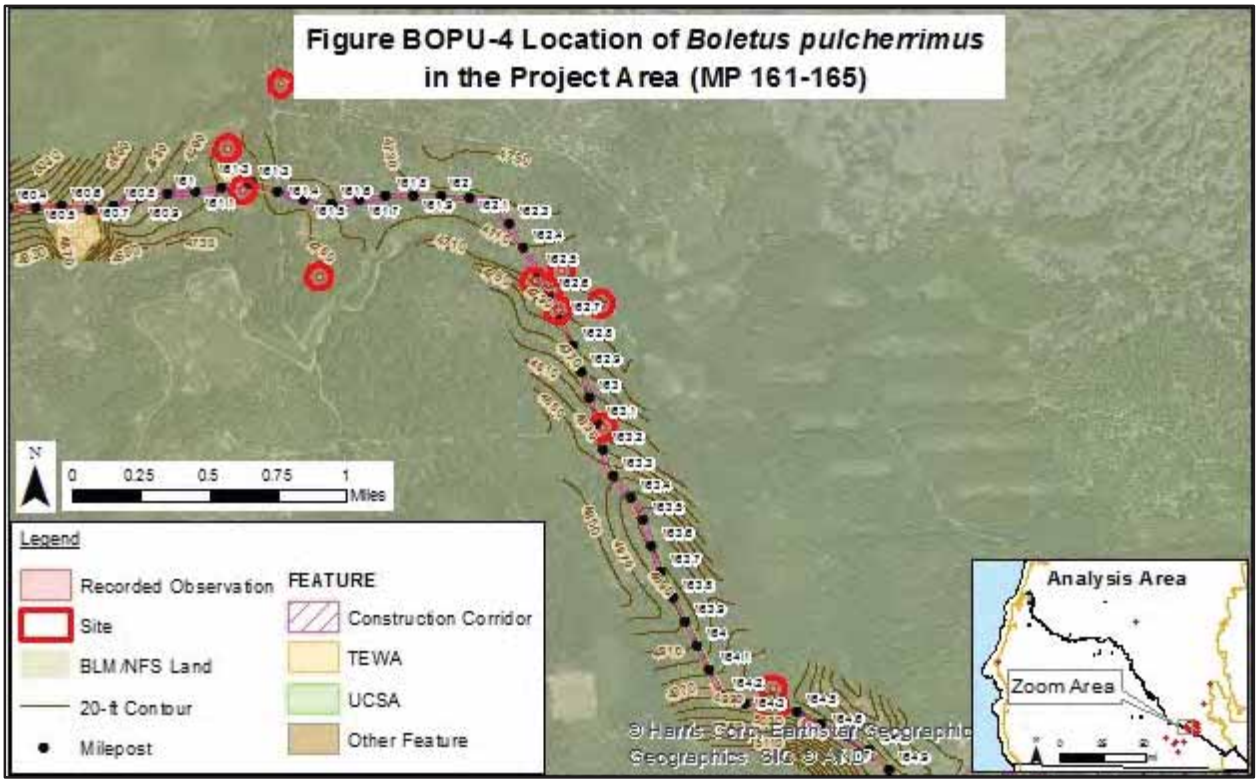
The PCGP Project would affect seven sites out of the 36 BLM- and Forest Service-managed sites in the region, representing approximately 19 percent of the sites (or seven out of 44 total sites on all lands in the NSO range). Table BOPU-6 presents an overview of the features of the PCGP Project that would affect the *B. pulcherrimus* sites. The construction corridor and associated work and storage areas would affect approximately 10.3 acres (27 percent) of the sites (the sites encompass 38 acres), with some sites experiencing greater impacts than others (see Figures BOPU-4 and BOPU-5). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *B. pulcherrimus* in and near the project area. Due to the proportion of sites affected, the effects on seven sites could potentially alter the distribution of the species in the NSO range if site persistence is affected. This discussion presents a detailed analysis of the features of the PCGP Project that could affect site persistence.

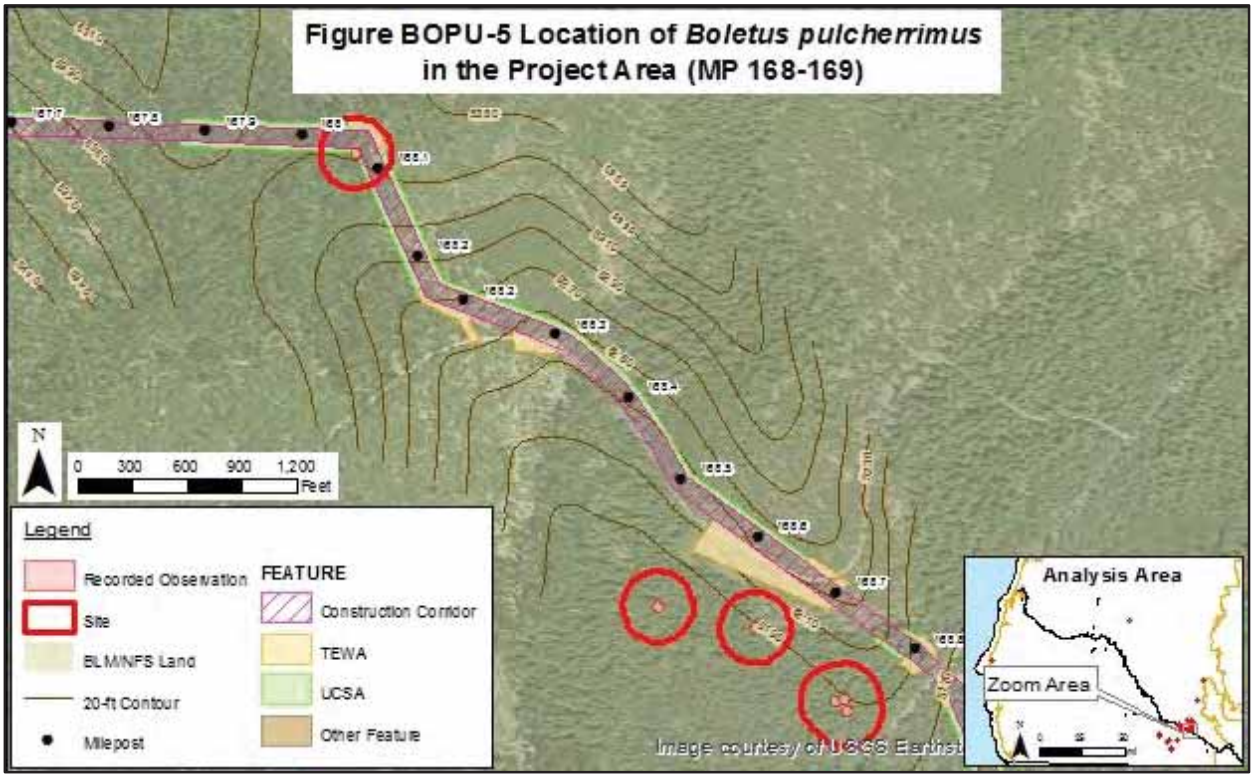
TABLE BOPU-6

Impacts to *Boletus pulcherrimus* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	5	6.3 ac
Temporary Extra Work Area (TEWA)	5	1.7 ac
Uncleared Storage Area (UCSA)	4	2.3 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.


Figure BOPU-4 Location of Boletus pulcherrimus in the Project Area (MP 161-165)
N
0 0.25 0.5 0.75 1 Miles
Legend
Recorded Observation
Site
BLM/NFS Land
20-ft Contour
Milepost
FEATURE
Construction Corridor
TEWA
UCSA
Other Feature
Analysis Area
Zoom Area


Figure BOPU-5 Location of Boletus pulcherrimus in the Project Area (MP 168-169)
N
0 300 600 900 1,200 Feet
Legend
Recorded Observation
Site
BLM/NFS Land
20-ft Contour
Milepost
FEATURE
Construction Corridor
TEWA
UCSA
Other Feature
Analysis Area
Zoom Area

The PCGP Project would result in ground disturbance and vegetation removal in five out of the seven sites in the analysis area (Table BOPU-7). The only recorded observations of the species in three of the sites (MP 161.2-161.3, MP 163.1, and MP 168.1) are in the central portions of the sites and would likely be removed during activities within the corridor (see Figures BOPU-4 and BOPU-5). The site at MP 162.5-162.7 is a large site and includes four observations, two of which are within the corridor and would likely be removed. One observation is in a UCSA and may be affected by material storage, but the fourth observation is outside the project area and would not likely be directly affected. The site at MP 164.4 is also a larger site with three observations, and two of the observations are within the corridor and would likely be removed. The third observation is outside the project area and would not likely be directly affected. For all of the sites, individuals outside the corridor and TEWAs may also be subject to indirect effects associated with the PCGP Project based on the proximity of project activities to the sites, as discussed below.

TABLE BOPU-7

Site-Specific Overview of Impacts to *Boletus pulcherrimus* Sites

Site Location	Source of Impacts	Area of Disturbance	Individuals Likely to Persist?
MP 161.2-161.3	Corridor	0.9 ac	No
	TEWA	0.5 ac	
MP 162.5-162.7	Corridor	2.4 ac	Yes
	TEWA	0.3 ac	
	UCSA	1.3 ac	
MP 163.1	Corridor	0.9 ac	No
	TEWA	0.5 ac	
	UCSA	0.2 ac	
MP 164.4	Corridor	1.2 ac	Yes
	TEWA	0.2 ac	
	UCSA	0.3 ac	
MP 168.1	Corridor	1.0 ac	No
	TEWA	0.3 ac	
	UCSA	0.4 ac	
MP 168.7	n/a	n/a	Yes
MP 168.8	n/a	n/a	Yes

Notes: MP = milepost; ac = acres

Establishment of the construction corridor and TEWAs would likely remove individuals of *B. pulcherrimus* in five sites and modify microclimate conditions around individuals that are not removed. The removal of forests and host trees and disturbance to soil could negatively affect *B. pulcherrimus* in adjacent areas by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees, although the species appears to be somewhat resilient to edge effects in some areas (e.g., it has been found along roadsides). Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. *B. pulcherrimus* is not likely to persist at three of the sites because of the extent of impacts within the sites and the proximity of the recorded observations to the corridor (see Table BOPU-7). *B. pulcherrimus* is likely to persist at the two larger sites (MP 162.5-162.7 and MP 164.4), despite impacts to some individuals, because some observations within those sites are more than 100 feet from the corridor, where direct effects are not anticipated and indirect effects are unlikely. The site at MP 162.5-162.7 is in a heavily forested area on a north-facing slope, and at least one individual is likely to persist in the site more than 300 feet northeast and downslope of the corridor. The site

at MP 164.4 has similar conditions, and one individual about 180 feet north and downslope of the corridor is likely to persist. A road crosses through the southern part of this site, and the corridor would follow the north side of the road where two observations have been recorded and cannot be avoided.

The two other sites in the analysis area (about 280-300 feet west of MP 168.7 and MP 168.8) are not likely to be affected by activities within the corridor or TEWAs. These sites are in a forested area on a south-facing slope, and more open forests exist to the northeast/east where the corridor and TEWAs would be located. Vegetation removal and disturbance in the project area are not expected to affect microclimate conditions in the sites based on their distance from the activities and the existing habitat conditions.

Based on this analysis, *B. pulcherrimus* is not likely to persist at three of the seven sites in the analysis area following project implementation. Several sites are located in the vicinity of the analysis area, and the four sites that are expected to persist are distributed across the Cascade Range in southern Oregon. The species would continue to be locally abundant in the southern Cascade Range in Oregon. Two of the affected sites are in LSRs, and the third is on land designated as Other (Matrix).

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *B. pulcherrimus*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the three sites as a result of the PCGP Project, 11 sites of *B. pulcherrimus* would remain on NFS lands in the local area, including eight in reserves, and 33 sites, including 18 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 18 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 56 percent of the remaining *B. pulcherrimus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest

Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *B. pulcherrimus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *B. pulcherrimus* has a wide, but scattered, distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (36 on BLM and NFS lands). The species is most abundant in the southern Cascade Range in Oregon, but less abundant in other areas. The currently known number of sites on BLM and NFS lands is an increase of 16 sites on BLM and NFS lands since 2007, with many sites documented during the PCGP Project surveys.
    - An estimated 56 percent of the sites (20 sites) are in reserves, which is an increase of about six sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, but fewer sites are located in these areas. A subcomponent of these forests likely provides habitat for *B. pulcherrimus*.
- The PCGP Project would affect seven of 36 BLM- and Forest Service-managed sites of *B. pulcherrimus*, representing approximately 19 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at three of the sites in the analysis area, a moderate-high number of sites (33) would continue to be documented on BLM and NFS lands in the region with a wide, but scattered, distribution across Washington, Oregon, and California. Several sites (11 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across two 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at two sites in LSRs, and the percentage of sites in reserves would remain the same (56 percent). Of the remaining sites, 16 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and two are in Congressionally Reserved areas where management activities that may adversely affect *B. pulcherrimus* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of

coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.

- The remaining forests could support additional populations of *B. pulcherrimus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO, particularly in the Cascade Range, that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.4.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *B. pulcherrimus* at three sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 33 sites would remain on BLM and NFS lands across the region, and 11 sites would remain on NFS lands in the local area. Although the PCGP Project would affect site persistence of *B. pulcherrimus* at three sites, these sites are part of a large cluster of sites in the Cascade Range where the species is locally abundant, and four sites in the analysis area would be expected to persist. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *B. pulcherrimus* would persist in the region without considering the three sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Oregon Cascade Range, several sites are scattered across the region and are less likely to be collectively affected by a single event.

The PCGP Project would not be able to avoid impacts to all *B. pulcherrimus* sites in the analysis area, although some individuals or populations within the sites and some sites are expected to persist following project implementation. Based on the above conclusions, avoidance of the five *B. pulcherrimus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *B. pulcherrimus* sites affected by the PCGP Project. The applicant shall

prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.5 BONDARZEWIA MESENTERICA

Bondarzewia mesenterica is an annual polyphore fungus in the Bondarzemiaceae family. It does not have a common name.

2.5.1 Regulatory Status and Ranking

The 2001 ROD identifies *B. mesenterica* as a Category B (rare) species. The ORBIC evaluated *B. mesenterica* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, both globally and in Oregon (G4?, S4, respectively), although its global ranking was uncertain. The species is not currently on the ORBIC Lists. *B. mesenterica* is not a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.5.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *B. mesenterica*. It is an annual polypore fungus and is most easily detected in late summer and fall, fruiting August through December (Catellano et al. 1999). The fungus is parasitic or saprophytic, causing root rot in Pinaceae species (Castellano and O'Dell 1997). The fruit bodies tend to be large and conspicuous, fruiting repeatedly in the same location. This may indicate the populations are long-lived (Holthausen et al. 1994). As with other polypore species, *B. mesenterica* is presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997). Based on the presumed dispersal capability, extirpated populations may become re-established through natural recolonization and may recover from decreased abundance over a period of several years (ORBIC 2004).

Range

B. mesenterica is found in Europe, Asia, and North America. In North America, *B. mesenterica* has been found in the Pacific Northwest, including British Columbia, Idaho, Washington, Oregon, and northern California (ORBIC 2004). In the Pacific Northwest, the fungus has been found most often in Oregon's Coast and Cascade Ranges. The currently known range of the

species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across North America, Europe, and Asia. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under the Threats section below.

Population Status

The ORBIC reported *B. mesenterica* from more than 200 element occurrences across the NSO range in 2004. The species' range also includes portions of Europe and Asia, but population estimates are not available for those regions. In the Pacific Northwest, Oregon had the highest number of occurrences at more than 150 in 2004. Washington had about 50 occurrences, and California had about 15 occurrences (ORBIC 2004). According to ORBIC (2004), *B. mesenterica* was considered to be common in the northerly latitudes within the NSO range, but less common in the species' southern range. Populations of the species appeared to be stable in the Pacific Northwest, as long as old-growth forests remain or other forests mature. The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 112 new sites of *B. mesenterica* in the NSO range between 1998–2006, and 145 total sites were documented by 2006, including 45 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 172 sites on federal lands and 195 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2011 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, and resulted in seven new observations of individuals or populations of *B. mesenterica*. Based on the increased number of sites since 1998 with increased surveys (more than a 4-fold increase between 1998–2006 per Molina 2008 records) and considering the species is fairly conspicuous, more survey effort would be expected to locate additional populations within the NSO range, particularly in Oregon's Coast and Cascade Ranges where most observations have been reported. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

B. mesenterica occurs as large fleshy sporocarps on the soil surface in coniferous and mixed hardwood-coniferous forests (Castellano et al. 1999, Holthausen et al. 1994). It has primarily been found in high elevation, late-successional, mixed-conifer stands in Oregon, Washington, and California (Holthausen et al. 1994). The sporocarps are commonly associated with stumps and snags (Castellano et al. 1999), but are also found on living pine trees (Siskiyou BioSurvey 2012a). *B. mesenterica* is not likely to be found away from wood substrate (Cushman and Huff 2007). The presence of conifers is required (Castellano et al. 1999), with *Abies* as a possible preferred host tree (Holthausen et al. 1994).

Threats

Threats to *B. mesenterica* are presumably those actions that disrupt stand conditions necessary for its survival, particularly damage to host trees and any changes to the microclimate conditions necessary for sporocarp production (Castellano and O'Dell 1997). Other threats in coniferous forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). *B. mesenterica* is rarely taken for food due to its tough texture and bitter taste (Holthausen et al. 1994). The decline of LSOG forests is considered to be a long-term threat (ORBIC 2004).

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *B. mesenterica* (Group 19 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites, which will maintain viable populations of the species until additional information on the effects of various management activities can be obtained and evaluated. Populations on federal land should be managed to maintain population viability. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized, and damage to or removal of host trees, snags, and stumps should be prevented. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *B. mesenterica*:

- As a wood saprobe, *B. mesenterica* probably does not extend beyond the available substrate (log, stump, etc.). Retention of habitat patches across a landscape could provide possible areas of refugia and potential areas for colonization. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.5.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *B. mesenterica* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table BOME-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 298 observations from BLM and Forest Service geodatabases were converted into 154 sites in the NSO range (region). Table BOME-2 presents the total number of sites on BLM and NFS land

and other land ownerships across the regional, local, and analysis areas. Table BOME-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure BOME-1 displays the regional distribution of the species across BLM and NFS lands, and Figure BOME-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE BOME-1

Number of *Bondarzewia mesenterica* Sites (2013)

Location*	Number of Sites
Regional Area	154
Local Area	37
Analysis Area (Project Area)	6 (5)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	78	32	2
Forest Service	63	5	4
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	25	6	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE BOME-3

Distribution of *Bondarzewia mesenterica* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	5	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	6	-	-
Congressionally Reserved (CR)	**6**	**-**	**-**
Late Successional Reserve (LSR)	**37**	**1**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**5**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	89	36	6
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

B. mesenterica is widely distributed across 11 physiographic provinces in Washington (Olympic Peninsula and Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, Willamette Valley, and Klamath Mountain), and California (Coast, Cascades, and Klamath). Most sites are found along the western Cascade Range, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the Klamath Mountains, Coast Range, and other outlying areas with some clusters of sites in southwestern Oregon and northwestern Washington. *B. mesenterica* appears to be well distributed in the western Cascade Range in Oregon and Washington and Klamath Mountains based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.



Figure BOME-1.
Regional Distribution of
Bondarzewia mesenterica



Figure BOME-2.
Forests That May Provide Habitat For *Bondarzewia mesenterica*

TABLE BOME-2

Distribution of *Bondarzewia mesenterica* Across Federal, Private, and Other Lands

Twenty-five of 154 sites are located on private, state, or other lands (at least partially); three sites are on NPS lands (Mount Rainier and Olympic National Parks); and 141 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include five sites in the Klamath Falls Resource Area of the Lakeview District, one site in the Coos Bay District, 44 sites in the Medford District, and three sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include four sites on the Rogue River National Forest and 13 sites on the Umpqua National Forest. The remaining 72 sites on BLM and NFS lands are in the Salem and Eugene Districts and on the Gifford Pinchot, Klamath, Mendocino, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 47 sites are located on reserve lands managed by BLM and the Forest Service, including 37 in LSRs, five in Known Owl Activity Centers, and six in Congressionally Reserved areas. This represents 33 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

B. mesenterica is more commonly found in LSOG forests based on available data (118 of 154 total sites are in LSOG), but it is also somewhat common in non-LSOG forests. It may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl, including the LSOG component of these forests, within this range could provide habitat for *B. mesenterica* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the NSO range, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table BOME-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure BOME-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE BOME-4

Extent of Forests that Could Provide Habitat for *Bondarzewia mesenterica* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *B. mesenterica* is found in six 5th field watersheds that overlap the project area (see Table BOME-5 and Figure BOME-3). Most of the sites are clustered and near one

another in the West Cascade Range and Klamath Mountains in the Little and Big Butte Creeks and Trail Creek watersheds. Site in the Myrtle Creek, South Umpqua River, and Klamath River-John C Boyle watersheds are somewhat distant from the clustered sites. Within the Cascade Range and Klamath Mountains, multiple avenues of connectivity appear to be available between sites based on the extent of forests and abundance of sites in the mountain ranges, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located to the north in the Cascade Range and to the west in the Klamath Mountains.

All of the 37 sites in the local area are on BLM or NFS lands (at least partially), and six sites are at least partially on private lands. Of the 37 sites in the local area, two sites are in reserves (LSR and Northern Spotted Owl Activity Center) and 36 sites are on land designated as Other (Matrix) (the site in an LSR is partially on land designated as Other). The two sites in LSRs represent 5 percent of the sites on BLM and NFS lands. Two of the sites in the Little Butte Creek watershed are in reserves.

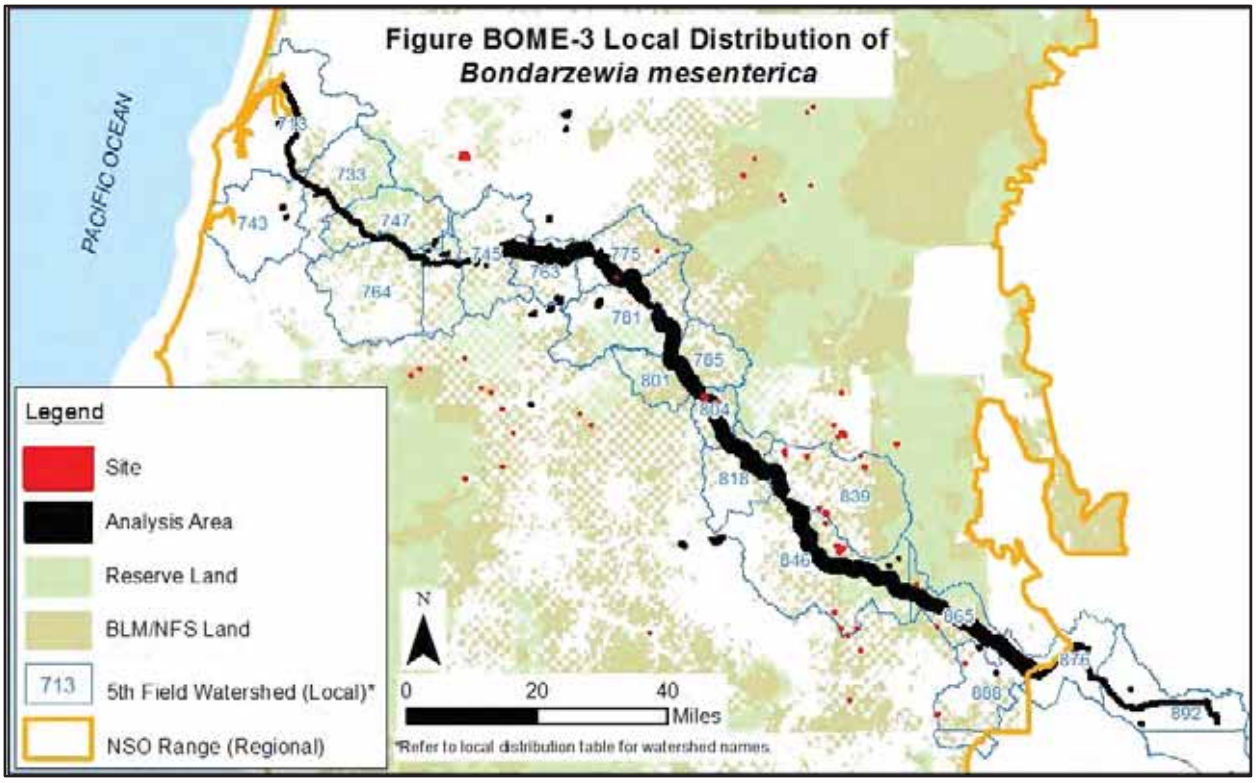
Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also exist in the Cascade Range in the local area where surveys have not been completed, based on the number of sites concentrated in the mountain range in the local and nearby regional areas and the extent of forests that may provide suitable habitat (see Figures BOME-2 and BOME-3).

TABLE BOME-5

Distribution of *Bondarzewia mesenterica* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	9	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	4	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	17	2
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	2*	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1*	-
Spencer Creek (865)	-	-
Trail Creek (804)	5	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because one site occurs in multiple watersheds and the counts overlap, as noted below:
*One site is partially in the Myrtle Creek and South Umpqua River watersheds.



Analysis/Project Area Distribution

The analysis area contains six sites of *B. mesenterica*, and the project area contains five sites. The analysis area sites are on BLM-managed lands (Roseburg and Medford Districts) and Forest Service-managed lands (Umpqua National Forest) in three 5th field watersheds (Myrtle Creek, South Umpqua River, and Trail Creek). The sites in the Trail Creek watershed are relatively close to one another in the central portion of the analysis area. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

The sites in the analysis area are located on lands designated as Other (Matrix). None of the sites are on reserve lands.

Surveys for the PCGP Project resulted in eight total observations of the species in seven locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). An estimated seven of these recorded observations comprise the six sites in the analysis area; the other observation is in a site outside the analysis area. Within the project area, one site is at MP 82.9, and four sites are between MP 112.2 and MP 113.

Project Impacts

Analysis

The PCGP Project would affect six sites out of the 141 sites on BLM- and Forest Service-managed lands in the region, representing approximately 4 percent of the sites (or six out of 154 total sites on all lands in the NSO range). Table BOME-6 presents an overview of the features of the PCGP Project that would affect the *B. mesenterica* sites. The construction corridor and associated work and storage areas would affect approximately 6.4 acres within five sites (about

38 percent of all sites in the analysis area); the sixth site may be indirectly affected by nearby PCGP Project activities. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *B. mesenterica* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 4.1 acres of vegetation and soil within five sites and could result in the removal of *B. mesenterica* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.4 acre within three sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *B. mesenterica* in adjacent areas by removing its habitat, disturbing soil around roots of conifer trees, and affecting its ability to attach to roots, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 1.9 acres of understory habitat in five sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Hydrostatic testing would disturb less than 0.01 acre within one site, but is not expected to affect individuals within the site. The sixth site in the analysis area is near a road and would not be directly affected by project activities. Indirect effects associated with road improvements would be similar to the microclimate changes discussed for the construction corridor and TEWAs and could affect site persistence.

TABLE BOME-6

Impacts to *Bondarzewia mesenterica* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	5	4.1 ac
Temporary Extra Work Area (TEWA)	3	0.4 ac
Uncleared Storage Area (UCSA)	5	1.9 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	1	<0.01 ac

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *B. mesenterica*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the six sites as a result of the PCGP Project, 31 sites of *B. mesenterica* would remain on BLM and NFS lands in the local area, including two in reserves, and 135 sites, including 47 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 47 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 35 percent of the remaining *B. mesenterica* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *B. mesenterica* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - This species was removed from the S&M Standards and Guidelines in Oregon via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M. The species remained on the list as Category B in Washington and California.
    - *B. mesenterica* has a wide distribution across 11 physiographic provinces and three states in the region and a moderate-high number of overall sites (141 on BLM and NFS lands). The species appears to be well distributed in the western Cascade Range in Oregon and Washington and in the Klamath Mountains. The currently known number of sites on BLM and NFS lands is an increase of nine sites since 2006 per Molina (2008), with several sites documented during the PCGP Project surveys.
    - An estimated 33 percent of the sites (47 sites) are in reserves, which is an increase of about two sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and

mixed hardwood-coniferous forests, but fewer sites are located in these areas. A subcomponent of these forests likely provides habitat for *B. mesenterica*.

- The PCGP Project would affect six of 141 BLM- and Forest Service-managed sites of *B. mesenterica*, representing approximately 4 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the six sites, a moderate-high number of sites (135) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (31 sites) would remain in the local vicinity of the analysis area; these sites would be distributed across four 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect site persistence at any sites in reserves, and the percentage of sites in reserves would be about the same (35 percent). Of the remaining sites, 42 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and six are at least partially in Congressionally Reserved areas where management activities that may adversely affect *B. mesenterica* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *B. mesenterica*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.5.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *B. mesenterica* at six sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 135 sites would remain on BLM and NFS lands across the region, and 31 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *B. mesenterica* at six sites, these sites are part of the many sites in the Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *B. mesenterica* would persist in the region without considering the six sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests below 6,000 feet msl (a

negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *B. mesenterica* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the six *B. mesenterica* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *B. mesenterica* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.6 CANTHARELLUS SUBALBIDUS

Cantharellus subalbidus is a chanterelle fungus in the Cantharellaceae family. It is commonly known as a white chanterelle.

2.6.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. subalbidus* as a Category D (uncommon) species. The ORBIC evaluated *C. subalbidus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, both globally and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. *C. subalbidus* is not a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.6.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *C. subalbidus*. *C. subalbidus* is a symbiotic mycorrhizal species, obtaining its nutrients from its association with a host tree. Studies have shown that if the host tree dies, *C. subalbidus* will die shortly after (ORBIC 2004). It is most easily detected in the fall through winter, during its fruiting season (Catellano et al. 2003). As with other chanterelle species, *C. subalbidus* is presumed to be dependent on wind for dispersal of spores (Trappe 2004).

Range

C. subalbidus is endemic to the Pacific Northwest region of North America, found in northern California, Oregon, Washington, and Idaho. The species has not been found in British Columbia, but it is likely present there. The species is relatively abundant and widespread throughout its range except in the Coast Range in Oregon (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across the Pacific Northwest. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under the Threats section below.

Population Status

The ORBIC reported *C. subalbidus* from more than 300 element occurrences across the NSO range in 2004, noting that the species is abundant with numerous collections and sightings. Estimates of occurrences in Oregon and other states were not presented by ORBIC (2004). The species was found in 33 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 215 new sites of *C. subalbidus* in the NSO range between 1998–2006, and 270 total sites were documented by 2006, including 107 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 274 sites on federal lands and 325 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area, and persistence surveys were conducted for some species in nearby LSRs (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category D species were recorded during these surveys, but did not result in new observations of *C. subalbidus*. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (5-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. subalbidus occurs as single or gregarious sporocarps in duff in mixed hardwood and coniferous forests (Castellano et al. 2003). Little is known about the habitat of this species, but it

may be similar to other chanterelle species (Holthausen 1994, Trappe 2004). As with other chanterelle species, *C. subalbidus* may prefer western hemlock as a host tree, forming mycorrhizae with Douglas-fir only when western hemlock is not present (Trappe 2004). A similar species, *C. tubaeformis*, prefers old-growth or late-seral forests, as well as forests with a high amount of well-decayed coarse woody debris (Trappe 2004). Another similar species, *C. formosus*, is closely associated with decaying coarse woody debris and prefers LSOG forests (Holthausen 1994). The same habitat characteristics may be true for *C. subalbidus*.

Threats

Threats to *C. subalbidus* are presumably those actions that disrupt stand conditions necessary for its survival, particularly host tree mortality (ORBIC 2004). Other specific short-term or long-term threats to the species are not currently known. C. *subalbidus* is often collected for food, but it is unknown if this is considered to be a major threat to known populations (California Fungi 2013).

Management Recommendations

As a Category D S&M species, the direction from the 2001 ROD is to manage high priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for C. *subalbidus*:

- As a mycorrhizal species, *C. subalbidus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.6.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. subalbidus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CASU-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 379 observations from BLM and Forest Service geodatabases were converted into 279 sites in the NSO range (region). Table CASU-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CASU-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the

regional, local, and analysis areas. Figure CASU-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CASU-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE CASU-1

Number of *Cantharellus subalbidus* Sites (2013)

Location*	Number of Sites
Regional Area	279
Local Area	13
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CASU-2

Distribution of *Cantharellus subalbidus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	67	7	-
Forest Service	196	6	1
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	21	2	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CASU-3

Distribution of *Cantharellus subalbidus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	13	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	10	-	-
Congressionally Reserved (CR)	**16**	**-**	**-**
Late Successional Reserve (LSR)	**113**	**3**	**-**
Marbled Murrelet Area (LSR3)	**2**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**3**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	5	-	-
Other (Matrix, Riparian Reserve, Other)	114	10	1
Riparian Reserve**	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

C. subalbidus is widely distributed across 11 physiographic provinces in Washington (Western and Eastern Cascades and Olympic Peninsula), Oregon (Coast Range, Cascades East and West, Willamette Valley, and Klamath Mountains), and California (Coast, Cascades, and Klamath). Sites are widely distributed along the Coast Range, Klamath Mountains, and Cascades Range, and many sites are clustered or relatively close to one another in groups. Scattered sites are located in other outlying areas. *C. subalbidus* appears to be well distributed in the Coast Range, Klamath Mountains, and Cascades Range where sites are widely distributed in many clusters across the mountain ranges.



Figure CASU-1. Regional Distribution of *Cantharellus subalbidus*

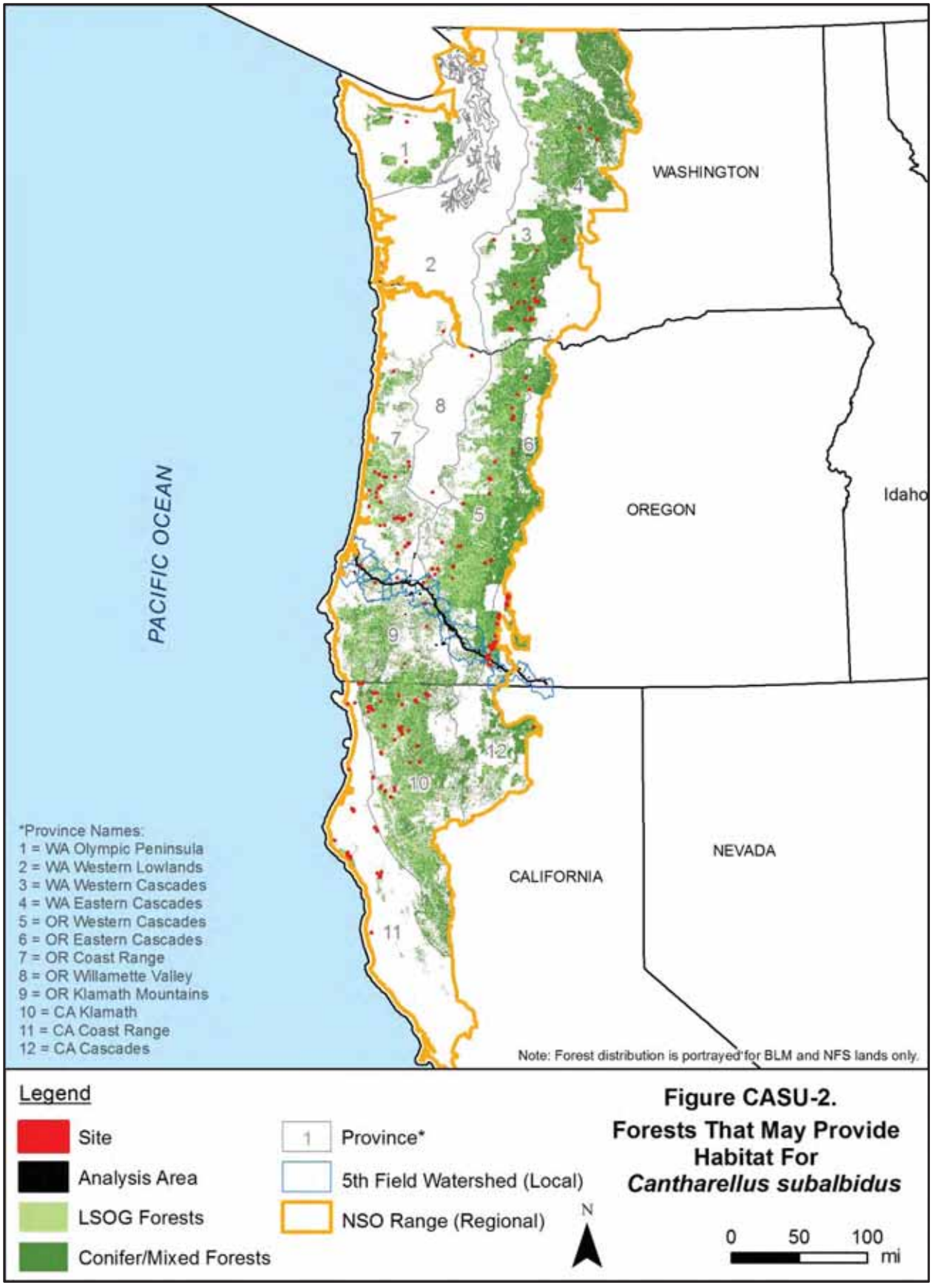


Figure CASU-2.
Forests That May Provide Habitat For *Cantharellus subalbidus*

Twenty-one of 279 sites are located on private, state, or other lands (at least partially); three sites are on NPS lands (Olympic National Park); and 263 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include two sites in the Klamath Falls Resource Area of the Lakeview District, six sites in the Coos Bay District, two sites in the Medford District, and 23 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include 78 sites on the Winema National Forest and 10 sites on the Umpqua National Forest. The remaining 142 sites on BLM and NFS lands are in the Arcata and Salem Districts and on the Gifford Pinchot, Klamath, Mt. Baker-Snoqualmie, Siuslaw, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 132 sites are located on reserve lands managed by BLM and the Forest Service, including 113 in LSRs, two in Marbled Murrelet Areas, three in Known Owl Activity Centers, and 16 in Congressionally Reserved areas (two sites are in two types of reserves). This represents 50 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

C. subalbidus is more commonly found in LSOG forests based on available data (219 of 279 total sites are in LSOG), but it is somewhat common in non-LSOG forests. It may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 7,000 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. subalbidus* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table CASU-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure CASU-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CASU-4

Extent of Forests that Could Provide Habitat for *Cantharellus subalbidus* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. subalbidus* is found in six 5th field watersheds that overlap the project area (see Table CASU-5 and Figure CASU-3). The sites are scattered across the local area, with a large cluster in the Spencer Creek watershed in the eastern Cascade Range. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Several regional sites are located in the vicinity of the local area sites.

All of the 13 sites in the local area are on BLM and NFS lands, with two sites partially on private land. Most of the local sites are on land designated as Other (Matrix); three sites are in LSRs, representing 23 percent of the BLM- and Forest Service-managed sites. The sites in LSRs are distributed across three watersheds (Table CASU-5).

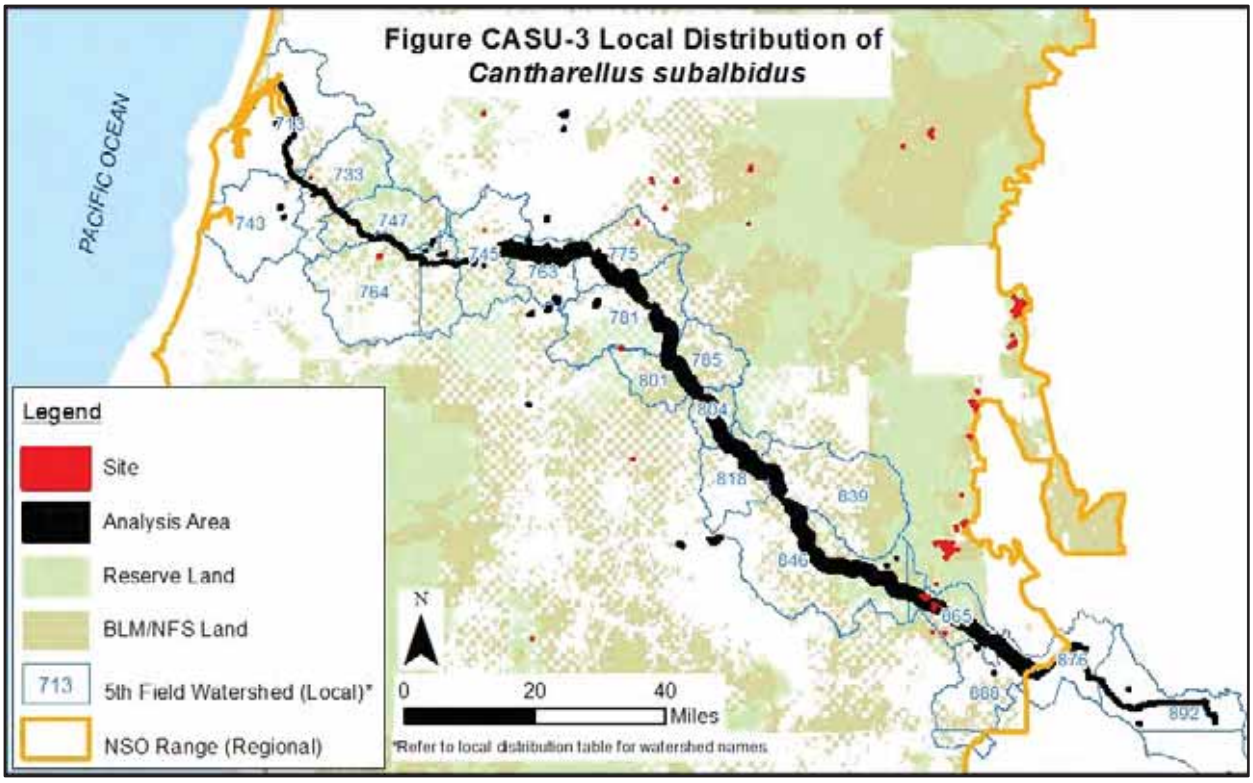
Coniferous and mixed hardwood-coniferous forests encompass approximately 1.3 million acres on BLM and NFS lands in the local area, including 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures CASU-2 and CASU-3).

TABLE CASU-5

Distribution of *Cantharellus subalbidus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	1	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	2	-
North Fork Coquille River (733)	1	-
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	7	1
Trail Creek (804)	-	-
Upper Cow Creek (801)	1	1

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *C. subalbidus*. This site is on Forest Service-managed land (Winema National Forest) on land designated as Other (Matrix). It is in the Spencer Creek watershed. Several sites are located within the immediate vicinity of the site, including in the same watershed (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in two total observation of the species in two locations near the project area between 2010–2012 (Siskiyou BioSurvey LLC 2012a). However, neither of these recorded observations falls within the analysis area. The recorded observation of the species in the analysis area is from agency databases and was recorded in 2000. The site is between MPs 172 and 172.1.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 263 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 279 total sites on all lands in the NSO range). Table CASU-6 presents an overview of the features of the PCGP Project that would affect the *C. subalbidus* site. The construction corridor and associated storage areas would affect approximately 0.3 acre within the site (about 11 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. subalbidus* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.1 acres of vegetation and soils within the site and could remove individuals of *C. subalbidus*. Disturbance in a TEWA would result in similar impacts on 0.2 acre of the site. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and host trees and disturbance to soil could negatively affect *C. subalbidus* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWA could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.04 acre of understory habitat in the site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE CASU-6

Impacts to *Cantharellus subalbidus* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.1 ac
Temporary Extra Work Area (TEWA)	1	0.2 ac
Uncleared Storage Area (UCSA)	1	0.04 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres

Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *C. subalbidus*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, 12 sites of *C. subalbidus* would remain on BLM land in the local area, with three in reserves, and 262 sites, including 132 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 132 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on

these site counts, approximately 50 percent of the remaining *C. subalbidus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. subalbidus* is a Category D (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines in Oregon via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M. The species remained on the list as Category D in Washington and California.
    - *C. subalbidus* has a wide, but scattered, distribution across 11 physiographic provinces and three states in the region and a moderate-high number of overall sites (263 on BLM and NFS lands). The species is well distributed in the Coast Range, Klamath Mountains, and Cascades Range. The currently known number of sites on BLM and NFS lands is about the same as the number of sites documented in 2007, and a couple of sites were documented during the PCGP Project surveys.
    - An estimated 50 percent of the sites (132 sites) are in reserves, which is an increase in the number of sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and many sites are found in the Coast Range. A subcomponent of these forests likely provides habitat for *C. subalbidus*.
- The PCGP Project would affect one of 263 BLM- and Forest Service-managed sites of *C. subalbidus*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (262) would continue to be documented on BLM and NFS lands in the region with a wide distribution across the NSO range. Twelve sites would remain in the local vicinity of the analysis area. The distribution of sites and extent of the species'

range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would not affect site persistence at any sites in reserves. Of the remaining sites, 118 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 16 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. subalbidus* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of the forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. subalbidus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category D species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.6.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. subalbidus* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 262 sites would remain on BLM and NFS lands across the region, and 12 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. subalbidus* at one site, this site is part of a large group of sites in the eastern Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. subalbidus* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of coniferous and mixed forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *C. subalbidus* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *C. subalbidus* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *C. subalbidus* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.7 CHOIROMYCES ALVEOLATUS

Choiromyces alveolatus is a truffle species in the Tuberaceae family and does not have a common name.

2.7.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. alveolatus* as a Category B (rare) species. The ORBIC evaluated *C. alveolatus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be rare, uncommon, or threatened, but not immediately imperiled, within its global range (G3) and was imperiled because of rarity or other factors that make it vulnerable to extirpation in Oregon (S2). The species is on the ORBIC List 3. It is not considered a BLM or Forest Service Sensitive species in Oregon, but it is a Strategic species.

2.7.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *C. alveolatus*. It is presumed to be ectomycorrhizal, forming symbiotic associations with the roots of conifer trees for translocation of minerals, water, and nutrients (Castellano and O'Dell 1997). It forms sporocarps below the soil surface (Castellano et al. 1999) and forms relatively large fruiting bodies (up to 2 inches in diameter) (ORBIC 2004). Fruiting has been documented from May through November (Castellano et al. 1999), although the species does not fruit regularly (ORBIC 2004). As with other sequestrate fungi, spore dispersal is presumed to depend on mycophagy or consumption of fungi and spores by small mammals (Castellano and O'Dell 1997, Holthausen et al. 1994).

Range

C. alveolatus appears to be endemic to the western United States, where it has been found in California, Oregon, Washington, and Utah (ORBIC 2004). Based on data available in 1997, its range in the Pacific Northwest extended from the Cascade Range in Mt. Rainier National Park south to the Klamath National Forest in California (Castellano and O'Dell 1997). It was also found in Placer County, California, and on the Tahoe National Forest. In Oregon, it has been documented in Douglas, Jackson, Jefferson, Linn, Yamhill, and Clackamas counties (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations distributed across western North America. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors may have reduced available habitat and further restricted the species' distribution, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. alveolatus* from less than 20 element occurrences across its range in 2004. An estimated nine of these occurrences were within the range of the NSO with four in protected areas (ORBIC 2004). In 2004, *C. alveolatus* had a patchy distribution across its range with few element occurrences (ORBIC 2004). Most of the occurrences were in California (about 10), with fewer in Oregon (6) and Washington (1). The species was found in one location during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented two new sites of *C. alveolatus* in the NSO range between 1998–2006, and 10 total sites were documented by 2006, including five in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the Forest Service and BLM reported seven sites on federal lands and eight total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *C. alveolatus*, and resulted in one new observation of the species in 2012 on the Winema National Forest. *C. alveolatus* has not been found in high numbers during past survey efforts, although limited fungi surveys have been conducted across the NSO range, and more survey effort may locate additional populations of the species. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. alveolatus is found in mixed coniferous forests associated with various Pinaceae species, particularly noble fir (*Abies procera*), other fir species (*Abies* spp.), lodgepole pine, ponderosa pine, Douglas-fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and mountain hemlock (Castellano et al. 1999). Based on data available in 1999, the species had been documented from elevations above 4,200 feet msl. More recent records indicate the species is found between about 1,600–7,000 feet msl (Trappe, pers. comm. 2013). Prior to 1994, it was

found in old-growth forests with abundant coarse woody debris along the forest floor and had only been documented from upper montane forests from Mount Hood in Oregon to Yuba Pass in California and west to the coast (Holthausen et al. 1994).

Threats

Threats to *C. alveolatus* are those that affect its host tree and disturb the soil, such as road and trail construction, logging and fire management activities, and recreational activities (Castellano and O'Dell 1997). Fire is a lower threat to this species because it is found in cool, wet habitats that are less susceptible to fire. Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *C. alveolatus* with several other species (Group 4 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat and microclimatic conditions at all known sites; minimize soil disturbance at or around known sites; and prevent removal of host trees. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. alveolatus*:

- As a mycorrhizal species, *C. alveolatus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.7.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. alveolatus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CHAL-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 21 observations from BLM and Forest Service geodatabases were converted into 15 sites in the NSO range (region). Table CHAL-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CHAL-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the

regional, local, and analysis areas. Figure CHAL-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CHAL-2 displays the species' regional distribution with the extent of coniferous and LSOG coniferous forests below 7,000 feet on BLM and NFS lands within the currently known range of the species.

TABLE CHAL-1

Number of *Choiromyces alveolatus* Sites (2013)

Location*	Number of Sites
Regional Area	15
Local Area	2
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CHAL-2

Distribution of *Choiromyces alveolatus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	-	-	-
Forest Service	12	2	1
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	2	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011

TABLE CHAL-3

Distribution of *Choiromyces alveolatus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	-	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	1	-	-
Congressionally Reserved (CR)	**1**	**-**	**-**
Late Successional Reserve (LSR)	**5**	**1**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	6	1	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

C. alveolatus is somewhat widely distributed across five physiographic provinces in Washington (Western Cascades), Oregon (Coast Range, Cascades East and West), and California (Klamath), despite a low overall number of sites (see Figure CHAL-1). Most sites are found along the Cascade Range, with scattered sites in the Coast Range and Klamath Mountains. A few of the sites are clustered and near other sites in the Cascade Range, but most sites appear isolated across the region. *C. alveolatus* does not appear to be well distributed within its range in the NSO range.



Figure CHAL-1.
Regional Distribution of *Choiromyces alveolatus*

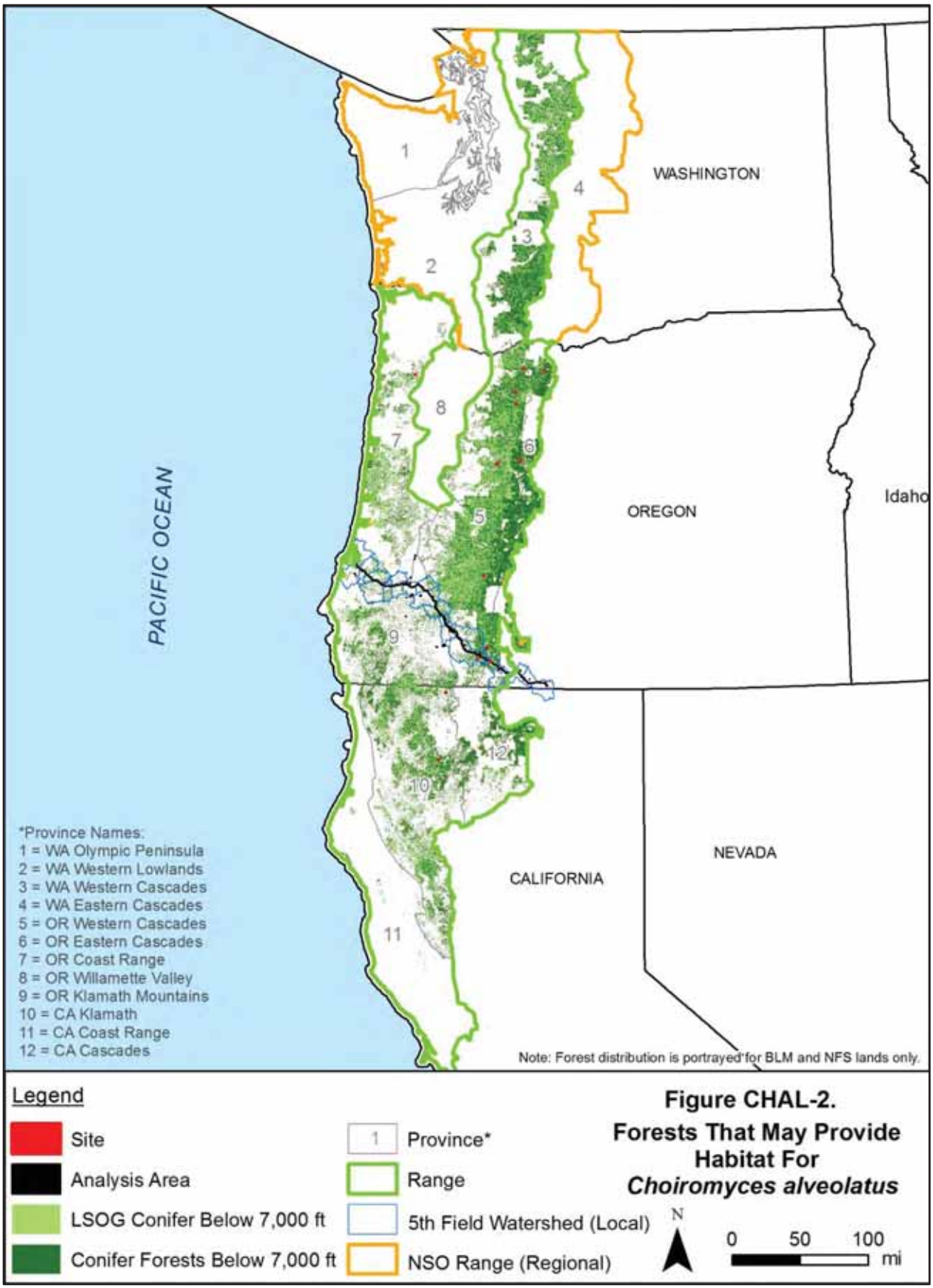


Figure CHAL-2.
Forests That May Provide Habitat For *Choiromyces alveolatus*

Two of the 15 sites are located on private land; one site is on NPS land (Mount Rainier National Park); and the remainder (12) are on NFS lands across the region (no sites are on BLM lands). Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest, one site on the Umpqua National Forest, and two sites on the Winema National Forest. Sites managed by other National Forests include one site on the Klamath National Forest, one site on the Willamette National Forest, two sites on the Deschutes National Forest, and four sites on the Mt. Hood National Forest.

Across the NSO range, six sites are located on reserve lands managed by the Forest Service, including five sites in LSRs and one site in a Congressionally Reserved area. This represents 50 percent of the total Forest Service-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

C. alveolatus is primarily found in LSOG forests based on available data (11 of 15 total sites are in LSOG) and may be restricted to specific microclimate conditions of these forests. Based on current site locations, the species is found in coniferous forests between about 2,000–6,200 feet msl and has only been found in part of the NSO range. LSOG coniferous forests within the western Cascade Range in Washington and Cascade and Coast Ranges and Klamath Mountains in Oregon and California could provide habitat for *C. alveolatus* and support additional sites. These forests encompass an estimated 4.5 million acres on BLM and NFS lands (see Figure CHAL-2 and Table CHAL-4), including 2.8 million acres in reserve land allocations (61 percent of the forests). LSOG coniferous forests below 7,000 feet msl are somewhat widespread across the region, particularly along the Cascade Range and Klamath Mountains. Younger coniferous forests may provide habitat for the species as they mature and develop suitable habitat conditions over time, and these forests are more widespread across the species' range (see Figure CHAL-2 and Table CHAL-4).

TABLE CHAL-4

Extent of Forests that Could Provide Habitat for *Choiromyces alveolatus* on BLM and NFS Lands*

Location	Coniferous Forests below 7,000 feet		LSOG Coniferous Forests below 7,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	12,793,570	6,941,290	4,519,610	2,764,790
Local Area	452,630	158,950	162,030	70,510
Project Area	960	430	270	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. alveolatus* is found in two 5th field watersheds (Little Butte Creek and Spencer Creek) that overlap the project area (see Table CHAL-5 and Figure CHAL-3). The sites are on NFS lands managed by the Rogue River (Little Butte Creek site) and Winema (Spencer Creek site) National Forests. The Spencer Creek site is on land designated as Other (Matrix), and the Little Butte Creek site is in an LSR. These sites are in the western and eastern Cascade

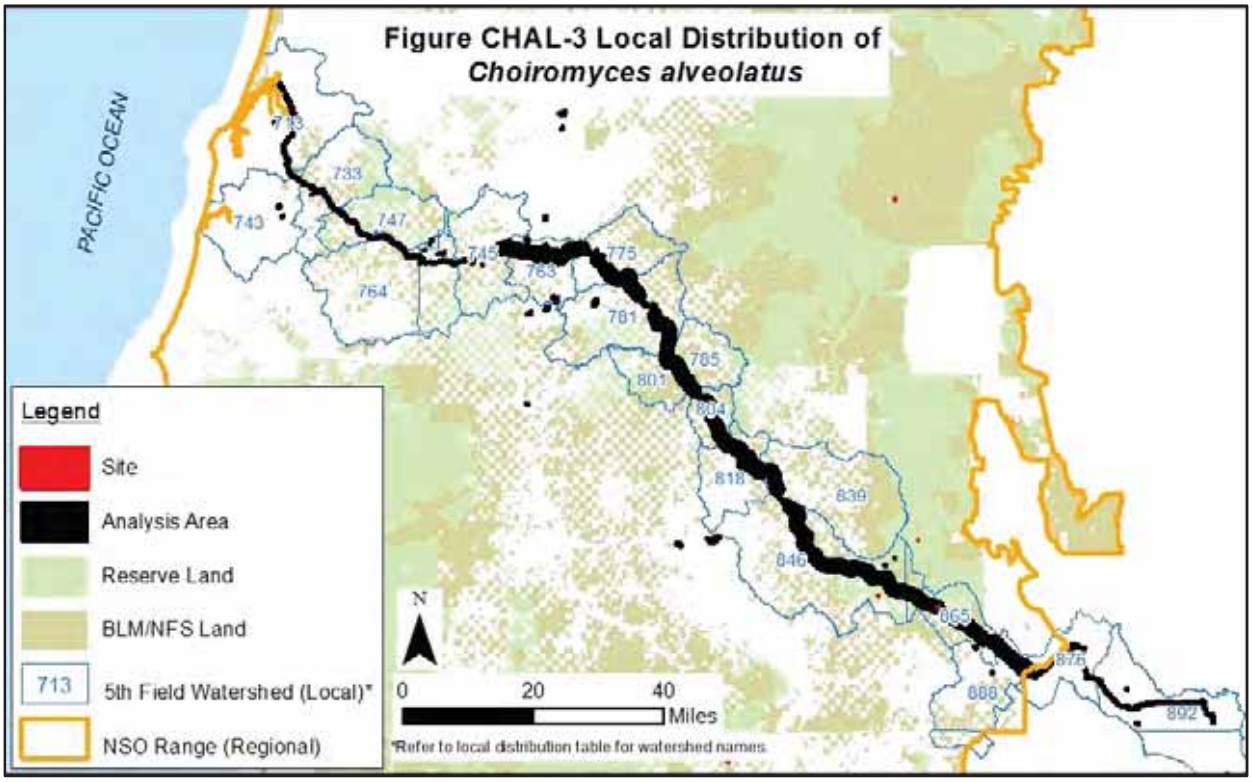
Range and are within 10 miles of one another and another site to the north in the Cascade Range. Connectivity may be available between the local sites and the other site in the Cascade Range based on the extent of forests that may provide suitable habitat, and animals could transport spores across suitable habitat within the local area.

TABLE CHAL-5

Distribution of *Choiromyces alveolatus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	1	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	1	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



LSOG coniferous forests below 7,000 feet msl encompass approximately 162,030 acres on BLM and NFS lands in the local area, including 70,510 acres in reserve land allocations (44 percent of the forests). Forests that may provide suitable habitat are primarily found in the Cascade and

Coast Ranges (see Figure CHAL-2), and other sites may be located in these mountain ranges in areas that have not been previously surveyed.

Analysis/Project Area Distribution

The analysis and project areas contain one site of *C. alveolatus*. This site is on NFS land designated as Other (Matrix) in the Spencer Creek watershed, as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in one observation of *C. alveolatus* in the survey area during summer 2012 (Siskiyou BioSurvey LLC 2012a). This recorded observation was between MP 172.1 and 172.2 and comprises the single site in the analysis area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 12 Forest Service-managed sites in the region, representing approximately 8 percent of the sites (or one out of 15 total sites on all lands in the NSO range). Table CHAL-6 presents an overview of the features of the PCGP Project that would affect the *C. alveolatus* site. The construction corridor and associated storage areas would affect approximately 0.6 acre (22 percent) of the site (the site is approximately 2.7 acres), and the corridor would cross through the northern portion of the site (see Figure CHAL-4). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. alveolatus* in and near the project area. Due to the low number of overall sites of *C. alveolatus*, the effects on one site could potentially alter the distribution of the species in the NSO range if site persistence is affected. This discussion presents a detailed analysis of the features of the PCGP Project that could affect site persistence.

TABLE CHAL-6

Impacts to *Choiromyces alveolatus* Sites on BLM and NFS Lands in the Project Area

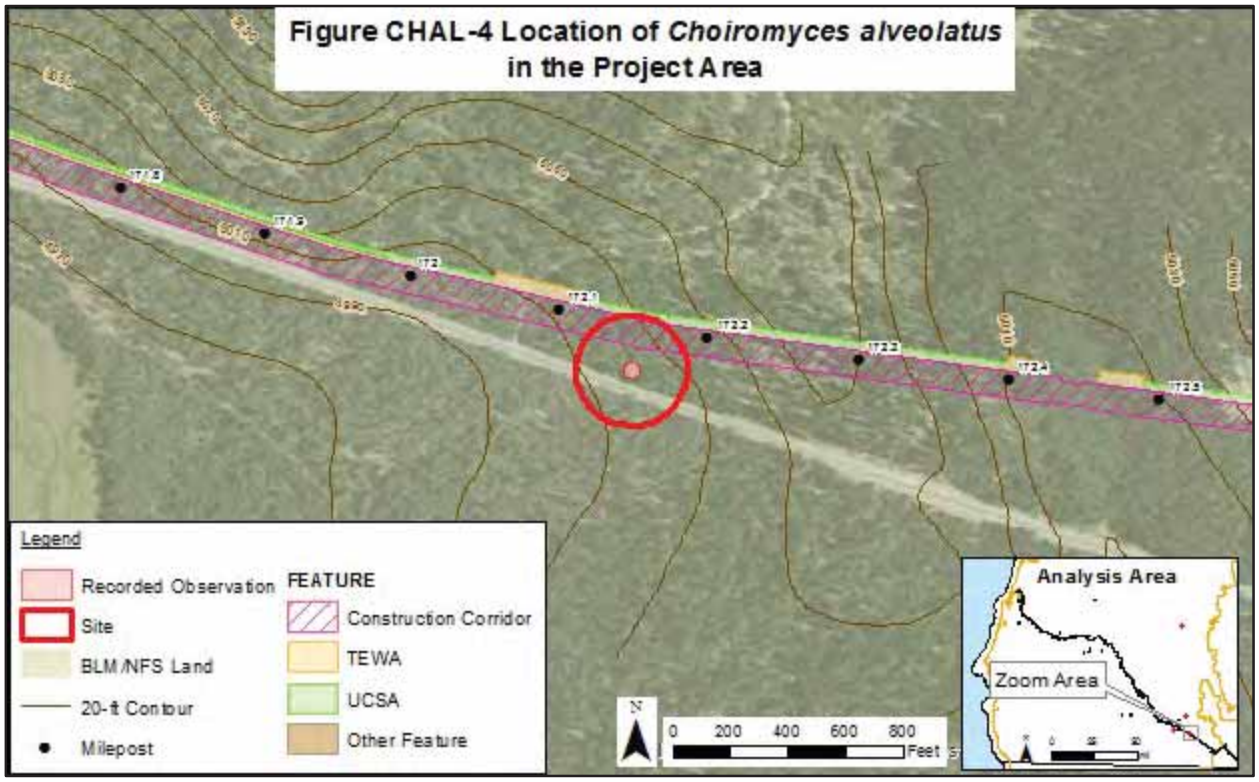
Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.6 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	1	0.03 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

The PCGP Project would result in ground disturbance and vegetation removal across the northern portion of the site near MP 172.2. The recorded observation of the species is in the center of the project area and may be avoided by activities within the corridor (see Figure CHAL-4).

Establishment of the construction corridor would disturb vegetation and soils near the recorded observation within the site and could result in removal of individuals. The area within the site is mostly forested with a road through the southern portion, and the establishment of the corridor could modify microclimate conditions around the recorded observation. The removal of forests and host trees and disturbance to soil would negatively affect *C. alveolatus* by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees,

affecting site persistence. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within a UCSA could damage fruiting bodies and would disturb understory habitat within the site, which could also modify microhabitats, potentially making the habitat no longer suitable for the species.



Based on this analysis, *C. alveolatus* may not persist at the site following project implementation. This site is one of only two sites in the local area and is one of the southernmost sites in Oregon. It may be important for dispersal of the species between other sites to the north in the Cascade Range and sites to the southwest in the Klamath Mountains in California. If the species does not persist at this site, *C. alveolatus* would still be found in the Cascade Range in Oregon, but opportunities for dispersal into the southern portion of the NSO range may be limited.

Across the project area, the PCGP Project would remove an estimated 200 acres of LSOG coniferous forests below 7,000 feet msl. These impacts would result in a reduction of habitat that may be suitable for *C. alveolatus*. Within this impact area, about 140 acres (70 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, but the restored areas would not return to LSOG conditions for more than 80 years and would not likely provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would also remain across the project area and would not provide habitat for the species. The permanent loss of LSOG coniferous forests below 7,000 feet msl represents less than 1 percent of the total estimated area of these forests across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, one site of *C. alveolatus* would remain in a reserve in the local area, and 11 sites, including six in reserves, would remain on NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and management recommendations for the species with regard to agency-related actions. The six sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 55 percent of the remaining *C. alveolatus* sites on NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. alveolatus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that more information on the species' distribution is available, as noted below:
    - Although *C. alveolatus* is somewhat widely distributed across five physiographic provinces and three states in the region, the total number of sites is low (12 on NFS lands). *C. alveolatus* does not appear to be well distributed in any part of its range because sites are scattered and its distribution is spotty. However, the currently known number of sites is an increase of five sites on BLM and NFS lands since 2007, with one site documented during the PCGP Project surveys.
    - An estimated 50 percent of the sites (six sites) are in reserves, which is an increase of one site in reserves since 2006 per Molina (2008).
- LSOG coniferous forests below 7,000 feet msl (general habitat for the species) have a somewhat wide distribution across the species' range and encompass approximately 2.8 million acres on BLM and NFS lands with an estimated 61 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented, and in the Klamath Mountains, where two sites are documented. *C. alveolatus* is likely restricted to a subcomponent of LSOG coniferous forests based on available information on its habitat and life history requirements.
- The PCGP Project would affect one of 12 Forest Service-managed sites of *C. alveolatus*, representing approximately 8 percent of the sites on NFS lands in the NSO range (no sites are on BLM lands). Assuming site persistence cannot be maintained at the site, a low number of sites (11) would continue to be documented on NFS lands in the region,

with most sites in Oregon and few sites in California and Washington. One site would remain in a reserve in the local area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project could be modified as a result of reduced dispersal opportunities and the reduction of sites on NFS lands.

- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be about the same (55 percent). Of the remaining sites, five are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and one is in a Congressionally Reserved area where management activities that may adversely affect *C. alveolatus* are unlikely.
- The PCGP Project would result in the permanent loss of approximately 200 acres of LSOG coniferous forests below 7,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 2.8 million acres (61 percent) of LSOG coniferous forests below 7,000 feet would remain in reserves in the portion of the NSO range where the species may occur. Suitable habitat for *C. alveolatus* includes a subcomponent of these forests, which may be limited based on the low number of currently known sites.
- The remaining forests could support additional populations of *C. alveolatus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites may exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.7.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. alveolatus* at one site and could modify the distribution of the species within the range of the NSO. The remaining sites may not provide a reasonable assurance of species persistence because:

- With project implementation, 11 sites would remain on NFS lands across the region, and one site would remain in the local area. Although only one *C. alveolatus* site would be affected, the low overall number of sites indicates that each site may be important for the persistence of the species in the NSO range, and the low number of sites in the local area indicates that the site may be important for dispersal opportunities in the local area and between sites in the Cascade Ranges and Klamath Mountains of Oregon and California. The species' distribution and range within the NSO range could be modified if site persistence is affected.
- The PCGP Project would remove approximately 200 acres of LSOG coniferous forests below 7,000 feet msl (a negligible amount of the forests). Although an estimated 70 percent of these forests would be restored following project implementation, they would not likely provide habitat for the species during the life of the project. About 2.8 million acres (61 percent) of LSOG coniferous forests below 7,000 feet msl would remain in reserves (negligible change with project implementation). Other sites may be located in

unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Oregon Cascade Range, other sites are scattered across the region and are less likely to be collectively affected by a single event.

Based on these conclusions, the single *C. alveolatus* site in the analysis area is necessary for the persistence of the species in the NSO range, and the PCGP Project must avoid impacts to the site. The segment of the construction corridor, along with associated TEWAs and UCSAs, should be moved at least 125 feet (40 meters) to the north of the currently proposed alignment, such that the southern edge of the work area is shifted outside the site boundary (see Figure CHAL-4). The nearest edge of the corridor, TEWA, or UCSA should be entirely outside of the site (the large red circle depicted in Figure CHAL-4), providing a no-disturbance buffer of at least 60 meters between the *C. alveolatus* observation point (centroid of site) and the outside edge of disturbance caused by clearing and construction activities. An existing dirt road about 200 feet (60 meters) north of the site may be an option for the realignment because it is at a sufficient distance to avoid the site. In addition, the applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the site and adjacent habitat over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.8 CHROMOSERA CYANOPHYLLA

Chromosera cyanophylla, synonymous with *Mycena lilacifolia*, is a gilled mushroom in the Hygrophoraceae family (formerly in Tricholomataceae) and does not have a common name.

2.8.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. cyanophylla* as a Category B (rare) species. The ORBIC did not evaluate *C. cyanophylla* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. In 2007, the species was considered to be not rare and apparently secure, but with cause for long-term concern globally (G4) and between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern in Oregon (S3S4) (USDA and USDI 2007). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.8.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation

in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

C. cyanophylla is a wood saprobe that is most easily detected in spring and fall (Castellano et al. 2003). Little specific information is known about the reproductive biology of *C. cyanophylla*, but it may be similar to other gilled mushroom species, including *Mycena* species. *Mycena* species (e.g., *M. monticola* and *M. overholtsii*) are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997).

Range

C. cyanophylla is found in Europe and western North America, with a wide distribution across Oregon, Washington, and California (Castellano et al. 2003). The species is also known from Idaho and British Columbia (Miller 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across Europe and the Pacific Northwest. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

C. cyanophylla is common in the Cascade Range in Oregon and Washington (Castellano et al 2003). *C. cyanophylla* was documented at 30 sites by 1994 and at 25 new sites between 1994–2000 (USDA and USDI 2000). The species was found in seven locations during Random Multi-Species surveys across the NSO range in 2001–2004, with five out of seven sites located in Washington and Oregon (USDA and USDI 2007). Molina (2008) documented 216 new sites of *C. cyanophylla* in the NSO range between 1998–2006, and 243 total sites were documented by 2006, including 42 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 230 sites on federal lands and 263 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *C. cyanophylla*, and resulted in 24 new observations of individuals or populations of *C. cyanophylla*. Out of the target species, *C. cyanophylla* was considered to be one of the most encountered species during the 2010-2012 surveys (Siskiyou BioSurvey LLC 2012a). Based on the increased number of sites since 1998 with increased surveys (9-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range, particularly in the Cascade Range where most observations have been reported. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. cyanophylla occurs as solitary, scattered, or caespitose sporocarps on well-rotted coniferous wood and under bark (Castellano et al. 2003, The Fungi of California 2010). The species appears to be restricted to coarse woody debris (Holthausen et al. 1994, Hibler et al. 2001d). The species is documented in many seral stages, both young and old (Hibler et al. 2001d). *C. cyanophylla* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *C. cyanophylla* are presumably similar to threats to other gilled mushrooms, including *Mycena* species. Threats may include fire and other activities that disrupt stand conditions or remove woody debris, such as road, trail, and campground construction (Castellano and O'Dell 1997). Typical threats to fungi species in coniferous and other forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). Activities that cause mortality of individuals or groups of individuals can threaten the species' genetic diversity in localized areas (USDA and USDI 2000). Specific threats to *C. cyanophylla* are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *C. cyanophylla* because it was removed from the S&M list after 2001.

2.8.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. cyanophylla* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CHCY-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 625 observations from BLM and Forest Service geodatabases were converted into 328 sites in the NSO range (region). Table CHCY-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CHCY-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CHCY-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CHCY-2 displays the species' regional

distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE CHCY-1

Number of *Chromosera cyanophylla* Sites (2013)

Location*	Number of Sites
Regional Area	328
Local Area	120
Analysis Area (Project Area)	3 (2)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CHCY-2

Distribution of *Chromosera cyanophylla* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	109	92	-
Forest Service	201	27	3
NPS	5	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	41	23	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CHCY-3

Distribution of *Chromosera cyanophylla* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	9	-	-
Congressionally Reserved (CR)	**9**	**-**	**-**
Late Successional Reserve (LSR)	**81**	**4**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**13**	**11**	**-**
Managed Late Successional Area (MLSA)	1	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	213	86	3
Riparian Reserve**	**9**	**9**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

C. cyanophylla is widely distributed across eight physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Cascades West and East and Klamath Mountain) and California (Coast, Klamath, and Cascades). Most sites are found along the Cascade Range, where the sites are be clustered or relatively close to one another in groups. A large cluster of sites is found in the eastern Cascade Range in southern Oregon. Scattered sites are located in the Coast Range and Klamath Mountains in Oregon and California. *C. cyanophylla* appears to be well distributed in the Cascade Range based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.



Figure CHCY-1.
Regional Distribution of *Chromosera cyanophylla*

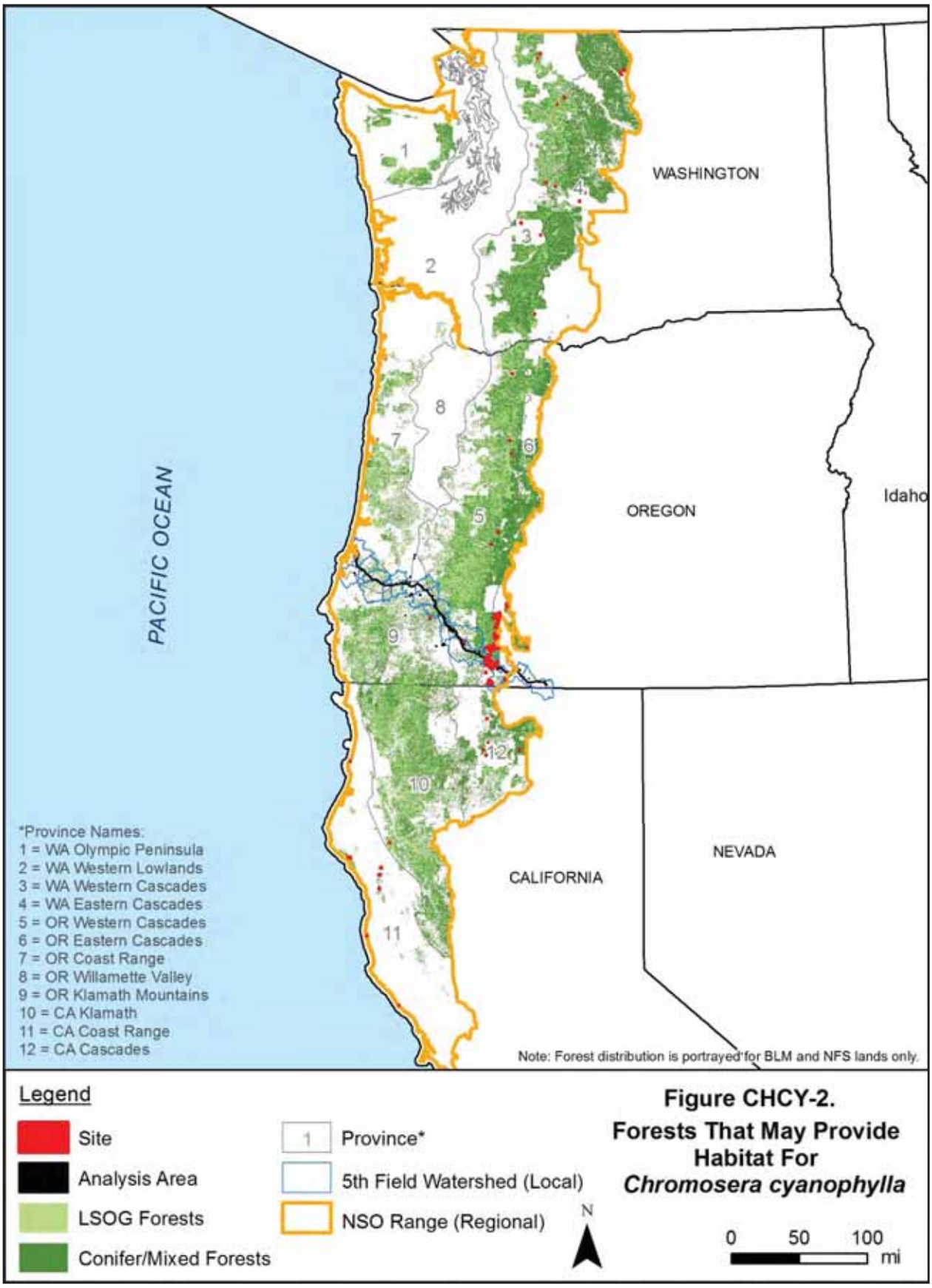


Figure CHCY-2.
Forests That May Provide Habitat For *Chromosera cyanophylla*

Forty-one of 328 sites are located on private, state, or other lands (at least partially), five sites are on NPS land (Mt. Rainier National Park), and 309 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 99 sites in the Klamath Falls Resource Area of the Lakeview District and three sites in the Medford District. Sites managed by the National Forests that encompass the project area include 180 sites on the Winema National Forest. The remaining 47 sites on BLM and NFS lands are in the Arcata District and on the Gifford-Pinchot, Mt. Baker-Snoqualmie, Okanogan-Wenatchee, Shasta-Trinity, Six Rivers, and Willamette National Forests.

Across the NSO range, 110 sites are located on reserve lands managed by BLM and the Forest Service, including nine in Congressionally Reserved areas (at least partially), 81 in LSRs (at least partially), 13 in Known Owl Activity Centers, and nine in Riparian Reserves. This represents 36 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The five NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

C. cyanophylla is more commonly found in LSOG forests based on available data (187 of 328 total sites are in LSOG), but it is also somewhat common in non-LSOG forests. It may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. cyanophylla* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table CHCY-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure CHCY-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CHCY-4

Extent of Forests that Could Provide Habitat for *Chromosera cyanophylla* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. cyanophylla* is found in three 5th field watersheds that overlap the project area (see Table CHCY-5 and Figure CHCY-3). The sites are clustered or near one another in two of the watersheds in the eastern Cascade Range. A single isolated site is located

in the third watershed in the western Cascade Range. Many sites are located to the north in the regional vicinity, and dispersal opportunities appear to be available between the local sites and other sites in the region. The cluster of sites in the local area is part of the largest group of sites in the region (see Regional Distribution discussion above).

Of the 120 sites in the local area, 119 are on BLM- or Forest Service-managed lands, including 92 sites on BLM lands (Lakeview District and Medford District) and 27 sites on Forest Service-managed lands (Winema National Forest). Most of the local sites are on lands designated as Other (Matrix); 24 sites are in reserve lands, representing 20 percent of BLM and Forest Service-managed sites in the local area. Most of the sites on reserve lands are in the Spencer Creek watershed (Table CHCY-5). Twenty-three sites in the local area are at least partially on private lands.

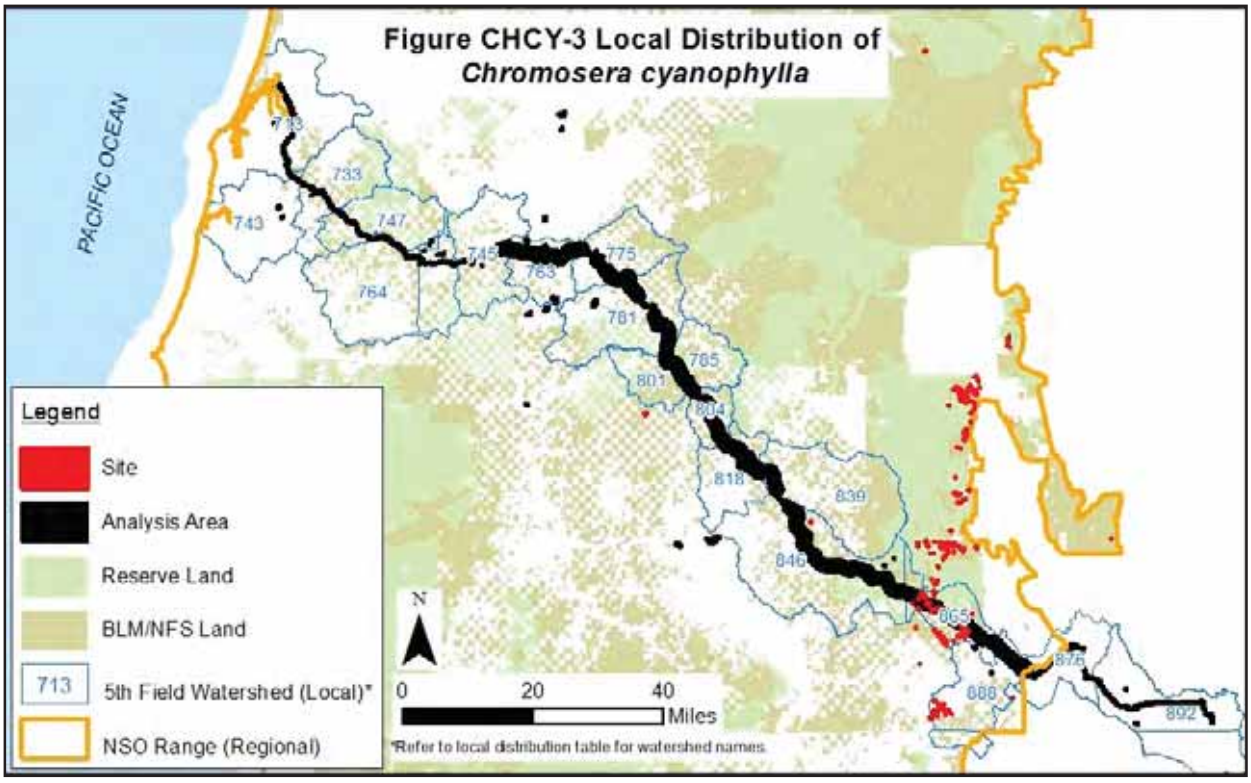
Coniferous and mixed hardwood-coniferous forests encompass approximately 1.3 million acres on BLM and NFS lands in the local area, including 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures CHCY-2 and CHCY-3).

TABLE CHCY-5

Distribution of *Chromosera cyanophylla* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	37	1
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	2*	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	82*	23
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because one site occurs in multiple watersheds and the counts overlap, as noted below:
*One site is partially in the Little Butte Creek and Spencer Creek watersheds.



Analysis/Project Area Distribution

The analysis area contains three sites of *C. cyanophylla*, and the project area contains two sites. All of the sites are on NFS lands (Winema National Forest) designated as Other (Matrix). The sites are located in the Spencer Creek watershed in the eastern portion of the analysis area. The sites are located relatively close to one another, and many sites are located within the vicinity of the analysis area in the Cascade Range (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 45 total observations of the species in 24 locations near the project area (Siskiyou BioSurvey LLC 2012a). These observations are in sites outside the analysis area, and four recorded observations of the species in agency databases from 2000 comprise the three sites in the analysis area. Within the project area, two sites are located between MPs 168.7 and 173.7.

Project Impacts

Analysis

The PCGP Project would affect three sites out of the 309 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or three out of 328 total sites on all lands in the NSO range). Table CHCY-6 presents an overview of the features of the PCGP Project that would affect the *C. cyanophylla* sites. The construction corridor and associated work and storage areas would affect approximately 2.4 acres within two sites (about 11 percent of all sites in the analysis area); the third site may be indirectly affected by nearby PCGP Project activities. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. cyanophylla* in and near the project

area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 1.9 acres of vegetation and soil within two sites and could result in the removal of *C. cyanophylla* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.4 acre within two sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and disturbance to soil could negatively affect *C. cyanophylla* in adjacent areas by removing its habitat, disturbing soil and duff, and affecting its ability to attach to woody debris, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.05 acre of understory habitat in one site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. The third site in the analysis area is near the corridor and would not be directly affected by project activities; however, indirect effects discussed above for the construction corridor would apply to this site and could affect site persistence.

TABLE CHCY-6

Impacts to *Chromosera cyanophylla* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	2	1.9 ac
Temporary Extra Work Area (TEWA)	2	0.4 ac
Uncleared Storage Area (UCSA)	1	0.05 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG coniferous and mixed hardwood-coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. cyanophylla*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the three sites as a result of the PCGP Project, 116 sites of *C. cyanophylla* would remain on BLM and NFS lands in the local area, including 24 in reserves, and 306 sites, including 110 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 110 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 36 percent of the remaining *C. cyanophylla* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. cyanophylla* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *C. cyanophylla* has a wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (309 on BLM and NFS lands). The species appears to be well distributed in the Cascade Range. The currently known number of sites on BLM and NFS lands is an increase of 79 sites on BLM and NFS lands since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 34 percent of the sites (110 sites) are in reserves, which is an increase of about 68 sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. The forests are primarily found in the Cascade Range, where most sites are documented. The Coast Range, Klamath Mountains, and other areas also contain coniferous and mixed hardwood-coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *C. cyanophylla*.

- The PCGP Project would affect three of 309 BLM- and Forest Service-managed sites of *C. cyanophylla*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the three sites, a moderate-high number of sites (306) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (116 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across three 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be the same (36 percent). Of the remaining sites, 94 sites are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 18 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. cyanophylla* are unlikely. Nine other sites are in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG coniferous and mixed hardwood-coniferous forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. cyanophylla*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.8.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. cyanophylla* at three sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 306 sites would remain on BLM and NFS lands across the region, and 116 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. cyanophylla* at three sites, these sites are part of the many sites in the Cascade Range where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. cyanophylla* would persist in the region without considering the three sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG coniferous and mixed hardwood-coniferous forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested

corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG coniferous and mixed hardwood-coniferous forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. cyanophylla* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the three *C. cyanophylla* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *C. cyanophylla* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.9 CLAVARIADELPHUS LIGULA

Clavariadelphus ligula is a club coral mushroom species in the Gomphaceae family (formerly in Clavariadelphaceae) and is commonly known as strap coral.

2.9.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. ligula* as a Category B (rare) species. The ORBIC evaluated *C. ligula* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be widespread, abundant, and secure within its global range (G5) and was not rare and apparently secure, but with cause for long-term concern, in Oregon (S4). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.9.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *C. ligula*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). The mushroom has been documented fruiting from July through December (Cushman and Huff 2007) and is conspicuous with a relatively large, brightly colored, and unusually shaped fruiting body (Holthausen et al. 1994). Fruiting may consist of a single basidiocarp, but more often contains between three and six.

Range

C. ligula is widespread in Europe and North America (ORBIC 2004). It is found in most Canadian provinces, throughout Europe, and in several states across the United States. In the Pacific Northwest, it occurs from Mendocino County in California to the North Cascades in Washington and into Canada. Based on data available in 2004, this species was considered fairly common with a broad range across the world (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed in Europe and North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. ligula* from approximately 220 element occurrences worldwide in 2004. An estimated 80 of these occurrences were in California, Oregon, and Washington, with the majority (41) found in western Oregon where the species was considered fairly common (ORBIC 2004). The ORBIC estimated that 16 of the element occurrences were in protected areas in the NSO range in 2004. In 2004, *C. ligula* was considered to be fairly common, especially in western Oregon, although overall population trends across its range were unknown (ORBIC 2004). The species was found in four locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 31 new sites of *C. ligula* in the NSO range between 1998–2006, and 54 total sites were documented by 2006, including 21 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 45 sites on federal lands and 51 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *C. ligula*, and resulted in no new observations of individuals or populations of *C. ligula*. Additional persistence surveys for *C. ligula* in LSRs in nearby areas resulted in one observation of the species. Based on the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO

range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. ligula is found in coniferous forests (ORBIC 2004). Based on data available in 1994, *C. ligula* was presumed to be similar to other club coral fungi, which require cool or cold, moist coniferous forests and was primarily found in LSOG forests (Holthausen et al. 1994). It may also require a well-developed humus layer and tends to be more common with increasing elevation and latitude. The species grows scattered or gregarious on soil or duff under mixed conifers (Castellano et al. 2003). *C. ligula* is considered to be fairly common (ORBIC 2004) and may prefer specific microclimate conditions of LSOG forests, but may not be as restricted to these conditions.

Threats

The primary threat to *C. ligula* is from logging activities, which result in removal of host trees and disturbance to soil (ORBIC 2004). Like other club coral fungi, *C. ligula* is not subject to commercial harvest, but may be occasionally gathered by recreational pickers (Holthausen et al. 1994). Other specific threats to the species are not known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. ligula*:

- As a mycorrhizal species, *C. ligula* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.9.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. ligula* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CLLI-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 98 observations from BLM and Forest Service geodatabases were converted into 72 sites in the

NSO range (region). Table CLLI-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CLLI-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CLLI-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CLLI-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests on BLM and NFS lands.

TABLE CLLI-1

Number of *Clavariadelphus ligula* Sites (2013)

Location*	Number of Sites
Regional Area	72
Local Area	13
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CLLI-2

Distribution of *Clavariadelphus ligula* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	16	12	1
Forest Service	49	1	1
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	6	2	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CLLI-3

Distribution of *Clavariadelphus ligula* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	3	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	13	-	-
Congressionally Reserved (CR)	**6**	**-**	**-**
Late Successional Reserve (LSR)	**12**	**1**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	33	11	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure CLLI-1.
Regional Distribution of *Clavariadelphus ligula*

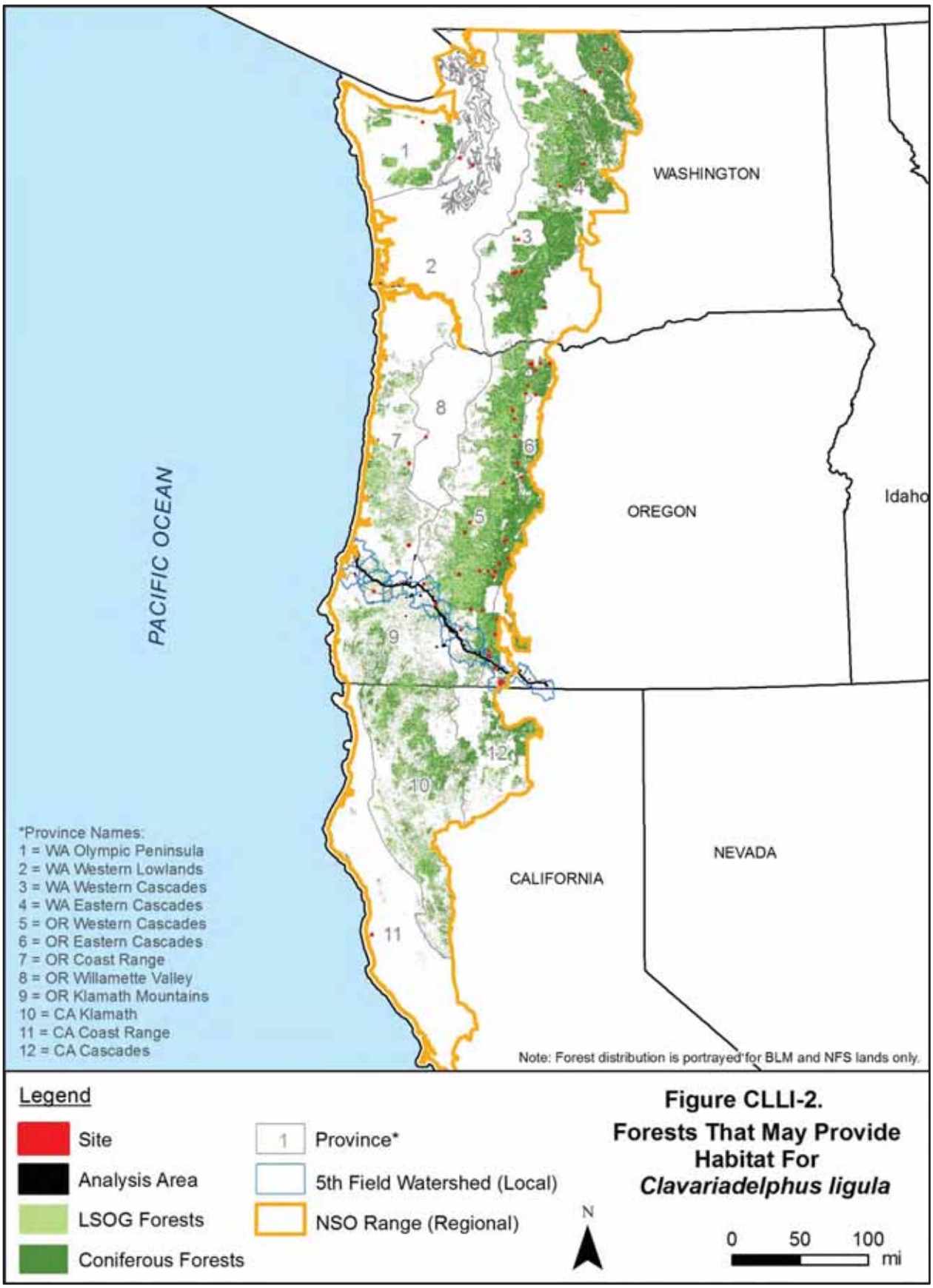


Figure CLLI-2.
Forests That May Provide Habitat For *Clavariadelphus ligula*

Regional Distribution

C. ligula is widely distributed across 10 physiographic provinces in Washington (Western and Eastern Cascades, Western Lowlands. Olympic Peninsula), Oregon (Coast Range, Cascades East and West, Willamette Valley, and Klamath Mountain), and California (Coast). Most sites are found along the Cascade Range in several groups with a few clusters of sites. Scattered sites are also located in the Coast Range, Klamath Mountains, and other outlying areas. A single site is documented in California and appears isolated from other sites in the NSO range. *C. ligula* appears to be well distributed in the Oregon Cascade Range based on the abundance and size of sites, proximity of sites to one another, and distribution of the species across forests that may provide suitable habitat in the mountain range.

Six of 72 sites are located on private or state lands (at least partially); three sites are on NPS lands (two in Mount Rainier National Park, one in Olympic National Park); and 64 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include eight sites in the Klamath Falls Resource Area of the Lakeview District, one site in the Coos Bay District, one site in the Medford District, and four sites in the Roseburg District (one site is partially in the Roseburg District and partially on the Umpqua National Forest). Sites managed by the National Forests that encompass the project area include four sites on the Winema National Forest, two sites on the Rogue River National Forest, and 13 sites on the Umpqua National Forest. The remaining 32 sites on BLM and NFS lands are in the Salem District and on the Deschutes, Gifford Pinchot, Mt. Hood, Okanogan, Wenatchee, and Willamette National Forests.

Across the NSO range, 18 sites are located on reserve lands managed by BLM and the Forest Service, including 12 sites in LSRs and six sites in Congressionally Reserved areas. This represents 28 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

C. ligula is more common in LSOG forests based on available data (42 of 72 total sites are in LSOG), but it is also relatively common in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. ligula* and support additional sites. These forests encompass an estimated 16.3 million acres on BLM and NFS lands in the region, including an estimated 11.1 million acres in reserve land allocations (68 percent of the forests; Table CLLI-4). Of this acreage, an estimated 5 million acres are LSOG (see Figure CLLI-2), including 3.15 million acres in reserve land allocations (63 percent of the forests). Although coniferous forests are widespread across the NSO range, LSOG coniferous forests are less common and primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CLLI-4

Extent of Forests that Could Provide Habitat for *Clavariadelphus ligula* on BLM and NFS Lands*

Location	Coniferous Forests		LSOG Coniferous Forests	
	Total	Reserves	Total	Reserves
Regional Area	16,284,850	11,109,210	5,029,190	3,149,050
Local Area	937,650	161,020	161,540	70,610
Project Area	960	430	270	140

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. ligula* is distributed across six 5th field watersheds that overlap the project area (see Table CLLI-5 and Figure CLLI-3). Most sites are scattered across the watersheds, while sites in the Klamath River-John C. Boyle Reservoir watershed are clustered and near one another. Multiple avenues of connectivity appear to be available between sites in the Klamath River-John C. Boyle Reservoir watershed and nearby areas. Many regional sites are located within 30 miles to the northeast in the Cascade Range. The sites in the local area appear to represent the southernmost extent of sites in Oregon and may provide dispersal opportunities into California.

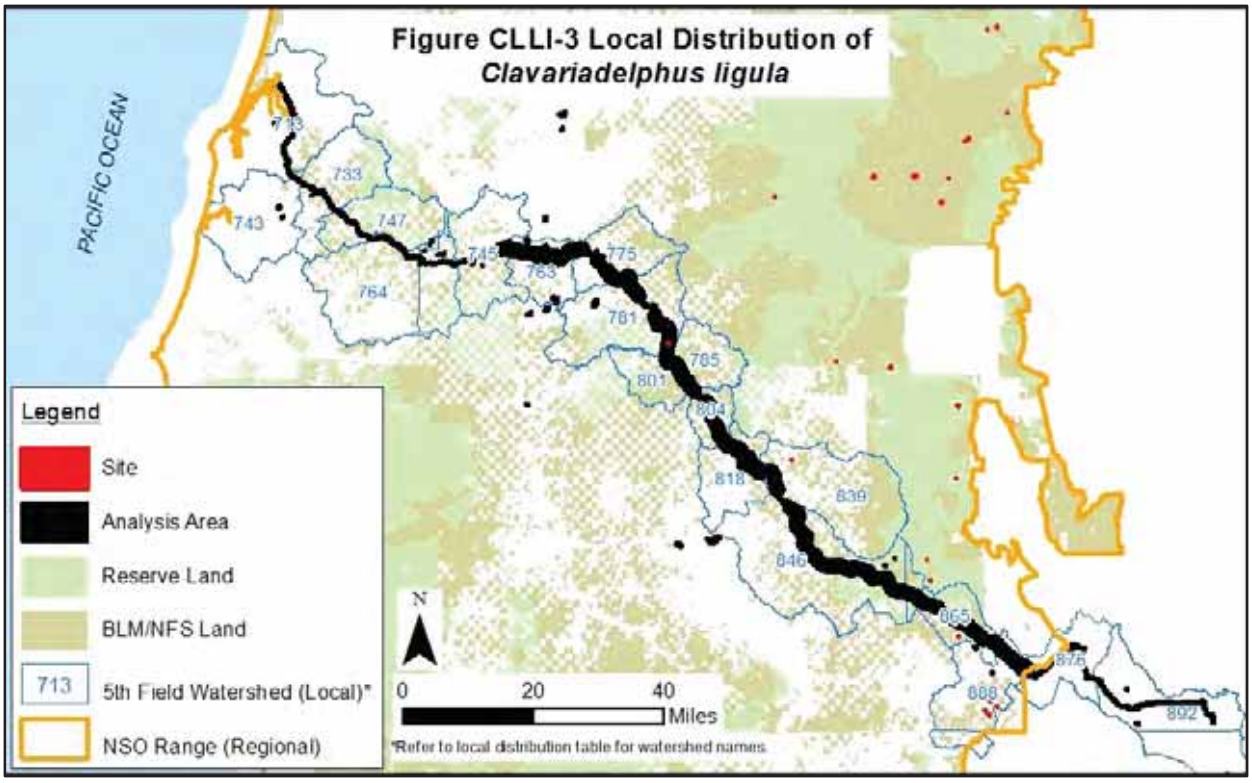
Twelve of the 13 sites in the local area are on BLM and NFS lands. These sites are primarily located on lands designated as Other (Matrix). Two sites are at least partially on private lands. The site in the South Umpqua River watershed is the only local site in a reserve (LSR), representing 8 percent of the sites.

TABLE CLLI-5

Distribution of *Clavariadelphus ligula* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	1	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	8	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	1	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	1	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1	1
Spencer Creek (865)	1	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous forests encompass approximately 937,650 acres on BLM and NFS lands in the local area, with 161,020 acres in reserve land allocations (17 percent of the forests). Of this acreage, an estimated 161,540 acres are LSOG, including 70,610 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the distribution of the local sites and the extent of forests that may provide suitable habitat (see Figures CLLI-2 and CLLI-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *C. ligula*. This site is partially on BLM land in the Roseburg District and partially on NFS land in the Umpqua National Forest. It is the only site in the South Umpqua River watershed in an LSR, as described under the Local Distribution discussion above. The site appears to be somewhat isolated from other sites in the local and regional areas; the nearest site is approximately 15 miles northwest in the local area. Many sites are also located to the northeast in the Cascade Range, and several scattered sites are located in the general vicinity (within about 30 miles).

Surveys for the PCGP Project resulted in one observation of the species near the project area (Siskiyou BioSurvey LLC 2012a). This recorded observation was near MP 100.4 and comprises the single site in the analysis area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 64 sites on BLM- and Forest Service-managed lands in the region, representing approximately 2 percent of the sites (or one out of 72 total sites

on all lands in the NSO range). Table CLLI-6 presents an overview of the features of the PCGP Project that would affect the *C. ligula* site. The construction corridor and associated storage areas would affect approximately 1.0 acre within the site (about 43 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. ligula* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.3 acre of vegetation and soil within one site and could result in the removal of *C. ligula* individuals. The establishment of the corridor could modify microclimate conditions near the site. The removal of forests and host trees and disturbance to soil could negatively affect *C. ligula* in nearby areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.7 acre of understory habitat in the site, which could modify microhabitats near extant individuals, potentially making the habitat no longer suitable for the species.

TABLE CLLI-6

Impacts to *Clavariadelphus ligula* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.3 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	1	0.7 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres

Across the project area, the PCGP Project would remove an estimated 750 acres of coniferous forests, including 200 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. ligula*. Within this impact area, about 540 acres (about 72 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 170 acres of coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, 11 sites of *C. ligula* would remain on BLM lands in the local area, with none in reserves, and 63 sites, including 17 in reserves, would remain on BLM and NFS lands in the NSO range. The

remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 17 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 27 percent of the remaining *C. ligula* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. ligula* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *C. ligula* has a wide distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (64 on BLM and NFS lands). The species appears to be most common in the Cascade Range, but is less common in other areas. The currently known number of sites on BLM and NFS lands is an increase of 19 sites on BLM and NFS lands since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 28 percent of the sites (18 sites) are in reserves, which is about the same number of sites in reserves as documented in Molina (2008).
- Coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 16.3 million acres on BLM and NFS lands with an estimated 68 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most of the sites are documented. The Coast Range and other areas also contain coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *C. ligula*.
- The PCGP Project would affect one of 64 BLM- and Forest Service-managed sites of *C. ligula*, representing approximately 2 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (63) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (11 sites) would remain in the local vicinity of the analysis area; these sites would be distributed across five 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would affect site persistence at one site in an LSR, which would reduce the percentage of sites in reserves to 27 percent. Of the remaining sites, 11 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and six are in Congressionally Reserved areas where management activities that may adversely affect *C. ligula* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 170 acres of coniferous forests (less than 1 percent of the total regional acreage). An estimated 11.1 million acres (68 percent) of coniferous forests and 3.2 million acres (63 percent) of LSOG coniferous forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. ligula*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

2.9.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. ligula* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 63 sites would remain on BLM and NFS lands across the region, and 11 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *C. ligula* at one site, this site is one of many sites in the Klamath Mountains and Cascade Range in Oregon. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. ligula* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 750 acres of coniferous forests and 200 acres of LSOG coniferous forests (a negligible amount of the forests). An estimated 72 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 11.1 million acres (68 percent) of coniferous forests and 3.2 million acres (63 percent) of LSOG coniferous forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *C. ligula* site in the analysis area, although individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *C. ligula* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence.

Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *C. ligula* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.10 CLAVARIADELPHUS OCCIDENTALIS

Clavariadelphus occidentalis is a club mushroom species in the Clavariadelphaceae family and is commonly known as club coral.

2.10.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. occidentalis* as a Category B (rare) species. The ORBIC evaluated *C. occidentalis* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be widespread, abundant, and secure within its global range (G5) and was not rare and apparently secure, but with cause for long-term concern, in Oregon (S4). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.10.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *C. occidentalis*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). Fruiting has been documented mostly from September through February but also occurs in May (Castellano et al. 2003). During fruiting, *C. occidentalis* produces clusters of two or three sporocarps.

Range

C. occidentalis is found across western North America, from Alaska to Mexico and east to Idaho and Arizona (ORBIC 2004). It is considered fairly common across its range, although its distribution within the NSO range was scattered to gregarious in 2004. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across western North America. Local

distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. occidentalis* from more than 200 element occurrences across its range in 2004. In the Pacific Northwest, Oregon had the highest number of occurrences with more than 60 (ORBIC 2004). California had more than 30 occurrences in 2004, and Washington had less than 10 occurrences. The ORBIC estimated that 31 of the total occurrences were in protected areas in the NSO range in 2004. In 2004, *C. occidentalis* was considered to be fairly common, although population trends across its range were unknown (ORBIC 2004). The species was found in nine locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 50 new sites of *C. occidentalis* between 1998–2006, and 90 total sites were documented by 2006, including 28 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 66 sites on federal lands and 80 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *C. occidentalis*, and resulted in 19 new observations of individuals or populations of *C. occidentalis*. Additional persistence surveys for *C. occidentalis* in LSRs in nearby areas resulted in seven additional observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by about 20 percent. Based on the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. occidentalis is found in coniferous and hardwood forests (ORBIC 2004). Based on data available in 1994, *C. occidentalis* was presumed to be similar to other club coral fungi, which require cool or cold, moist coniferous forests and are primarily found in LSOG forests (Holthausen et al. 1994). It may also require a well-developed humus layer and tends to be more common with increasing elevation and latitude. It grows solitary to gregarious in caespitose clusters on soil or duff under mixed hardwood-coniferous forests or hardwood forests (Castellano et al. 2003). Based on data available in 2007, recorded observations were found below about 4,500 feet msl (Cushman and Huff 2007). *C. occidentalis* is considered to be fairly common (ORBIC 2004) and may prefer specific microclimate conditions of LSOG forests, but may not be as restricted to these conditions.

Threats

The primary threat to *C. occidentalis* is from logging activities, which result in removal of host trees and disturbance to soil (ORBIC 2004). Like other club coral fungi, *C. occidentalis* is not

subject to commercial harvest, but may be occasionally gathered by recreational pickers (Holthausen et al. 1994). Other specific threats to the species are not known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. occidentalis*:

- As a mycorrhizal species, *C. occidentalis* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.10.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. occidentalis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CLOC-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 267 observations from BLM and Forest Service geodatabases were converted into 149 sites in the NSO range (region). Table CLOC-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CLOC-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CLOC-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CLOC-2 displays the species' regional distribution with the extent of coniferous, mixed hardwood-coniferous, and hardwood forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE CLOC-1

Number of *Clavariadelphus occidentalis* Sites (2013)

Location*	Number of Sites
Regional Area	149
Local Area	40
Analysis Area (Project Area)	15 (10)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CLOC-2

Distribution of *Clavariadelphus occidentalis* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	79	37	15
Forest Service	54	4	1
NPS	2	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	29	4	2

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CLOC-3

Distribution of *Clavariadelphus occidentalis* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	22	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	5	-	-
Congressionally Reserved (CR)	**8**	**-**	**-**
Late Successional Reserve (LSR)	**46**	**18**	**11**
Marbled Murrelet Area (LSR3)	**3**	**3**	**1**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**1**	**1**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	53	21	4
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

C. occidentalis is widely distributed across 10 physiographic provinces in Washington (Western and Eastern Cascades, Olympic Peninsula), Oregon (Coast Range, Cascades East and West, Willamette Valley, and Klamath Mountain), and California (Klamath and Coast). Most sites are found along the western Cascade Range, Coast Range, and Klamath Mountains in Oregon, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in Washington, California, and other areas of Oregon. *C. occidentalis* appears to be well distributed in its range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of the species across forests that may provide suitable habitat in the mountain ranges.

Twenty-nine of 149 sites are located on private, state, or other lands (at least partially); two sites are on NPS lands (in Olympic and Mount Rainier National Parks); and 132 sites are on BLM and NFS lands (at least partially). Sites managed by the BLM Districts that encompass the project area include nine sites in the Coos Bay District, 11 sites in the Medford District, and 31 sites in the Roseburg District (one site is partially in the Roseburg District and partially on the Umpqua National Forest). Sites managed by the National Forests that encompass the project area include three sites on the Rogue River National Forest and 15 sites on the Umpqua National Forest. The remaining 64 sites on BLM and NFS lands are in the Arcata, Eugene, and Salem Districts and on the Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Siskiyou, Six Rivers, and Willamette National Forests.



Figure CLOC-1.
Regional Distribution of
Clavariadelphus occidentalis

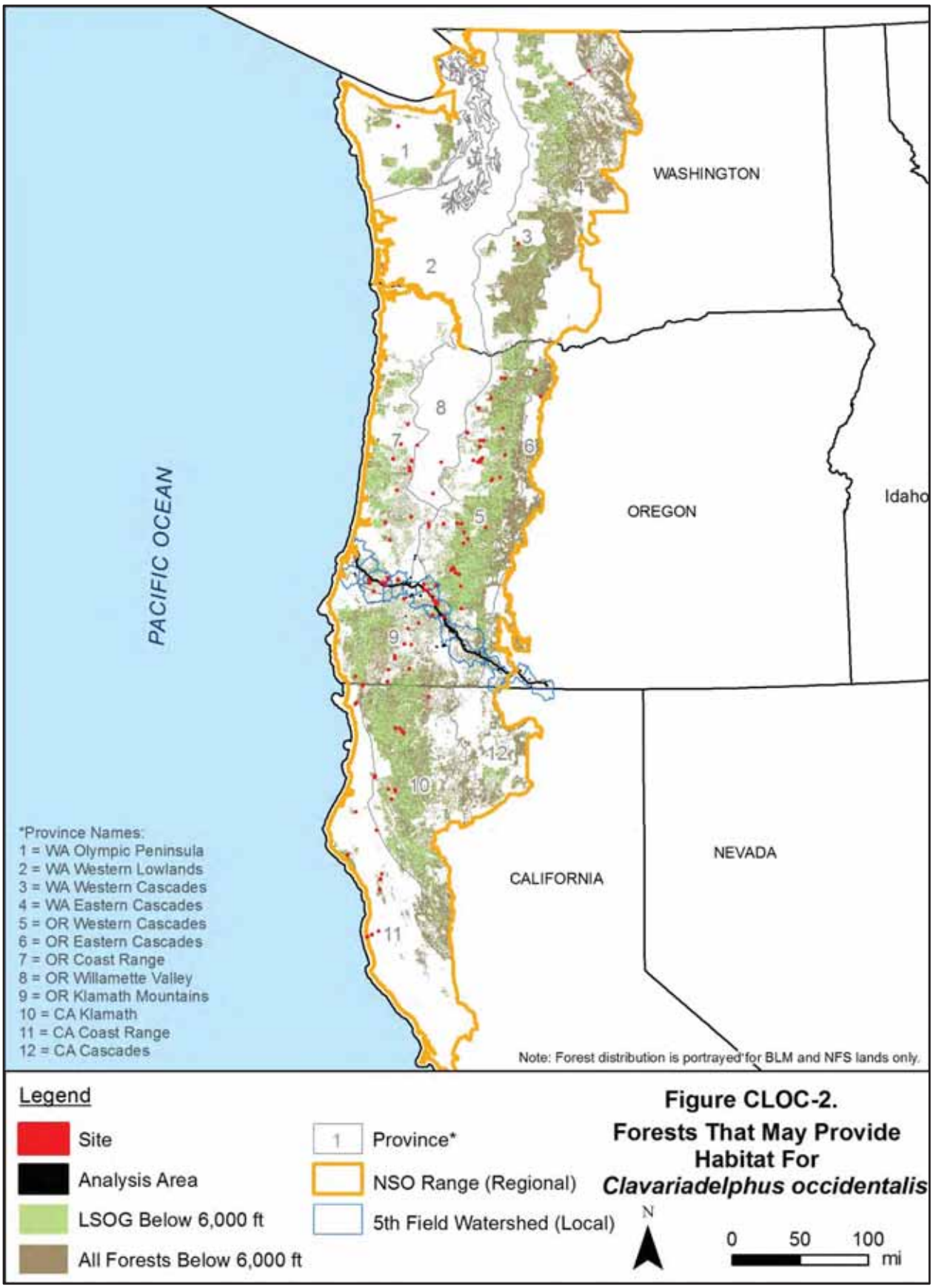


Figure CLOC-2.
Forests That May Provide Habitat For *Clavariadelphus occidentalis*

Across the NSO range, 52 sites are located on reserve lands managed by BLM and the Forest Service, including 46 in LSRs (at least partially), three in Marbled Murrelet Areas, one in a Known Owl Activity Center, and eight in Congressionally Reserved areas (at least partially). This represents 39 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The two NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

C. occidentalis is more common in LSOG forests based on available data (116 of 149 total sites are in LSOG), but it is also relatively common in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in all forest types below about 5,300 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *C. occidentalis* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 10.4 million acres in reserve land allocations (54 percent of the forests; Table CLOC-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure CLOC-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although all forests below 6,000 feet msl are widespread across the NSO range, LSOG forests are less common and primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CLOC-4

Extent of Forests that Could Provide Habitat for *Clavariadelphus occidentalis* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	19,194,850	10,381,240	6,092,570	3,750,320
Local Area	611,850	199,720	185,170	80,260
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. occidentalis* is distributed across seven 5th field watersheds that overlap the project area (see Table CLOC-5 and Figure CLOC-3). The sites tend to be clustered and near other sites within the watersheds in the western and central portions of the local area. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 20 miles to the northeast in the Cascade Range and within 30 miles to the south in the Klamath Mountains.

All of the 40 sites in the local area are on BLM and NFS lands. These sites are located on lands designated as Other (Matrix) and LSR. Four sites are partially located on private lands. Of the 40 sites in the local area, 20 sites are on reserve lands, representing 50 percent of the sites. The

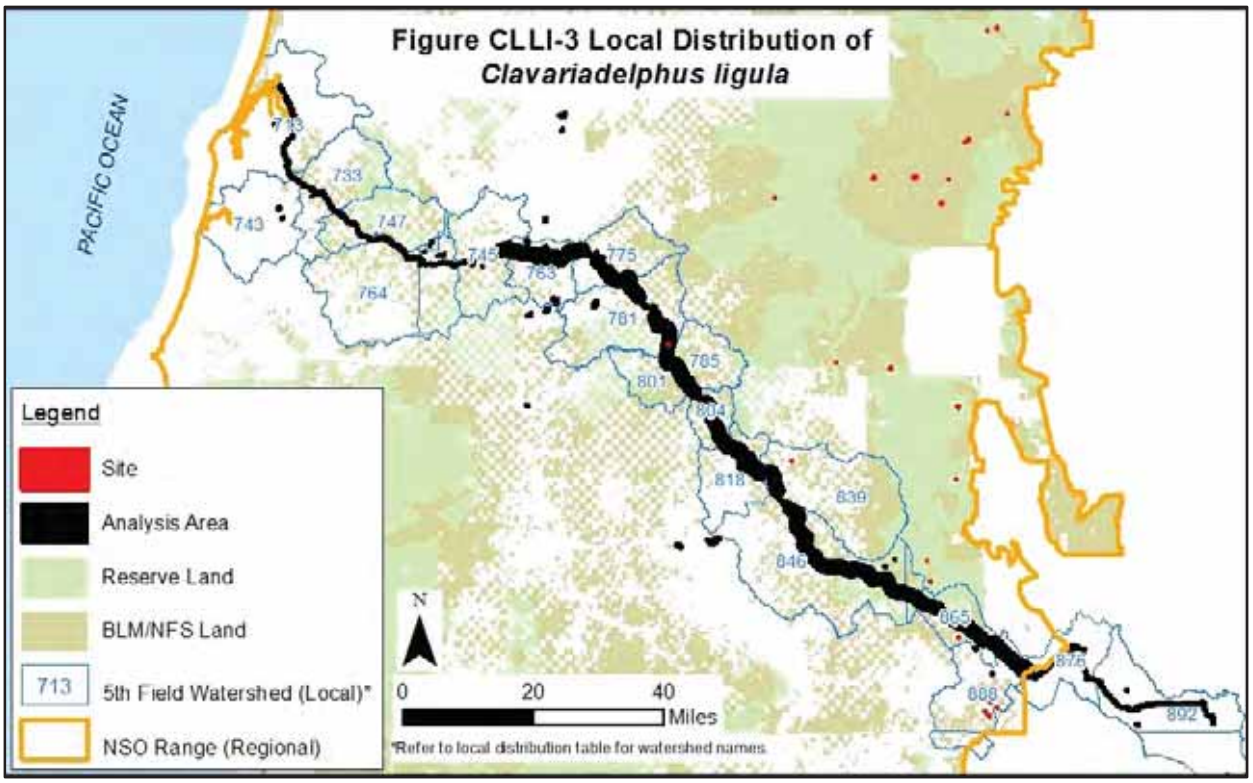
distribution of these reserve sites across the watersheds is depicted in Table CLOC-5 and on Figure CLOC-3. Most of the sites in the South Umpqua River watershed are in reserves (LSRs), and some sites in the other watersheds are in reserves (LSRs).

TABLE CLOC-5

Distribution of *Clavariadelphus occidentalis* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	5*	2
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	5*	3
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	9**	1
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	4	2
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	15**	14
Spencer Creek (865)	-	-
Trail Creek (804)	3	-
Upper Cow Creek (801)	1	-

Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*One site in both East Fork and Middle Fork Coquille River watersheds.
**One site is in both Myrtle Creek and South Umpqua River watersheds.



Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 611,850 acres on BLM and NFS lands in the local area, including 199,720 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 185,170 acres are LSOG, including 80,260 acres in reserve land allocations (43 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures CLOC-2 and CLOC-3).

Analysis/Project Area Distribution

The analysis area contains 15 sites of *C. occidentalis*, and the project area contains 10 sites. These sites are distributed across five 5th field watersheds in the Coos Bay, Roseburg, and Medford Districts and on the Umpqua National Forest. The sites are distributed across the central and western portions of the analysis area in three general areas (East Fork/Middle Fork Coquille River watersheds, Myrtle Creek/South Umpqua River watersheds, and Trail Creek watershed). They appear to be clustered and near one another within each area. Many sites are also located within the immediate vicinity of the analysis area (see Local Distribution), including several within 10 miles.

All of the sites in the analysis area are at least partially on BLM- or Forest Service-managed lands with two sites partially on private lands. The sites are located on lands designated as Other (Matrix), LSR, LSR3, and LSR4. Of the 15 sites in the analysis area, 12 sites are on reserve lands.

Surveys for the PCGP Project resulted in 36 total observations of the species in 26 locations in or near the project area (Siskiyou BioSurvey LLC 2012a). An estimated 31 of these recorded observations comprise the 15 sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, one site is at MP 41.9, and 10 sites are between MPs 86 and 100.2.

Project Impacts

Analysis

The PCGP Project would affect 15 sites out of the 132 sites on BLM- and Forest Service-managed lands in the region, representing approximately 11 percent of the sites (or 15 out of 149 total sites on all lands in the NSO range). Table CLOC-6 presents an overview of the features of the PCGP Project that would affect the *C. occidentalis* sites. The construction corridor and associated work and storage areas would affect approximately 14.5 acres within 10 sites (about 25 percent of all sites in the analysis area); the other five sites may be indirectly affected by nearby PCGP Project activities. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. occidentalis* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 8.5 acres of vegetation and soil within 10 sites and could result in the removal of *C. occidentalis* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.9 acres within six sites. Five other sites would be indirectly affected by activities within the

corridor and UCSAs, but direct effects on these sites are not anticipated. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *C. occidentalis* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 5.0 acres of understory habitat in three sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Hydrostatic testing would take place on less than 0.1 acre of one site and is not likely to affect individuals or populations of the species because it would be done after the pipeline is installed and ground disturbance would have already affected the site.

TABLE CLOC-6

Impacts to *Clavariadelphus occidentalis* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	10	8.5 ac
Temporary Extra Work Area (TEWA)	6	0.9 ac
Uncleared Storage Area (UCSA)	3	5.0 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	1	<0.1 ac

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *C. occidentalis*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 15 sites as a result of the PCGP Project, 25 sites of *C. occidentalis* would remain on BLM and NFS lands in the local area, including eight in reserves, and 117 sites, including 40 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 40 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in

place for those land allocations. Based on these site counts, approximately 34 percent of the remaining *C. occidentalis* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. occidentalis* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *C. occidentalis* has a wide distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (132 on BLM and NFS lands). The species appears to be well distributed in the western Cascade Range in Oregon and is locally abundant in parts of the Klamath Mountains and Coast Range. The currently known number of sites on BLM and NFS lands is an increase of 66 sites on BLM and NFS lands since 2007, with many sites documented during the PCGP Project surveys.
    - An estimated 39 percent of the sites (52 sites) are in reserves, which is an increase of about 24 sites in reserves since 2006 per Molina (2008).
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 54 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain the forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *C. occidentalis*.
- The PCGP Project would affect 15 of 132 BLM- and Forest Service-managed sites of *C. occidentalis*, representing approximately 11 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the 15 sites, a moderate-high number of sites (117) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (25 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across seven 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would affect site persistence at 12 sites in LSRs, which would reduce the percentage of sites in reserves to 34 percent. Of the remaining sites, 37 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and eight are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. occidentalis* are unlikely.
- The PCGP Project would result in the permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. occidentalis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.10.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. occidentalis* at 15 sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 117 sites would remain on BLM and NFS lands across the region, and 25 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. occidentalis* at 15 sites, these sites are part of the many sites in the Coast Range and Klamath Mountains in Oregon, where the species is locally abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. occidentalis* would persist in the region without considering the 15 sites as part of the population.
- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. occidentalis* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 15 *C. occidentalis* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *C. occidentalis* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.11 CLAVARIADELPHUS SACHALINENSIS

Clavariadelphus sachalinensis is a club coral mushroom species in the Clavariadelphaceae family and does not currently have a common name.

2.11.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. sachalinensis* as a Category B (rare) species. The ORBIC evaluated *C. sachalinensis* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was widespread, abundant, and secure within its global range (G5) and was rare, uncommon, or threatened, but not immediately imperiled, in Oregon (S3). The species is on the ORBIC List 3. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.11.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *C. sachalinensis*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). The mushroom has been documented fruiting from June through October (Castellano et al. 2003) and has a conspicuous and relatively large, brightly colored, and unusually shaped fruiting body (Holthausen et al. 1994). Fruiting may consist of a single basidiocarp, but more often contains between three and six.

Range

C. sachalinensis is widespread across Europe, Asia, and North America (ORBIC 2004). It is found in most Canadian provinces, Japan, Sweden, and several states in the United States. In the Pacific Northwest, it occurs from Mendocino County in California to the North Cascades in Washington and into Canada. This species has been considered common across its global range.

The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed in Europe, Asia, and North America. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. sachalinensis* from approximately 183 element occurrences worldwide in 2004. An estimated 35 of these occurrences were in California, Oregon, and Washington, with the majority (29) found west of the Cascade Range in Oregon (ORBIC 2004). In 2004, the species was considered fairly common, although population trends were unknown (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 30 new sites of *C. sachalinensis* between 1998–2006, and 35 total sites were documented by 2006, including four in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 30 sites on federal lands and 35 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *C. sachalinensis*, and resulted in 13 new observations of individuals or populations of *C. sachalinensis*. Additional persistence surveys for *C. sachalinensis* in LSRs in nearby areas resulted in 27 additional observations of the species. Based on the increased number of sites since 1998 with increased surveys (7-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. sachalinensis is found in coniferous forests (ORBIC 2004). Based on data available in 1994, *C. sachalinensis* was presumed to be similar to other club coral fungi, which require cool or cold, moist coniferous forests and are primarily found in LSOG forests (Holthausen et al. 1994). It may also require a well-developed humus layer and tends to be more common with increasing elevation and latitude. The species grows scattered or gregarious on soil or duff under mixed conifers (Castellano et al. 2003). Based on data available in 2007, recorded observations were found below about 5,500 feet msl (Cushman and Huff 2007). *C. sachalinensis* is considered to be fairly common (ORBIC 2004) and may prefer specific microclimate conditions of LSOG forests, but may not be as restricted to these conditions.

Threats

The primary threat to *C. sachalinensis* is from logging activities, which result in removal of host trees and disturbance to soil (ORBIC 2004). Like other club coral fungi, *C. sachalinensis* is not subject to commercial harvest, but may be occasionally gathered by recreational pickers (Holthausen et al. 1994). Other specific threats to the species are not known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. sachalinensis*:

- As a mycorrhizal species, *C. sachalinensis* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.11.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. sachalinensis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CLSA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 525 observations from BLM and Forest Service geodatabases were converted into 129 sites in the NSO range (region). Table CLSA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CLSA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CLSA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CLSA-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests below 6,000 feet msl on BLM and NFS lands.

TABLE CLSA-1

Number of *Clavariadelphus sachalinensis* Sites (2013)

Location*	Number of Sites
Regional Area	129
Local Area	86
Analysis Area (Project Area)	14 (12)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CLSA-2

Distribution of *Clavariadelphus sachalinensis* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	98	71	6
Forest Service	32	18	8
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	24	18	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CLSA-3

Distribution of *Clavariadelphus sachalinensis* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	9	-	-
Congressionally Reserved (CR)	**3**	**-**	**-**
Late Successional Reserve (LSR)	**21**	**12**	**5**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**3**	**2**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	94	74	9
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

C. sachalinensis is widely distributed across eight physiographic provinces in Washington (Western and Eastern Cascades and Western Lowlands), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Coast). Most sites are found along the western Cascade Range and eastern Klamath Mountains in southern Oregon, where the sites tend to be clustered or relatively close to one another in a large group. *C. sachalinensis* appears to be locally abundant in that area, but scattered sites are located in the Coast Range, northern Cascade Range in Washington, and other outlying areas. *C. sachalinensis* is primarily found in southern Oregon and has a scattered distribution in other portions of the region despite the widespread distribution of forests that may provide suitable habitat, and the species does not appear to be well distributed within its range in the NSO range.



Figure CLSA-1.
Regional Distribution of
Clavariadelphus sachalinensis



Figure CLSA-2.
Forests That May Provide Habitat For *Clavariadelphus sachalinensis*

Twenty-four of 129 sites are located on private or state lands (at least partially), and 127 sites are on BLM and NFS lands (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Klamath Falls Resource Area of the Lakeview District, 95 sites in the Medford District (three sites are partially in the Medford District and partially on the Umpqua National Forest), and one site in the Roseburg District. Sites managed by the National Forests that encompass the project area include 16 sites on the Rogue River National Forest and eight sites on the Umpqua National Forest. Sites managed by other BLM Districts and National Forests include one site in the Salem District, three sites on the Deschutes National Forest, one site on the Willamette National Forest, one site on the Okanogan National Forest, one site on the Mt. Hood National Forest, one site on the Wenatchee National Forest, and one site on the Gifford Pinchot National Forest.

Across the NSO range, 26 sites are located on reserve lands managed by BLM and the Forest Service, including 21 in LSRs (at least partially), three partially in Known Owl Activity Centers, and three in Congressionally Reserved areas. This represents 20 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

C. sachalinensis is more common in LSOG forests based on available data (94 of 129 total sites are in LSOG), but it is also fairly common in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous forests below about 5,600 feet msl and has been documented in most of the NSO range. Coniferous forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *C. sachalinensis* and support additional sites. These forests encompass an estimated 15.1 million acres on BLM and NFS lands in the region, including an estimated 8.5 million acres in reserve land allocations (56 percent of the forests; Table CLSA-4). Of this acreage, an estimated 4.9 million acres are LSOG (see Figure CLSA-2), including 3.1 million acres in reserve land allocations (63 percent of the forests). Although coniferous forests are widespread in the NSO range, LSOG coniferous forests below 6,000 feet msl are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CLSA-4

Extent of Forests that Could Provide Habitat for *Clavariadelphus sachalinensis* on BLM and NFS Lands*

Location	Coniferous Forests below 6,000 feet		LSOG Coniferous Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	15,117,640	8,511,690	4,873,020	3,045,810
Local Area	443,530	151,710	159,610	68,490
Project Area	960	430	270	150

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. sachalinensis* is distributed across six 5th field watersheds that overlap the project area (see Table CLSA-5 and Figure CLSA-3). The sites are located within the central and eastern portions of the local area, and most sites tend to be clustered and close to one another in the watersheds. Across the watersheds, multiple avenues of connectivity appear to be

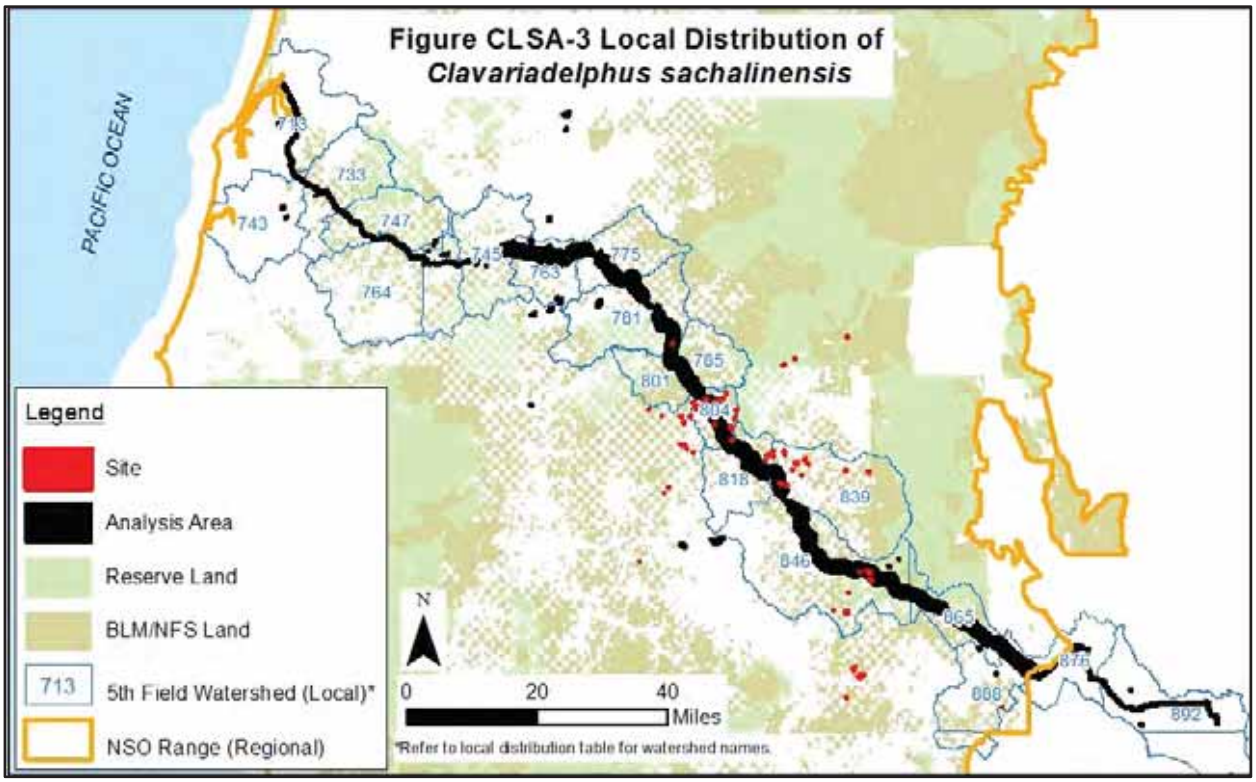
available between sites based on the extent of coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 20 miles to the northeast in the Cascade Range and to the southwest in the Klamath Mountains.

TABLE CLSA-5

Distribution of *Clavariadelphus sachalinensis* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	27	1
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	1	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	16	10
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	1*	-
South Umpqua River (781)	2	2
Spencer Creek (865)	-	-
Trail Creek (804)	40*	1
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2012; HUC5 Watershed layer, Aug. 23, 2011
*One site is partially in the Rogue-River Shady Cove and Trail Creek watersheds.



All of the 86 sites in the local area are at least partially on BLM and NFS lands. These sites are located on lands designated as Other (Matrix), LSR, and LSR4. Eighteen sites are partially on private lands. Of the 86 sites in the local area, 14 sites are on reserve lands, representing 16

percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table CLSA-5 and on Figure CLSA-3. Most of the sites in the Little Butte Creek and South Umpqua River watersheds are in reserves (LSRs), and one site in the Big Butte Creek and Trail Creek watersheds is in an LSR.

Coniferous forests below 6,000 feet msl encompass approximately 443,530 acres on BLM and NFS lands in the local area, with 151,710 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 159,610 acres are LSOG, including 68,490 acres in reserves (43 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures CLSA-2 and CLSA-3).

Analysis/Project Area Distribution

The analysis area contains 14 sites of *C. sachalinensis*, and the project area contains 12 sites. The analysis area sites are distributed across four 5th field watersheds in the Medford (one site) and Roseburg (five sites) Districts and on the Rogue River (three sites) and Umpqua (five sites) National Forests. The sites are found in the eastern portion of the analysis area, and most of the sites are clustered in three groups. Many sites are also located within the immediate vicinity of the analysis area (see Local Distribution discussion above), including several within 5 miles.

The sites in the analysis area are located on lands designated as Other (Matrix) and LSR. Of the 14 sites in the analysis area, five sites are on reserve lands.

Surveys for the PCGP Project resulted in an estimated 160 observations of the species in 40 locations in or near the project area (Siskiyou BioSurvey LLC 2012a). An estimated 100 of these recorded observations combined with other data in the agency databases comprise the 14 sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, four sites are between MPs 112.6 and 113.2, and two sites are between MPs 157.7 and 158.3. Two sites are near MP 100.4, and one site is near MP 133.3.

Project Impacts

Analysis

The PCGP Project would affect 14 sites out of the 127 sites on BLM- and Forest Service-managed lands in the region, representing approximately 11 percent of the sites (or 14 out of 129 total sites on all lands in the NSO range). Table CLSA-6 presents an overview of the features of the PCGP Project that would affect the *C. sachalinensis* sites. The construction corridor and associated work and storage areas would affect approximately 20 acres within 12 sites (about 17 percent of all sites in the analysis area); the other two sites may be indirectly affected by nearby PCGP Project activities. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. sachalinensis* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 10.7 acres of vegetation and soil within eight sites and could result in the removal of *C. sachalinensis*

populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1 acre within five sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *C. sachalinensis* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 6.7 acres of understory habitat in eight sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Road improvements and establishment would disturb approximately 1.8 acre within four sites and could remove habitat and extant populations or individuals of *C. sachalinensis*.

TABLE CLSA-6

Impacts to *Clavariadelphus sachalinensis* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	8	10.7 ac
Temporary Extra Work Area (TEWA)	5	1.0 ac
Uncleared Storage Area (UCSA)	8	6.7 ac
Roads (TMP)	4	1.8 ac
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 750 acres of coniferous forests below 6,000 feet msl, including 200 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. sachalinensis*. Within this impact area, about 540 acres (about 72 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 170 acres of coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 14 sites as a result of the PCGP Project, 28 sites of *C. sachalinensis* would remain on BLM and NFS lands in the local area, including nine in reserves, and 113 sites, including 21 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 21 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for

those land allocations. Based on these site counts, approximately 19 percent of the remaining *C. sachalinensis* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. sachalinensis* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *C. sachalinensis* has a wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (127 on BLM and NFS lands). The species is locally abundant in the southern Cascade Range and eastern Klamath Mountains in Oregon. The currently known number of sites on BLM and NFS lands is an increase of 97 sites on BLM and NFS lands since 2007, with most sites documented during the PCGP Project surveys.
    - An estimated 20 percent of the sites (26 sites) are in reserves, which is an increase of about 22 sites in reserves since 2006 per Molina (2008).
- Coniferous forests below 6,000 feet msl (general habitat for the species) are widespread across the region and encompass approximately 15.1 million acres on BLM and NFS lands with an estimated 56 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *C. sachalinensis*.
- The PCGP Project would affect 14 of 127 BLM- and Forest Service-managed sites of *C. sachalinensis*, representing approximately 11 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the 14 sites, a moderate-high number of sites (113) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (28 sites) would remain in the local vicinity of the analysis area; these sites would be distributed across five 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at five sites in LSRs, but the percentage of sites in reserves would be about the same (19 percent). Of the remaining sites, 18 are in LSRs where management actions are restricted to those activities that benefit LSOG

forests, and three are in Congressionally Reserved areas where management activities that may adversely affect *C. sachalinensis* are unlikely.

- The PCGP Project would result in a permanent loss of an estimated 170 acres of coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 8.5 million acres (56 percent) of coniferous forests and 3.1 million acres (63 percent) of LSOG coniferous forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. sachalinensis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.11.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. sachalinensis* at 14 sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 113 sites would remain on BLM and NFS lands across the region, and 28 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. sachalinensis* at 14 sites, these sites are part of a group of sites in southern Oregon where the species is locally abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. sachalinensis* would persist in the region without considering the 14 sites as part of the population.
- The PCGP Project would remove approximately 750 acres of coniferous forests and 200 acres of LSOG coniferous forests below 6,000 feet msl (a negligible amount of the forests). An estimated 72 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 8.5 million acres (56 percent) of coniferous forests and 3.1 million acres (63 percent) of LSOG coniferous forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. sachalinensis* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 14 *C. sachalinensis* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that

apply to affected sites would waive implementation of Management Recommendations for *C. sachalinensis* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.12 CLAVARIADELPHUS TRUNCATUS

Clavariadelphus truncatus is a club mushroom species in the Gomphaceae family (formerly in Clavariadelphaceae) and is commonly known as flat-topped, truncate, or club coral or the orange club. *C. truncatus* is also known as *C. borealis*.

2.12.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. truncatus* as a Category B (rare) species. The ORBIC evaluated *C. truncatus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be widespread, abundant, and secure within its global range (G5). In Oregon, it was not rare and apparently secure, but with cause for long-term concern (S4). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.12.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *C. truncatus*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). The mushroom has been documented fruiting from July through November in the NSO range (Castellano et al. 2003). In California, fruiting has been documented from late fall to mid-winter (The Fungi of California 2010).

Range

C. truncatus is widespread in Asia, Europe, and North America, including most Canadian provinces; 22 states from Alaska to California, Idaho, Utah, and east to Maine and Virginia; and Mexico (ORBIC 2004). Within the NSO range, populations are widely distributed from northern California, throughout Oregon, and north to the North Cascades and Olympic Mountains of Washington. The species is considered to be very common across its global range and is found in northern coniferous forests throughout the world. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed in Asia, Europe, and North America. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. truncatus* from more than 300 element occurrences worldwide in 2004. An estimated 120 of these occurrences were in California, Oregon, and Washington, with the majority (more than 100) found in Oregon (ORBIC 2004). The ORBIC estimated that 53 of the element occurrences were in protected areas in the NSO range in 2004. In 2004, *C. truncatus* was considered to be very common and likely to be secure across its range and was considered widespread in western Oregon (ORBIC 2004). The species was found in two locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 89 new sites of *C. truncatus* in the NSO range between 1998–2006, and 133 total sites were documented by 2006, including 54 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 118 sites on federal lands and 130 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *C. truncatus*, and resulted in 30 new observations of individuals or populations of *C. truncatus*. Additional persistence surveys for *C. truncatus* in LSRs in nearby areas resulted in 20 additional observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by about 20 percent. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (3-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. truncatus is found in coniferous forests (ORBIC 2004). Based on data available in 1994, *C. truncatus* was presumed to be similar to other club coral fungi, which require cool or cold, moist coniferous forests and are primarily found in LSOG forests (Holthausen et al. 1994). It may also require a well-developed humus layer and tends to be more common with increasing elevation and latitude. The species grows scattered or gregarious on soil or duff under mixed conifers (Castellano et al. 2003). *C. truncatus* is more widespread and abundant than many other S&M fungi species and may prefer specific microclimate conditions of LSOG forests, but may not be as restricted to these conditions.

Threats

The primary threat to *C. truncatus* is from logging activities, which result in removal of host trees and disturbance to soil (ORBIC 2004). Like other club coral fungi, *C. truncatus* is not subject to commercial harvest, but may be occasionally gathered by recreational pickers (Holthausen et al. 1994). Other specific threats to the species are not known.

Management Recommendations

As a Category B species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. truncatus*:

- As a mycorrhizal species, *C. truncatus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.12.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. truncatus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CLTR-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 462 observations from BLM and Forest Service geodatabases were converted into 228 sites in the NSO range (region). Table CLTR-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CLTR-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CLTR-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CLTR-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests on BLM and NFS lands.

TABLE CLTR-1

Number of *Clavariadelphus truncatus* Sites (2013)

Location*	Number of Sites
Regional Area	228
Local Area	91
Analysis Area (Project Area)	33 (32)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CLTR-2

Distribution of *Clavariadelphus truncatus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	94	67	17
Forest Service	124	27	18
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	32	17	4

Data Source: Merged land ownership data for WA, OR, and CA in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CLTR-3

Distribution of *Clavariadelphus truncatus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	5	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	17	-	-
Congressionally Reserved (CR)	**18**	**-**	**-**
Late Successional Reserve (LSR)	**56**	**28**	**17**
Marbled Murrelet Area (LSR3)	**4**	**4**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**8**	**5**	**2**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	121	57	16
Riparian Reserve**	**2**	**1**	**-**

Data Sources: 1994 ROD land allocation data, September 2009; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

C. truncatus is widely distributed across 11 physiographic provinces in Washington (Western and Eastern Cascades and Western Lowlands), Oregon (Coast Range, Cascades West and East, Willamette Valley, and Klamath Mountains), and California (Klamath, Cascades, and Coast) (see Figure CLTR-1). Most sites are found along the Cascade Range and Klamath Mountains, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the Klamath Mountains, Coast Range, and other outlying areas with some clusters of sites in western Oregon and northwestern California. *C. truncatus* appears to be well distributed in the Cascade Range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.



Figure CLTR-1. Regional Distribution of *Clavariadelphus truncatus*

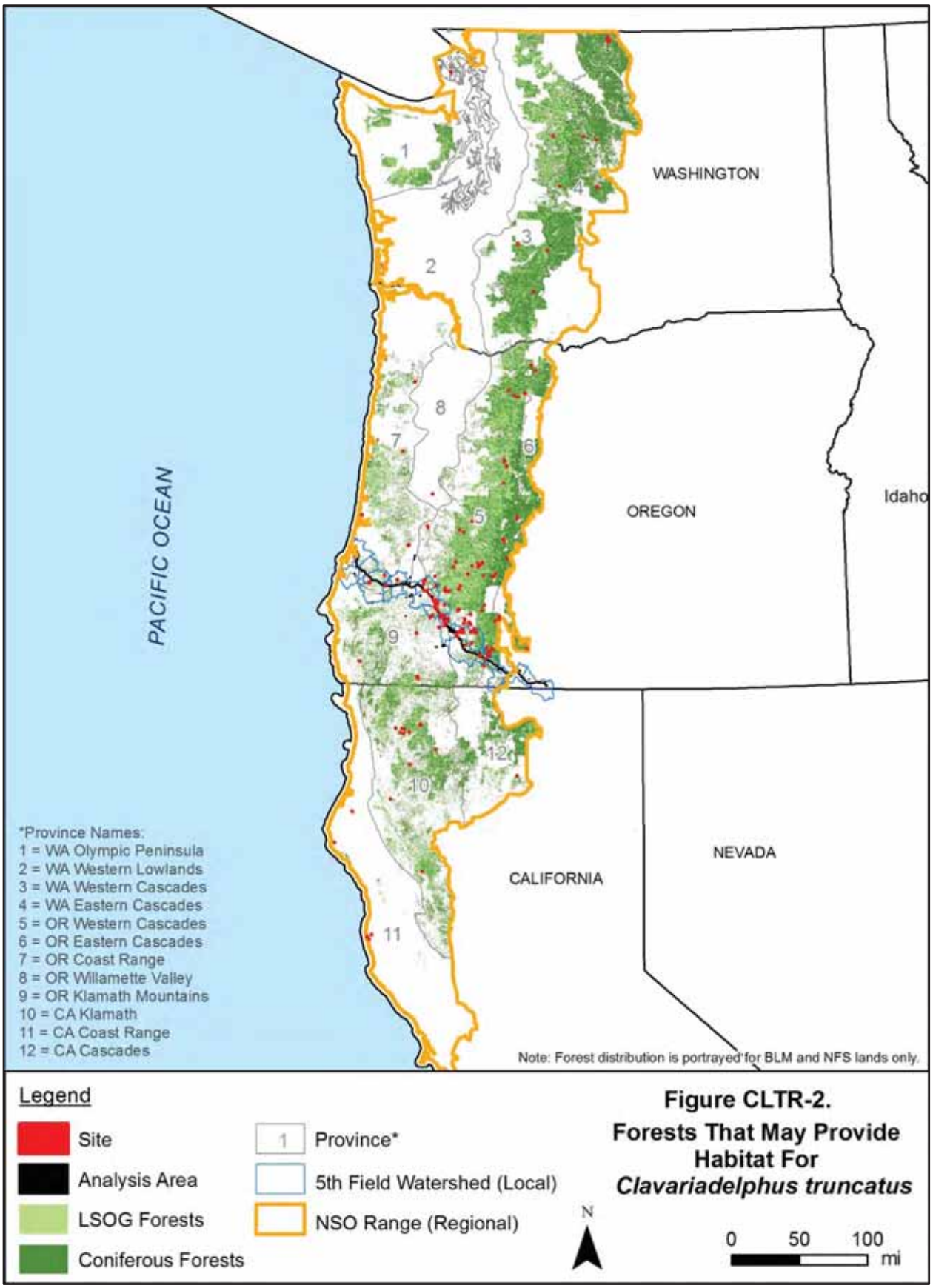


Figure CLTR-2.
Forests That May Provide Habitat For *Clavariadelphus truncatus*

Thirty-two of 228 sites are located on private, state, or other lands (at least partially); three sites are on NPS lands (Mount Rainier National Park and partially in Crater Lake National Park); and 213 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include two sites in the Coos Bay District, 51 sites in the Medford District (three sites are partially in the Medford District and partially on the Rogue River National Forest), 38 sites in the Roseburg District (three sites are partially in the Roseburg District and partially on the Umpqua National Forest), and one site in the Klamath Falls Resource Area of the Lakeview District. Sites managed by the National Forests that encompass the project area include 15 sites on the Winema National Forest, 18 sites on the Rogue River National Forest, and 45 sites on the Umpqua National Forest. The remaining 47 sites on BLM and NFS lands are in the Arcata District and on the Deschutes, Gifford Pinchot, Klamath, Lassen, Mendocino, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Siskiyou, Siuslaw, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 85 sites are located on reserve lands managed by BLM and the Forest Service, including 56 in LSRs (at least partially), eight in Known Owl Activity Centers (at least partially), four in Marbled Murrelet Areas, 18 in Congressionally Reserved areas, and two in Riparian Reserves. This represents 40 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

C. truncatus is more common in LSOG forests based on available data (186 of 228 total sites are in LSOG), but it is also relatively common in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. truncatus* and support additional sites. These forests encompass an estimated 16.3 million acres on BLM and NFS lands in the region, including an estimated 11.1 million acres in reserve land allocations (68 percent of the forests; Table CLTR-4). Of this acreage, an estimated 5 million acres are LSOG (see Figure CLTR-2), including 3.15 million acres in reserve land allocations (63 percent of the forests). Although coniferous forests are widespread across the region, LSOG coniferous forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CLTR-4

Extent of Forests that Could Provide Habitat for *Clavariadelphus truncatus* on BLM and NFS Lands*

Location	Coniferous Forests		LSOG Coniferous Forests	
	Total	Reserves	Total	Reserves
Regional Area	16,284,850	11,109,210	5,029,190	3,149,050
Local Area	937,650	161,020	161,540	70,610
Project Area	960	430	270	140

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. truncatus* is distributed across 10 5th field watersheds that overlap the project area (see Table CLTR-5 and Figure CLTR-3). Some sites appear more scattered than others, while multiple clusters of sites are found in the Myrtle, South Umpqua River, Trail Creek, and Big Butte Creek watersheds. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 10 miles to the northeast in the Cascade Range.

Of the 91 sites in the local area, 89 sites are on BLM and NFS lands (at least partially). These sites are primarily located on lands designated as Other (Matrix) and LSR. Seventeen sites are at least partially on private lands. Of the 89 sites in the local area on BLM and NFS lands, 36 sites are on reserve lands, representing 40 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table CLTR-5 and on Figure CLTR-3. Most of the sites in the Elk Creek-South Umpqua, Little Butte Creek, Middle Fork Coquille River, Olalla Creek-Lookingglass Creek, South Umpqua River, and Upper Cow Creek watersheds are in reserves (mostly LSRs).

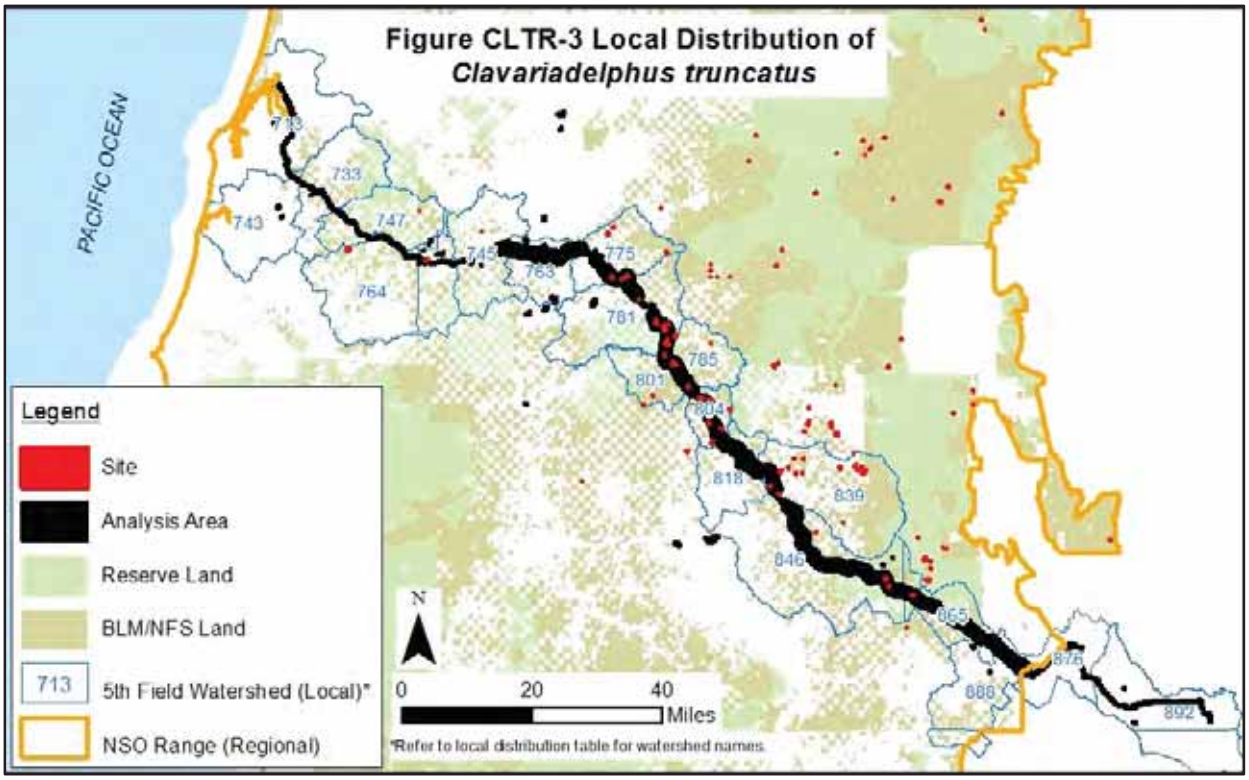
Coniferous forests encompass approximately 937,650 acres on BLM and NFS lands in the local area, with 161,020 acres in reserve land allocations (17 percent of the forests). Of this acreage, an estimated 161,540 acres are LSOG, including 70,610 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures CLTR-2 and CLTR-3).

TABLE CLTR-5

Distribution of *Clavariadelphus truncatus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	21	2
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	1	-
Elk Creek-South Umpqua (785)	7*	4**
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	5	4
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	4	4
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	9	3***
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	23*	19***
Spencer Creek (865)	-	-
Trail Creek (804)	21	-
Upper Cow Creek (801)	6	4**

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*Two sites are in both Elk Creek-South Umpqua and Upper Cow Creek watersheds.
**Four sites in reserves are in both Elk Creek-South Umpqua and Upper Cow Creek watersheds.
***One site in reserves is in both Myrtle Creek and South Umpqua River watersheds.



Analysis/Project Area Distribution

The analysis area contains 33 sites of *C. truncatus*, all of which are at least partially on BLM or NFS lands, and the project area contains 32 sites. Seventeen sites are on BLM-managed lands in the Roseburg and Medford Districts, and 18 sites are on Forest Service-managed lands on the Rogue River and Umpqua National Forests. Four sites are partially on private lands. The analysis area sites are distributed across six 5th field watersheds. The sites are widely distributed across much of the analysis area and tend to be found in several clusters, with a few scattered sites. Many sites are also located within the immediate vicinity of the analysis area (see Local Distribution discussion above), including several within 1 mile.

The sites on BLM and NFS lands in the analysis area are located on lands designated as Other (Matrix), LSR, and LSR4. Of the 33 sites in the analysis area, 19 sites are on reserve lands.

Surveys for the PCGP Project resulted in 107 total observations of the species in 50 locations in or near the project area (Siskiyou BioSurvey LLC 2012a). An estimated 73 of these recorded observations comprise the 33 sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, 25 sites are between MPs 83 and 113.3, and four sites are between MPs 162 and 168. Three sites are along roads northeast of MP 114.

Project Impacts

Analysis

The PCGP Project would affect 33 sites out of the 213 sites on BLM- and Forest Service-managed lands in the region, representing approximately 16 percent of the sites (or 33 out of 228 total sites on all lands in the NSO range). Table CLTR-6 presents an overview of the features of

the PCGP Project that would affect the *C. truncatus* sites. The construction corridor and associated work and storage areas would affect approximately 50 acres within 32 sites (about 36 percent of all sites in the analysis area); the other site may be indirectly affected by nearby PCGP Project activities. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. truncatus* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 27.2 acres of vegetation and soil within 28 sites and could result in the removal of *C. truncatus* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 4 acres within 17 sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *C. truncatus* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 18.1 acres of understory habitat in 14 sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Road improvements and establishment would disturb approximately 1.1 acres within four sites and could remove habitat and extant populations or individuals of *C. truncatus*. Hydrostatic testing would take place on less than 0.1 acre of two sites and is not likely to affect individuals or populations of the species because it would be done after the pipeline is installed and ground disturbance would have already affected the sites.

TABLE CLTR-6

Impacts to *Clavariadelphus truncatus* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	28	27.2 ac
Temporary Extra Work Area (TEWA)	17	4.0 ac
Uncleared Storage Area (UCSA)	14	18.1 ac
Roads (TMP)	4	1.1 ac
Other Minimal Disturbance Activities	2	0.05 ac

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 750 acres of coniferous forests, including 200 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. truncatus*. Within this impact area, about 540 acres (about 72 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent

loss of about 170 acres of coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 33 sites as a result of the PCGP Project, 56 sites of *C. truncatus* would remain on BLM and NFS lands in the local area, including 17 in reserves, and 180 sites, including 66 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 66 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 37 percent of the remaining *C. truncatus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. truncatus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *C. truncatus* has a wide distribution across 11 physiographic provinces and three states in the region and a moderate-high number of overall sites (213 on BLM and NFS lands). The species appears to be well distributed in the Cascade Range in Oregon and is fairly common and widespread outside the mountain range. The currently known number of sites on BLM and NFS lands is an increase of 95 sites on BLM and NFS lands since 2007, with most sites documented during the PCGP Project surveys.
    - An estimated 40 percent of the sites (85 sites) are in reserves, which is an increase of about 31 sites in reserves since 2006 per Molina (2008).
- Coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 16.3 million acres on BLM and NFS lands with an estimated 68 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *C. truncatus*.
- The PCGP Project would affect 33 of 213 BLM- and Forest Service-managed sites of *C. truncatus*, representing approximately 16 percent of the sites on BLM and NFS lands in

the NSO range. Assuming site persistence cannot be maintained at the 33 sites, a moderate-high number of sites (180) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (56 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across 10 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would affect site persistence of 19 sites in LSRs, but the percentage of sites in reserves would be about the same (37 percent). Of the remaining sites, 47 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 18 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. truncatus* are unlikely. Two other sites are at least partially in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 170 acres of coniferous forests (less than 1 percent of the total regional acreage). An estimated 11.1 million acres (68 percent) of coniferous forests and 3.2 million acres (63 percent) of LSOG coniferous forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. truncatus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.12.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. truncatus* at 33 sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 180 sites would remain on BLM and NFS lands across the region, and 56 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. truncatus* at 33 sites, these sites are part of the many sites in southern Oregon where the species is fairly common. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. truncatus* would persist in the region without considering the 33 sites as part of the population.
- The PCGP Project would remove approximately 750 acres of coniferous forests and 200 acres of LSOG coniferous forests (a negligible amount of the forests). An estimated 72 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 11.1 million acres (68 percent) of coniferous forests and 3.2 million acres (63 percent) of LSOG coniferous forests would remain in reserves in the NSO range. Other sites may be

located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. truncatus* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 33 *C. truncatus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *C. truncatus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.13 COLLYBIA BAKERENSIS

Collybia bakerensis is a gilled wood-decaying mushroom species in the Tricholomataceae family and is commonly known as common snow agaric.

2.13.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. bakerensis* as a Category B (rare) species. The ORBIC evaluated *C. bakerensis* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.13.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *C. bakerensis*. It is a saprophytic mushroom found on standing or dead conifer trees (ORBIC 2004). It is most commonly found on firs (*Abies)*, spruces (*Picea*), and hemlocks (*Tsuga*). The mushroom grows scattered to gregarious (Castellano et al. 1999). In the Sierra Nevada and Cascade Range of California, *C. bakerensis* fruits shortly after snowmelt; in Washington, Colorado, and Idaho, it fruits in late

summer and fall (Castellano and O'Dell 1997, ORBIC 2004). In the NSO range, *C. bakerensis* has been documented to fruit between May and October (Castellano et al. 1999).

Range

C. bakerensis is endemic to western North America (ORBIC 2004). The species' range extends from British Columbia south to California, and it has also been documented in Colorado and Idaho. Based on data available in 2004, the species was found in the NSO range from northern California to the central Cascade Range in Oregon and in the northern Cascade Range and Olympic Mountains in Washington. Like other bryophilous fungi, *C. bakerensis* exhibits irregular distributions that are directly proportional to the presence of suitable substrate. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. bakerensis* from 155 element occurrences in California, Oregon, and Washington in 2004. An estimated 120 occurrences were in California and Washington, with an unknown number in Oregon (ORBIC 2004). The ORBIC estimated that 128 of these occurrences were in protected areas in the NSO range. In 2004, *C. bakerensis* was considered resilient, stable, and common across its global range and was considered stable in Oregon (ORBIC 2004). The species was found in two locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 120 new sites of *C. bakerensis* in the NSO range between 1998–2006, and 134 total sites were documented by 2006, including 83 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 124 sites on federal lands and 129 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species and included incidental observations of other species. No new observations of *C. bakerensis* were recorded. Despite the lack of observations during PCGP surveys, the increased number of sites since 1998 with increased surveys (9-fold increase between 1998–2006 per Molina 2008 records) demonstrates that this species is likely more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. bakerensis grows on the trunks of conifer trees or on fallen trees, particularly after snowmelt (Castellano and O'Dell 1997, ORBIC 2004). In the Sierra Nevada and Cascade Range of

California, it has been documented primarily on fir trees above about 8,200 feet msl. In Washington, the species is primarily found on hemlock trees and rarely on spruce trees. *C. bakerensis* may require forest litter, duff, or debris as a habitat component (Cushman and Huff 2007). *C. bakerensis* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

The primary threat to *C. bakerensis* is hot fires that can damage trees and modify the general habitat, microclimate, and growth substrate inhabited by the mushroom (ORBIC 2004). Anthropogenic activities also threaten localized occurrences of *C. bakerensis* through disturbance of microclimates, coarse woody debris, and/or damage to conifer trees. These activities include building of roads, campgrounds, and trails; stream diversions; timber harvests; and other incidental catastrophic events (Holthausen et al. 1994). Populations not located in reserves or protected areas are at particular risk from habitat loss. *C. bakerensis* is not collected for human consumption and is therefore not subject to commercial harvest. Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *C. bakerensis* with several other species (Group 16 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites by minimizing soil disturbance at or around known sites and preventing removal of host trees. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. bakerensis*:

- As a litter saprobe, *C. bakerensis* may be associated with forest litter, duff or debris. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.13.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. bakerensis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table COBA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that

encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 187 observations from BLM and Forest Service geodatabases were converted into 137 sites in the NSO range (region). Table COBA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table COBA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure COBA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure COBA-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests on BLM and NFS lands.

TABLE COBA-1

Number of *Collybia bakerensis* Sites (2013)

Location*	Number of Sites
Regional Area	137
Local Area	21
Analysis Area (Project Area)	2 (2)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE COBA-2

Distribution of *Collybia bakerensis* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	-	-	-
Forest Service	133	21	2
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	1	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011

TABLE COBA-3

Distribution of *Collybia bakerensis* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	-	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	36	-	-
Congressionally Reserved (CR)	**3**	**-**	**-**
Late Successional Reserve (LSR)	**56**	**2**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	48	19	2
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure COBA-1. Regional Distribution of *Collybia bakerensis*

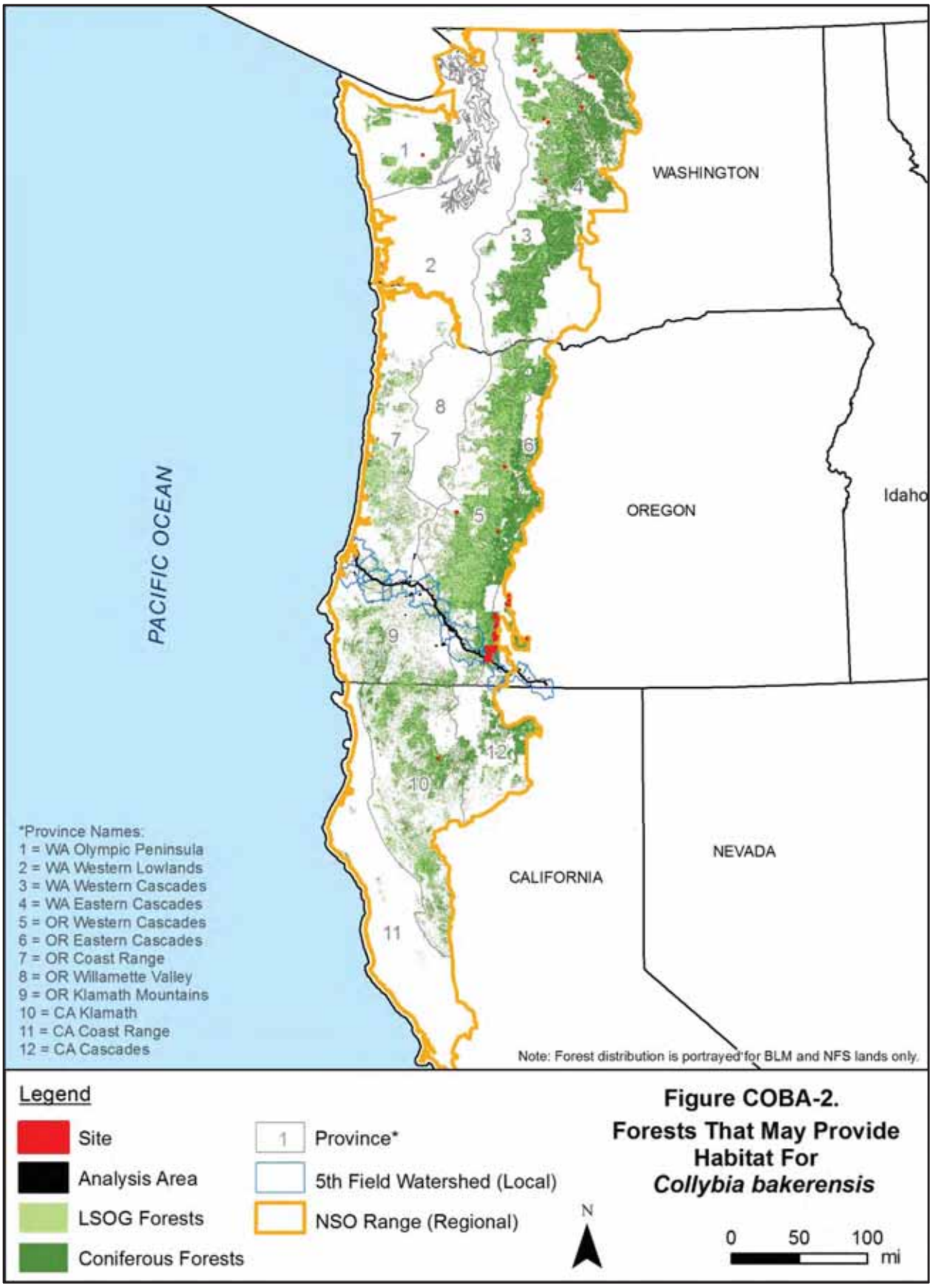


Figure COBA-2.
Forests That May Provide Habitat For *Collybia bakerensis*

Regional Distribution

C. bakerensis is somewhat widely distributed across six physiographic provinces in Washington (Western and Eastern Cascades and Olympic Peninsula), Oregon (Cascades West and East), and California (Klamath) (see Figure COBA-1). The highest density of sites is found in the eastern Cascade Range in southern Oregon, where several sites are clustered near one another and the species appears to be locally abundant. Other sites are scattered across the Cascade Range in Oregon and Washington, and a couple of isolated sites are located in the Olympic Peninsula of Washington and the Klamath Mountains of California. Although *C. bakerensis* is fairly common based on the overall number of sites, its distribution is scattered across the NSO range with a group of sites in the Cascade Range, and the species does not appear to be well distributed in its range within the region.

One of 137 sites is located on private land; three sites are on NPS lands (Mount Rainier, North Cascades, and Olympic National Parks); and 133 sites are on NFS lands across the region (no sites are on BLM lands). Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest and 119 sites on the Winema National Forest. Sites managed by other National Forests include one site on the Klamath National Forest, five sites managed by the Willamette National Forest, four sites on the Mt. Baker-Snoqualmie National Forest, three sites on the Okanogan National Forest, and one site on the Wenatchee National Forest.

Across the NSO range, 58 sites are located on reserve lands managed by the Forest Service, including 56 in LSRs (at least partially) and three in Congressionally Reserved areas (at least partially). This represents 44 percent of the total Forest Service-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

C. bakerensis is more common in LSOG forests based on available data (117 of 137 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. bakerensis* and support additional sites. These forests encompass an estimated 16.3 million acres on BLM and NFS lands in the region, including an estimated 11.1 million acres in reserve land allocations (68 percent of the forests; Table COBA-4). Of this acreage, an estimated 5 million acres are LSOG (see Figure COBA-2), including 3.15 million acres in reserve land allocations (63 percent of the forests). Although coniferous forests are widespread across the region, LSOG coniferous forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE COBA-4

Extent of Forests that Could Provide Habitat for *Collybia bakerensis* on BLM and NFS Lands*

Location	Coniferous Forests		LSOG Coniferous Forests	
	Total	Reserves	Total	Reserves
Regional Area	16,284,850	11,109,210	5,029,190	3,149,050
Local Area	937,650	161,020	161,540	70,610
Project Area	960	430	270	140

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. bakerensis* is found in two 5th field watersheds that overlap the project area (see Table COBA-5 and Figure COBA-3). The sites in the local area are part of the large cluster of sites in the eastern Cascade Range in southern Oregon. Many regional sites are located within 20 miles to the north in the Cascade Range. All of the 21 sites in the local area are on NFS lands. These sites are primarily located on lands designated as Other (Matrix). Of the 21 sites in the local area, two sites are on reserve lands, representing 10 percent of the sites.

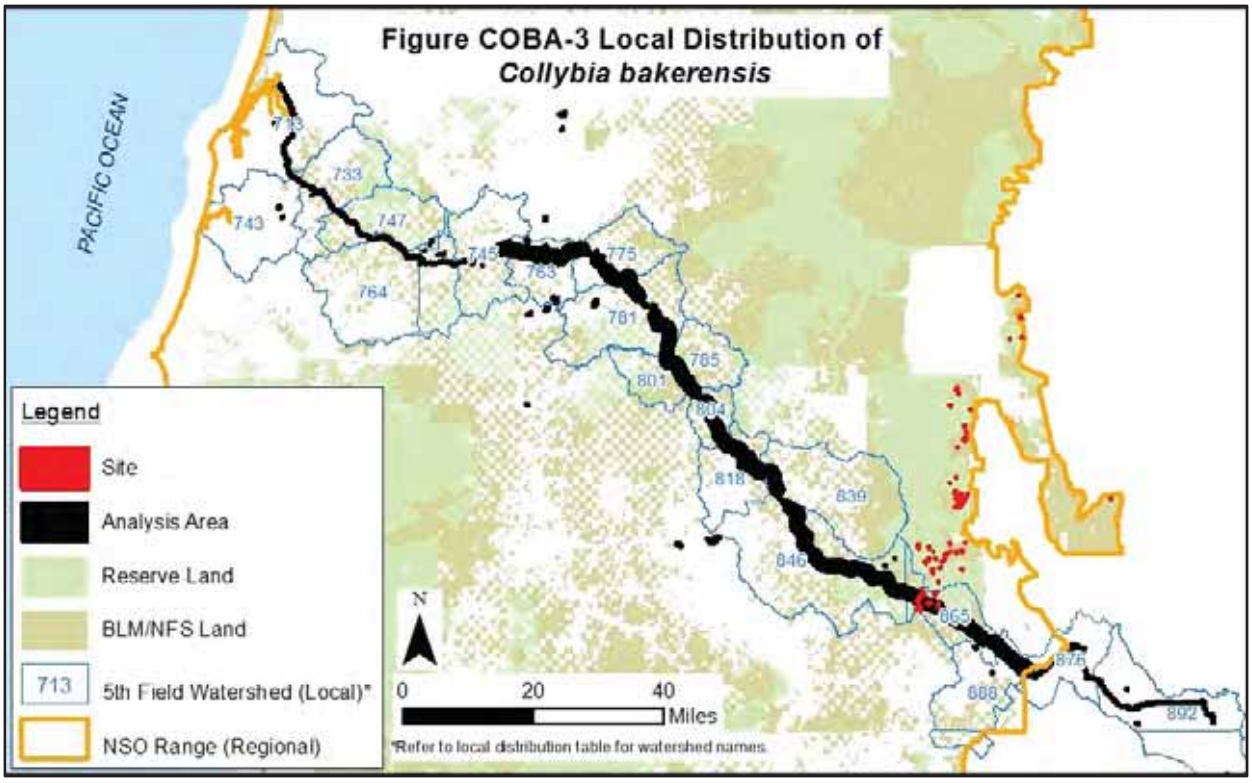
Coniferous forests encompass approximately 937,650 acres on BLM and NFS lands in the local area, with 161,020 acres in reserve land allocations (17 percent of the forests). Of this acreage, an estimated 161,540 acres are LSOG, including 70,610 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures COBA-2 and COBA-3).

TABLE COBA-5

Distribution of *Collybia bakerensis* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	3	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	18	1
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain two sites of *C. bakerensis*. These sites are two of the many in the Spencer Creek watershed, as described in the Local Distribution discussion above. Both are on NFS land designated as Other (Matrix).

Surveys for the PCGP Project resulted in no observations of *C. bakerensis* in the survey area (Siskiyou BioSurvey LLC 2012a). The recorded observations of the species in the analysis area are from agency databases and were recorded in 2000. Within the project area, one site is at MP 168.8, and one site is between MPs 173.7 and 173.8.

Project Impacts

Analysis

The PCGP Project would affect two sites out of the 133 sites on Forest Service-managed lands in the region (no sites are on BLM-managed lands), representing approximately 2 percent of the sites (or two out of 137 total sites on all lands in the NSO range). Table COBA-6 presents an overview of the features of the PCGP Project that would affect the *C. bakerensis* site. The construction corridor would affect approximately 1.4 acres within the sites (about 26 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. bakerensis* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 1.1 acres of vegetation and soils within the sites and could remove individuals of *C. bakerensis*. Disturbance in the TEWAs would result in similar impacts on about 0.2 acre within one site. The establishment of the corridor could modify microclimate conditions in the sites after the corridor is established. The removal of trees and woody debris and disturbance to soil could negatively affect site persistence by removing habitat and disturbing trees and understory components. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.2 acre of understory habitat in one site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE COBA-6

Impacts to *Collybia bakerensis* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	2	1.1 ac
Temporary Extra Work Area (TEWA)	1	0.2 ac
Uncleared Storage Area (UCSA)	1	0.2 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres

Across the project area, the PCGP Project would remove an estimated 750 acres of coniferous forests, including 200 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. bakerensis*. Within this impact area, about 540 acres (about 72 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 170 acres of coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the two sites as a result of the PCGP Project, 19 sites of *C. bakerensis* would remain on NFS lands in the local area, including two in reserves, and 131 sites, including 58 in reserves, would remain on NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 58 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 44 percent of the remaining *C. bakerensis* sites on NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. bakerensis* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *C. bakerensis* has a somewhat wide distribution across six physiographic provinces and three states in the region and a moderate-high number of overall sites (133 on NFS lands; no sites are on BLM lands). This species is locally abundant in the southern Cascade Range in Oregon, but is less abundant in other parts of its range within the NSO range. The currently known number of sites on BLM and NFS lands is an increase of nine sites since 2007.
    - An estimated 44 percent of the sites (58 sites) are in reserves, which is a smaller proportion of sites in reserves since 2006 per Molina (2008).
- Coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 16.3 million acres on BLM and NFS lands with an estimated 68 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous forests, but fewer sites are documented in these areas. A subcomponent of these forests likely provides habitat for *C. bakerensis*.
- The PCGP Project would affect two of 133 Forest Service-managed sites of *C. bakerensis*, representing about 2 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (131) would continue to be documented on NFS lands in the region with a somewhat wide distribution across Washington, Oregon, and California. Several sites (19 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across two 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be the same. Of the remaining sites, 56 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. bakerensis* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 170 acres of coniferous forests (less than 1 percent of the total regional acreage). An estimated 11.1

million acres (68 percent) of coniferous forests and 3.2 million acres (63 percent) of LSOG coniferous forests would remain in reserves in the NSO range.

- The remaining forests could support additional populations of *C. bakerensis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

2.13.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. bakerensis* at two sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 131 sites would remain on NFS lands across the region, and 19 sites would remain on NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. bakerensis* at two sites, these sites are part of a group of sites in the Cascade Range in southern Oregon where the species is locally abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. bakerensis* would persist in the region without considering the sites as part of the population.
- The PCGP Project would remove approximately 750 acres of coniferous forests and 200 acres of LSOG coniferous forests (a negligible amount of the forests). An estimated 72 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 11.1 million acres (68 percent) of coniferous forests and 3.2 million acres (63 percent) of LSOG coniferous forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Oregon Cascade Range, several sites are scattered across the region and are less likely to be collectively affected by a single event.

The PCGP Project would not be able to avoid impacts to the *C. bakerensis* sites in the analysis area, although some individuals within the sites may persist following project implementation. Based on the above conclusions, avoidance of the two *C. bakerensis* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *C. bakerensis* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over

the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.14 COLLYBIA RACEMOSA

Collybia racemosa is a gilled mushroom species in the Tricholomataceae family and is commonly known as branched collybia or branched shanklet. *C. racemosa* is also known as *Dendrocollybia racemosa*.

2.14.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. racemosa* as a Category B (rare) species. The ORBIC evaluated *C. racemosa* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be between imperiled because of rarity or other factors that make it vulnerable to extinction and rare, uncommon or threatened, but not immediately imperiled, within its global range (G2G3). In Oregon, it was between critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation and imperiled because of rarity or other factors that make it vulnerable to extinction (S1S2). The species is on the ORBIC List 3. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.14.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

C. racemosa is mycoparasitic and fruits after rapidly digesting its host (fleshy mushrooms in forests) (ORBIC 2004). It appears to prefer the Nigricans group of *Russula* species (Trappe, pers. comm. 2013), although it has also been found on rotting or mummified remnants of Agarics (gilled mushrooms) and occasionally in nutrient-rich leaf mulch (Castellano et al. 2003). It has been documented fruiting in autumn in the range of the NSO (Castellano et al. 2003) and in late fall to mid-winter in California (The Fungi of California 2010). *C. racemosa* forms protective sclerotia that likely enable it to lie dormant for long periods and can grow vegetatively or produce new fruit bodies (ORBIC 2004). The mushroom produces both sexual and asexual spores.

Range

C. racemosa is widespread, but locally rare, in the northern hemisphere (ORBIC 2004). In Oregon, *C. racemosa* is widely distributed from Mount Hood south along the western slope of the Cascade Range to the California border and west to the Siuslaw near the Pacific Ocean. Based on data available in 2004, it had a spotty distribution throughout its range. Its range in the Pacific Northwest extends from California north to coastal British Columbia, and most recorded

observations are from the California coast (Trappe, pers. comm. 2013). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across the northern hemisphere. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. racemosa* from 33 element occurrences in the Pacific Northwest in 2004. Most of these occurrences were in California (16), with fewer in Oregon (9) and Washington (8) (ORBIC 2004). In 2004, *C. racemosa* was considered to be widespread, but locally rare (ORBIC 2004). The species was found in four locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 12 new sites of *C. racemosa* in the NSO range between 1998–2006, and 43 total sites were documented by 2006, including 14 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 19 sites on federal lands and 36 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *C. racemosa*, and resulted in one new observation of the species. *C. racemosa* is occasionally found during surveys, and based on the increased number of sites since 1998 with increased surveys, more survey effort may locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

Prior to 1994, *C. racemosa* was primarily found in LSOG coastal forests (Holthausen et al. 1994). It has been documented in mixed hardwood-coniferous forests in California (The Fungi of California 2010). The mushroom grows gregarious or solitary on the fruit bodies or the remains of fruit bodies of other mushroom species (Castellano et al. 2003, The Fungi of California 2010, Holthausen et al. 1994). It may be associated with forest litter, duff, or debris (Cushman and Huff 2007). Based on available information, *C. racemosa* may prefer specific microclimate conditions of LSOG forests, but it may also be found in other forests with host mushrooms and favorable conditions.

Threats

Threats to *C. racemosa* are those that affect its host mushroom, general habitat, microclimates, and the substrate or symbiotic partner of the host (ORBIC 2004). *C. racemosa* is particularly vulnerable to removal of the host mushroom and substrate prior to fruiting or sclerotia formation. The removal or destruction of the sclerotia within the litter and mushroom residue and destruction of the habitat that fosters growth of the intended host could affect populations of the

species. It is also presumably vulnerable to alteration of microhabitats and microclimate regimes (stream diversion, road construction, development). Other threats include incidental catastrophic events (wildfires), road construction, development, heavy logging activities, and other activities that displace the protective sclerotia or host mushroom population.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. racemosa*:

- As a litter saprobe, *C. racemosa* may be associated with forest litter, duff or debris. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.14.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. racemosa* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CORA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 98 observations from BLM and Forest Service geodatabases were converted into 55 sites in the NSO range (region). Table CORA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CORA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CORA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CORA-2 displays the species' regional distribution with the extent of all forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE CORA-1

Number of *Collybia racemosa* Sites (2013)

Location*	Number of Sites
Regional Area	55
Local Area	2
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CORA-2

Distribution of *Collybia racemosa* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	5	1	-
Forest Service	27	1	1
NPS	4	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	22	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CORA-3

Distribution of *Collybia racemosa* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	8	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	3	-	-
Congressionally Reserved (CR)	**4**	**-**	**-**
Late Successional Reserve (LSR)	**10**	**-**	**-**
Marbled Murrelet Area (LSR3)	**1**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	3	-	-
Other (Matrix, Riparian Reserve, Other)	4	2	1
Riparian Reserve**	**1**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

C. racemosa has a wide, but scattered, distribution across 10 physiographic provinces in Washington (Western and Eastern Cascades, Western Lowlands, and Olympic Peninsula), Oregon (Coast Range, Cascades West, and Klamath Mountain), and California (Klamath, Cascades, and Coast). The sites are scattered primarily along the Cascade and Coast Ranges and Klamath Mountains. A few clustered sites are located in the Coast Range. Although *C. racemosa* is widely distributed across the NSO range, its distribution is scattered with few clusters of sites, despite the extent of forests that may provide suitable habitat. Based on the species' currently known distribution, *C. racemosa* does not appear to be well distributed within its range in the NSO range.



Figure CORA-1.
Regional Distribution of *Collybia racemosa*

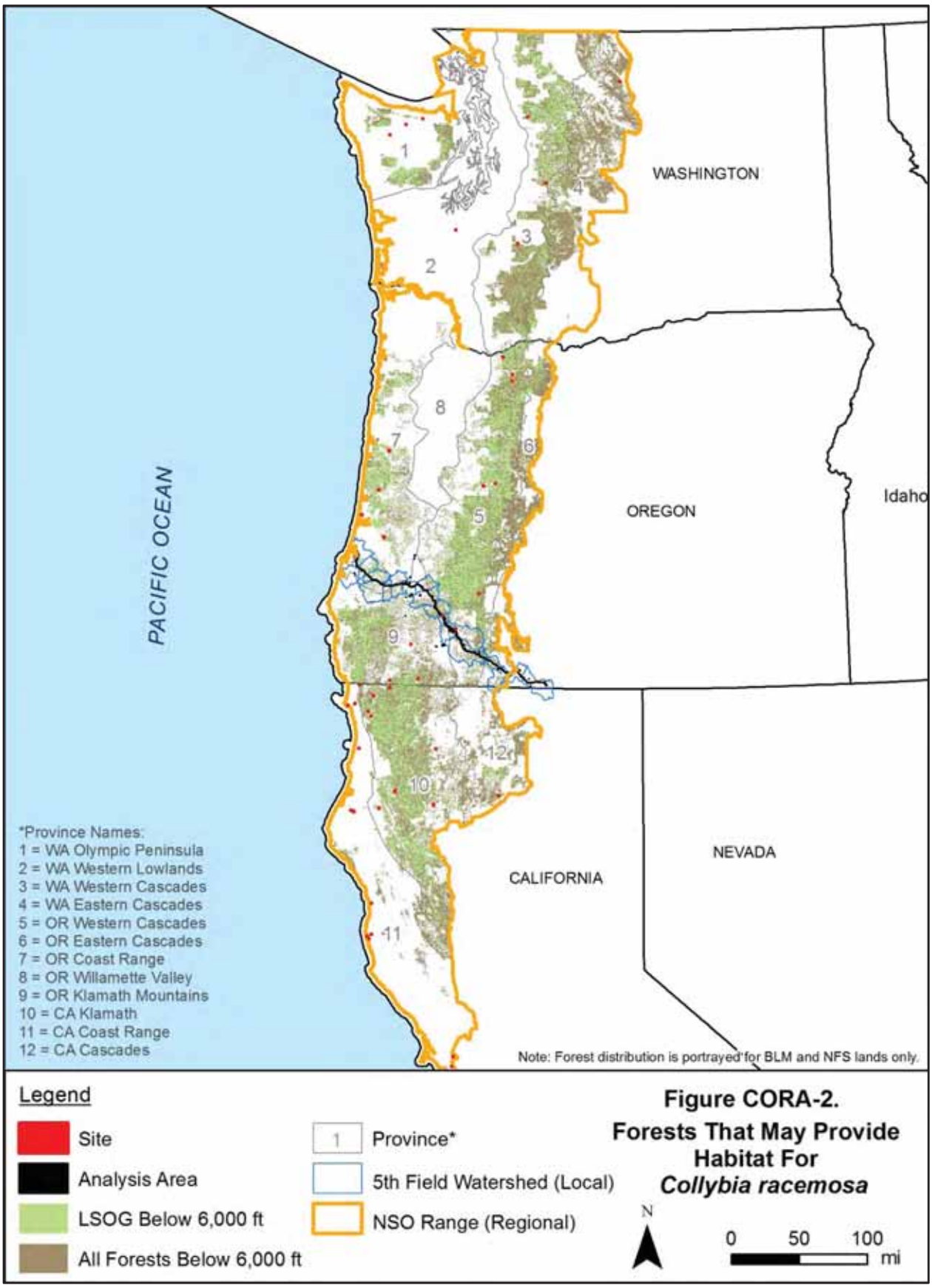


Figure CORA-2.
Forests That May Provide Habitat For *Collybia racemosa*

Twenty-two of 55 sites are located on private, state, or other lands (at least partially); four sites are on NPS lands (Mount Rainier, Olympic, and Redwood National Parks); and 32 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Coos Bay District and one site in the Medford District. Sites managed by the National Forests that encompass the project area include four sites on the Rogue River National Forest and one site on the Umpqua National Forest. Sites managed by other BLM Districts and on other National Forests include one site in the Salem District, three sites in the Arcata BLM District, one site on the Mt. Baker-Snoqualmie National Forest, one site on the Okanogan National Forest, three sites on the Mt. Hood National Forest, one site on the Siuslaw National Forest, five sites on the Willamette National Forest, six sites on the Six Rivers National Forest, two sites on the Siskiyou National Forest, one site on the Klamath National Forest, and one site on the Shasta-Trinity National Forest.

Across the NSO range, 16 sites are located on reserve lands managed by BLM and the Forest Service, including 10 in LSRs (at least partially); one each in a Marbled Murrelet Area, Known Owl Activity Center, and Riparian Reserve; and four in Congressionally Reserved areas (at least partially). This represents 50 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The four NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

C. racemosa is more common in LSOG forests based on available data (42 of 55 total sites are in LSOG), but it is somewhat common in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in all forest types below about 6,000 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. racemosa* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 10.4 million acres in reserve land allocations (54 percent of the forests; Table CORA-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure CORA-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CORA-4

Extent of Forests that Could Provide Habitat for *Collybia racemosa* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	19,194,850	10,381,240	6,092,570	3,750,320
Local Area	611,850	199,720	185,170	80,260
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. racemosa* is found in two 5th field watersheds (Big Butte Creek and Trail Creek) that overlap the project area (see Table CORA-5 and Figure CORA-3). The two local sites are on land designated as Other (Matrix) in the western Cascade Range in the Medford District and in the Klamath Mountains on the Umpqua National Forest. The two sites are distant from one another (more than 10 miles apart) and appear to be isolated from other sites in the region (the nearest regional sites are 30 miles to the northeast and southwest). Limited connectivity appears available between the local sites and other sites in the region based on the distance between the sites, although the distribution patterns of the regional sites indicate that dispersal opportunities likely exist between sites in the Cascade Range and Klamath Mountains.

Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 611,850 acres on BLM and NFS lands in the local area, including 199,720 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 185,170 acres are LSOG, including 80,260 acres in reserve land allocations (43 percent of the forests). Other sites may be located in these mountains ranges in areas that have not been previously surveyed.

TABLE CORA-5

Distribution of *Collybia racemosa* in Local 5th Field Watersheds

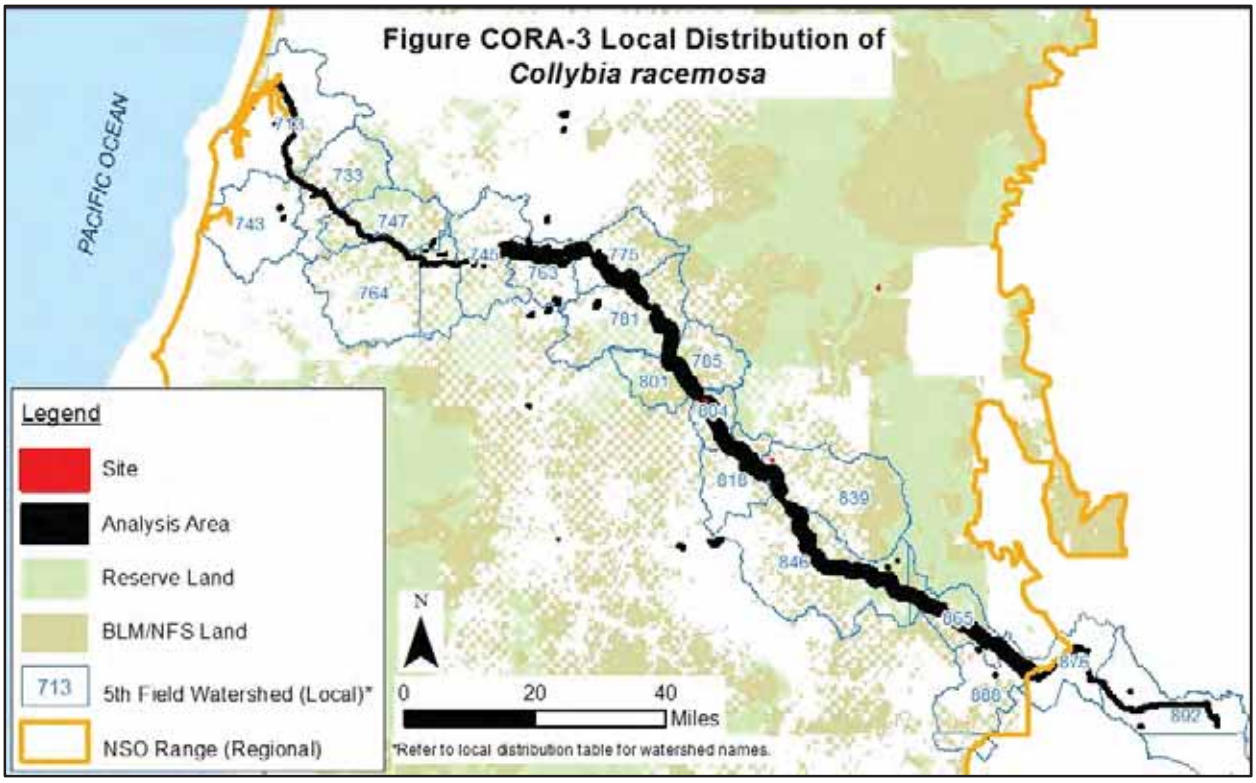
Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	1	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	1	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011

Analysis/Project Area Distribution

The analysis and project areas contain one site of *C. racemosa*. This site is on NFS land designated as Other (Matrix) on the Umpqua National Forest, as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in one observation of *C. racemosa* in the survey area (Siskiyou BioSurvey LLC 2012a). This recorded observation was near MP 113 and comprises the single site in the analysis area.



Project Impacts

Analysis

The PCGP Project would affect one site out of the 32 sites on BLM- and Forest Service-managed lands in the region, representing approximately 3 percent of the sites (or one out of 55 total sites on all lands in the NSO range). Table CORA-6 presents an overview of the features of the PCGP Project that would affect the *C. racemosa* site. The construction corridor and associated storage areas would affect approximately 1 acre (44 percent) of the site (the site is approximately 2.3 acres), and the corridor would cross through the central portion of the site (see Figure CORA-4). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. racemosa* in and near the project area. Due to the scattered distribution of the species and few sites near the project area, the effects on one site could potentially alter the distribution of the species in the NSO range. This discussion presents a detailed analysis of the features of the PCGP Project that could affect site persistence.

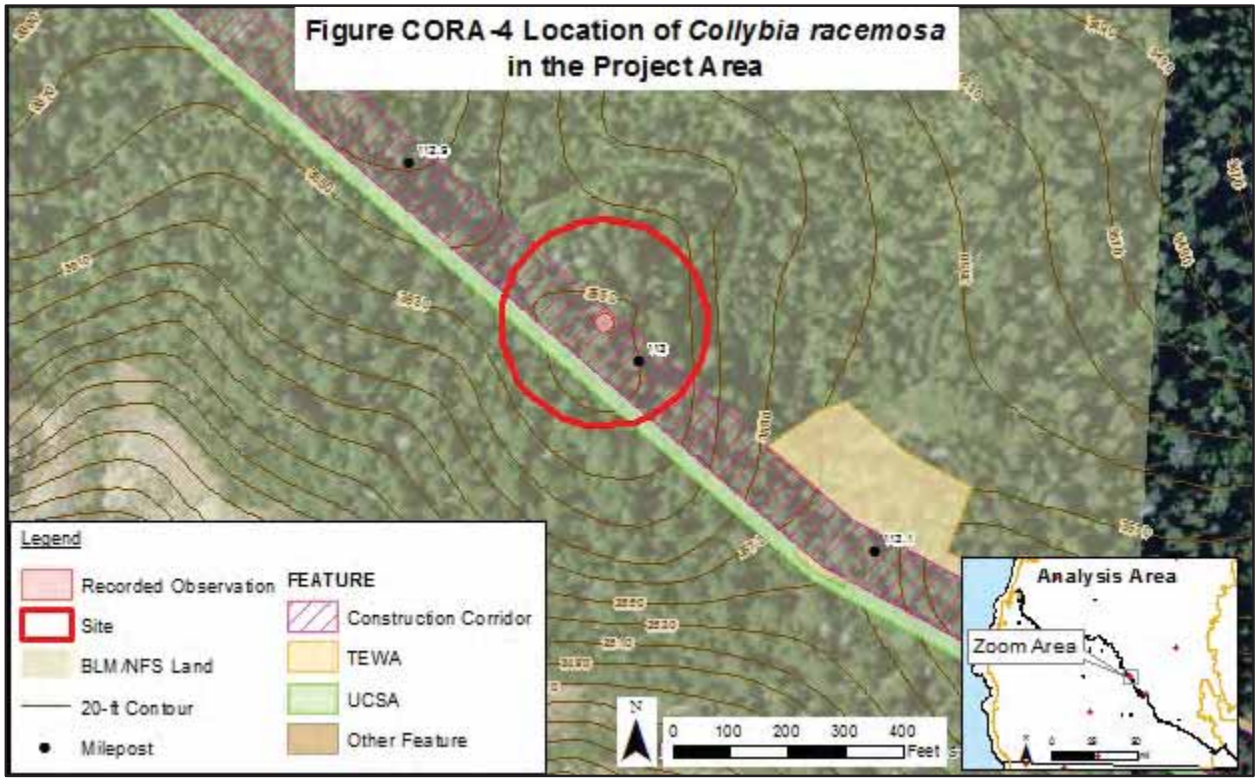
TABLE CORA-6

Impacts to *Collybia racemosa* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.8 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	1	0.2 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be affected by multiple activities.

The PCGP Project would result in ground disturbance and vegetation removal across the central portion of the site near MP 113. The recorded observation of the species is in the center of the project area and would be directly affected by activities within the corridor (see Figure CORA-4).



Establishment of the construction corridor would disturb vegetation and soils around the recorded observation within the site and would result in removal of individuals. The area within the site is forested and appears to be on a ridgetop, and a dirt road is located just outside the site to the north and east. The establishment of the corridor could modify microclimate conditions around the recorded observation. The removal of forests and host mushrooms and disturbance to soil would negatively affect *C. racemosa* by removing its habitat and affecting its association with other mushrooms, affecting site persistence. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within a UCSA could remove host mushrooms and would disturb understory habitat within the site, which could also modify microhabitats, potentially making the habitat no longer suitable for the species.

Based on this analysis, *C. racemosa* is not likely to persist at the site following project implementation. This site is one of only two sites in the local area and is one of several scattered sites across the Klamath Mountains and Cascade Range in Oregon. It may contribute to dispersal of the species between other sites to the north in the Cascade Range and sites to the southwest in the Klamath Mountains in Oregon and California. However, if the species does not persist at this site, *C. racemosa* would still be found in the Klamath Mountains and Cascade

Range in Oregon, and opportunities for dispersal across the mountain ranges would still exist based on the distribution of other sites in the region.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *C. racemosa*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, one site of *C. racemosa* would remain on BLM land in the local area, with none in reserves, and 31 sites, including 16 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 16 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 52 percent of the remaining *C. racemosa* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. racemosa* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that more information about the species' distribution is available, as noted below:
    - *C. racemosa* has a wide, but scattered, distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (32 on BLM and NFS lands). *C. racemosa* does not appear to be well distributed in any part of its range because sites are scattered. The currently known number of sites on BLM and NFS lands is an increase of 13 sites on BLM

and NFS lands since 2007, with one site documented during the PCGP Project surveys.

  - An estimated 50 percent of the sites (16 sites) are in reserves, which is an increase of about two sites in reserves since 2006 per Molina (2008).

- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 54 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous, mixed hardwood-coniferous, and hardwood forests, but sites are less abundant in these areas. A subcomponent of these forests likely provides habitat for *C. racemosa*.
- The PCGP Project would affect one of 32 BLM- and Forest Service-managed sites of *C. racemosa,* representing approximately 3 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (31) would continue to be documented on BLM and NFS lands in the region with a wide distribution across the NSO range. One site would remain in the local vicinity of the analysis area with several other sites in the Cascade Range and Klamath Mountains. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 12 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and four are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. racemosa* are unlikely. At least one other site is in a Riparian Reserve where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests below 6,000 feet msl and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests may support additional populations of *C. racemosa*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.14.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. racemosa* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 31 sites would remain on BLM and NFS lands across the region, and one site would remain on BLM land in the local area. Although the PCGP Project would affect site persistence of *C. racemosa* at one site, the site is part of several scattered sites in the Klamath Mountains and Cascade Range in Oregon and California. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. racemosa* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 230 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests below 6,000 feet msl and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *C. racemosa* site in the analysis area. Based on the above conclusions, avoidance of the *C. racemosa* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *C. racemosa* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.15 CORTINARIUS OLYMPIANUS

Cortinarius olympianus is a gilled mushroom species in the Cortinariaceae family and has no common name.

2.15.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. olympianus* as a Category B (rare) species. The ORBIC evaluated *C. olympianus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not

rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.15.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

C. olympianus is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (Castellano and O'Dell 1997). It fruits on the humus layer and in association with roots of various conifer trees between September and November (Castellano and O'Dell 1997, Castellano et al. 1999). According to the ORBIC (2004), individuals are presumed to be dispersed through mycelial interactions with other individuals and their mycorrhizal partners, rather than spore dispersal. However, spores may also be dispersed by animals (Holthausen et al. 1994). Populations of the mushroom are believed to be long-lived (ORBIC 2004).

Range

C. olympianus is endemic to the Pacific Northwest (Castellano et al. 1999). It is known from the Bainbridge Island and the Olympic Peninsula east to Easy Pass in Okanagan County, Washington, and south to Shasta County, California (ORBIC 2004). It is found in the Washington Olympic Range and Cascade Range, the Oregon Cascade Range and Siskiyou Mountains, and coastal California (Castellano and O'Dell 1997). Based on data available in 1997, the species' distribution was considered spotty across its range. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, Holthausen et al. (1994) indicated that the species' range may be more restricted than historically. This restriction may be a result of habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. olympianus* from an estimated 51 element occurrences across the Pacific Northwest in 2004. An estimated 28 of these occurrences were in Oregon, and 27 were in reserves or protected areas (ORBIC 2004). In 2004, *C. olympianus* was considered uncommon, but had stable populations with more than half in protected areas (ORBIC 2004). The species was found in five locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 26 new sites of *C. olympianus* in the NSO range between 1998–2006, and 50 total sites were documented by 2006, including 33 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the

BLM and Forest Service reported 44 sites on federal lands and 45 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *C. olympianus*, and resulted in six new observations of individuals or populations of *C. olympianus*. Based on the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. olympianus is found in complex coniferous forests and is generally restricted to the western hemlock zone of the NSO range (ORBIC 2004). Sporocarps of *C. olympianus* usually occur in association with the roots of various species in family Pinaceae (Castellano et al. 1999). It is symbiotic with *Abies*, *Picea*, and *Tsuga* species and is historically reported from LSOG forests (ORBIC 2004). *C. olympianus* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Primary threats to *C. olympianus* are those that affect its host trees, such as hot fires, road construction, other development, and clear-cutting (ORBIC 2004). Other threats to forest habitat, such as drought or insect infestations, and degraded air quality can also threaten the species. Other specific threats to the species are not known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *C. olympianus* with several other species (Group 9 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites by retaining old-growth forest structure and soil conditions, including coarse woody debris, and avoid disturbance at or around known sites, such as from removal of host trees or modification of canopy. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. olympianus*:

- As a mycorrhizal species, *C. olympianus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.15.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. olympianus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table COOL-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 97 observations from BLM and Forest Service geodatabases were converted into 55 sites in the NSO range (region). Table COOL-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table COOL-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure COOL-1 displays the regional distribution of the species across BLM and NFS lands, and Figure COOL-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests on BLM and NFS lands.

TABLE COOL-1

Number of *Cortinarius olympianus* Sites (2013)

Location*	Number of Sites
Regional Area	55
Local Area	5
Analysis Area (Project Area)	4 (4)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE COOL-2

Distribution of *Cortinarius olympianus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	12	-	-
Forest Service	40	5	4
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	4	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.



Figure COOL-1.
Regional Distribution of *Cortinarius olympianus*

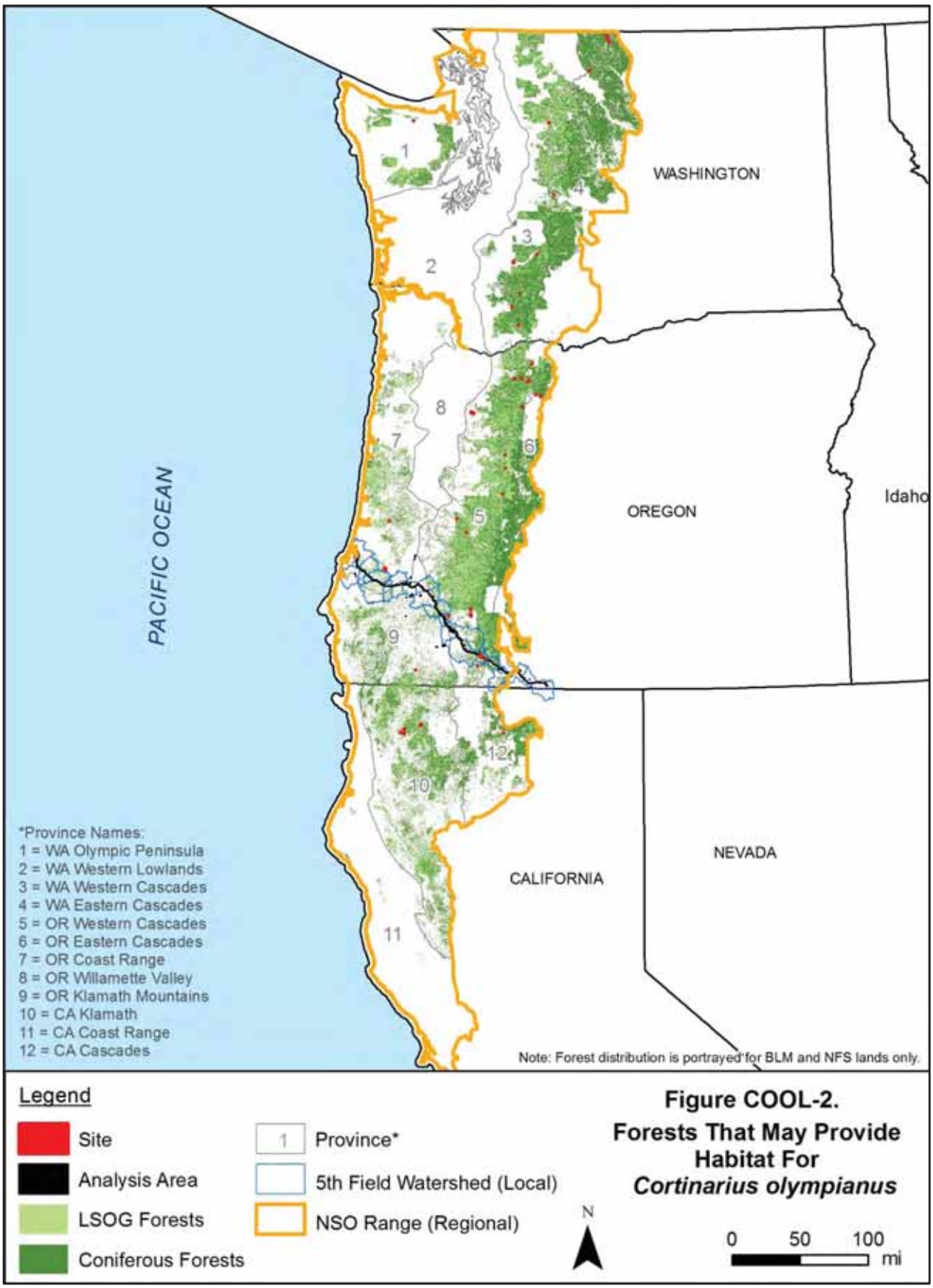


Figure COOL-2.
Forests That May Provide Habitat For *Cortinarius olympianus*

TABLE COOL-3

Distribution of *Cortinarius olympianus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	2	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	8	-	-
Congressionally Reserved (CR)	**11**	**-**	**-**
Late Successional Reserve (LSR)	**18**	**5**	**4**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	15	-	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

C. olympianus has a wide, but scattered, distribution across nine physiographic provinces in Washington (Western and Eastern Cascades and Olympic Peninsula), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Klamath and Cascades). Most sites are found along the Cascade Range, with scattered sites or groups of sites in the Klamath Mountains and other outlying areas. Some clusters of sites are located in the Cascade Range and Klamath Mountains; however, most sites appear scattered and somewhat isolated across the NSO range. Although *C. olympianus* is widely distributed across the NSO range, its distribution is scattered with few clusters of sites, despite the extent of forests that may provide suitable habitat, and the species does not appear to be well distributed within its range in the NSO range.

Four of 55 sites are located on private or other lands (at least partially); one site is on NPS land (Olympic National Park); and 52 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include two sites in the Coos Bay District and six sites in the Medford District. Sites managed by the National Forests that encompass the project area include nine sites on the Rogue River National Forest and one site on the Umpqua National Forest. The remaining 34 sites on BLM and NFS lands are in the Salem District and on the Gifford Pinchot, Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Siskiyou, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 30 sites are located on reserve lands managed by BLM and the Forest Service, including 18 in LSRs (at least partially), 11 in Congressionally Reserved areas (at least partially), and one in a Known Owl Activity Center. This represents 58 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

C. olympianus is primarily found in LSOG forests based on available data (47 of 55 total sites are in LSOG), but it is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous forests across a wide elevation range and

has been documented in most of the NSO range. Coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. olympianus* and support additional sites. These forests encompass an estimated 16.3 million acres on BLM and NFS lands in the region, including an estimated 11.1 million acres in reserve land allocations (68 percent of the forests; Table COOL-4). Of this acreage, an estimated 5 million acres are LSOG (see Figure COOL-2), including 3.15 million acres in reserve land allocations (63 percent of the forests). Although coniferous forests are widespread across the region, LSOG coniferous forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE COOL-4

Extent of Forests that Could Provide Habitat for *Cortinarius olympianus* on BLM and NFS Lands*

Location	Coniferous Forests		LSOG Coniferous Forests	
	Total	Reserves	Total	Reserves
Regional Area	16,284,850	11,109,210	5,029,190	3,149,050
Local Area	937,650	161,020	161,540	70,610
Project Area	960	430	270	140

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. olympianus* is found in one 5th field watershed (Little Butte Creek) that overlaps the project area (see Table COOL-5 and Figure COOL-3). All of the five sites in the local area are in an LSR on NFS land (Rogue River National Forest). The sites are near one another in the Cascade Range in the eastern portion of the local area. The local sites are within 5 miles of one other site in the Cascade Range, but are distant from most other sites in the region (the other nearest regional sites are 30 miles to the north). Limited connectivity appears available between the local sites and most other sites in the region based on the distance between the sites, although the distribution patterns of the regional sites indicate that dispersal opportunities may exist between sites in the Cascade Range and possibly Klamath Mountains.

Coniferous forests encompass approximately 937,650 acres on BLM and NFS lands in the local area, with 161,020 acres in reserve land allocations (17 percent of the forests). Of this acreage, an estimated 161,540 acres are LSOG, including 70,610 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures COOL-2 and COOL-3).

TABLE COOL-5

Distribution of *Cortinarius olympianus* in Local 5th Field Watersheds

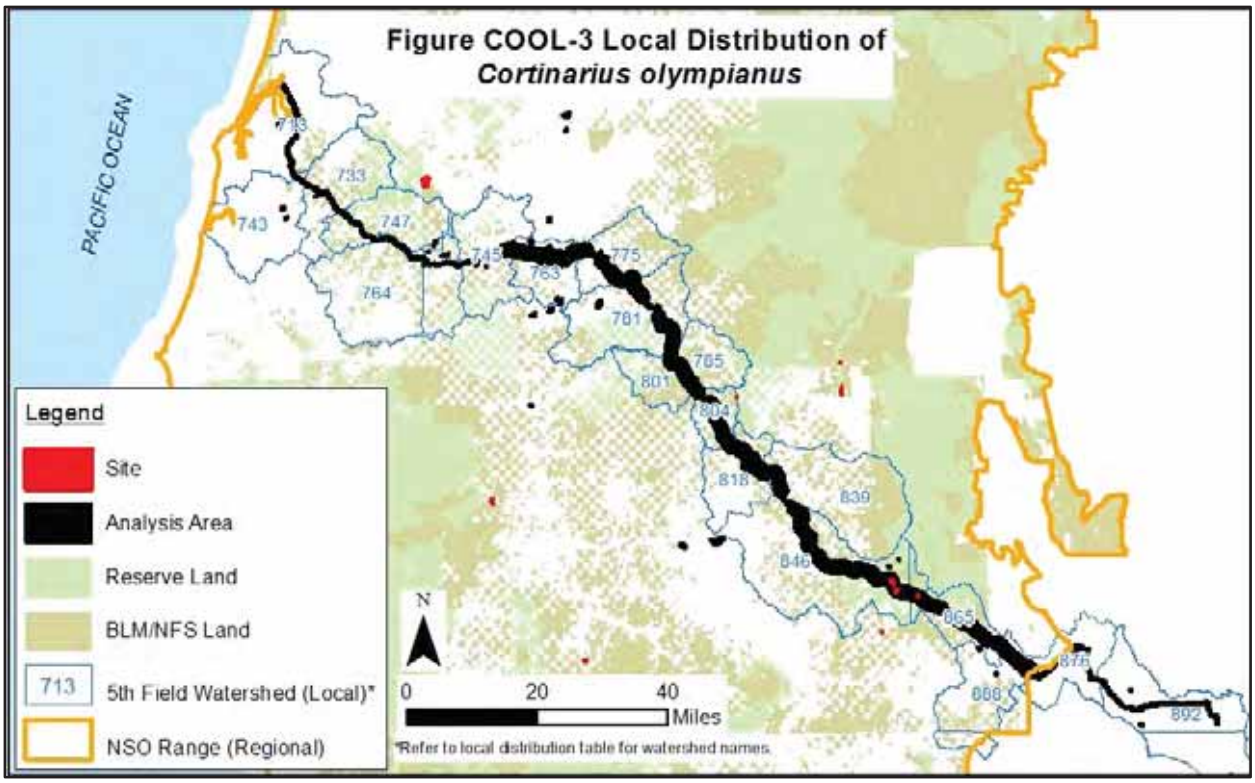
Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	5	5
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-

TABLE COOL-5

Distribution of *Cortinarius olympianus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain four sites of *C. olympianus*. These sites are part of the group of sites in the Cascade Range, as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in nine total observations of individuals of the species in or near the project area during 2010 (Siskiyou BioSurvey LLC 2012a). Eight of these recorded observations comprise the four sites in the analysis area; the other observation is in a site outside the analysis area. Within the project area, the four sites are between MPs 162.5 and 167.9.

Project Impacts

Analysis

The PCGP Project would affect four sites out of the 52 sites on BLM- and Forest Service-managed lands in the region, representing approximately 8 percent of the sites (or four out of 55

total sites on all lands in the NSO range). Table COOL-6 presents an overview of the features of the PCGP Project that would affect the *C. olympianus* sites. The construction corridor and associated work and storage areas would affect approximately 7.3 acres within the sites (about 30 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. olympianus* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 4.9 acres of vegetation and soil within four sites and could result in the removal of *C. olympianus* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1.3 acres within two sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *C. olympianus* in adjacent areas by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species; however, the mushroom appears to be somewhat resilient to open canopy and edge effects based on the proximity of some observations to roads. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 1.2 acres of understory habitat in four sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE COOL-6

Impacts to *Cortinarius olympianus* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	4	4.9 ac
Temporary Extra Work Area (TEWA)	2	1.3 ac
Uncleared Storage Area (UCSA)	4	1.2 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 750 acres of coniferous forests, including 200 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. olympianus*. Within this impact area, about 540 acres (about 72 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 170 acres of coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the four sites in the analysis area as a result of the PCGP Project, one site of *C. olympianus* would remain in an LSR on NFS land in the local area, and 48 sites, including 26 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 26 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 54 percent of the remaining *C. olympianus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. olympianus* is a Category B (rare) S&M species across the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that more information about the species' distribution is available, as noted below:
    - *C. olympianus* has a wide, but scattered, distribution across nine physiographic provinces and three states the region and a moderate-high number of overall sites (52 on BLM and NFS lands). The species is most abundant in the Cascade Range and Klamath Mountains, but it does not appear to be well distributed in its range due to its scattered distribution. The currently known number of sites on BLM and NFS lands is an increase of eight sites on BLM and NFS lands since 2007, with most sites documented during the PCGP Project surveys.
    - An estimated 58 percent of the sites (30 sites) are in reserves, which is about the same number of sites in reserves as in 2006 per Molina (2008).
- Coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 16.3 million acres on BLM and NFS lands with an estimated 68 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous forests, but fewer sites are documented in these areas. A subcomponent of these forests likely provides habitat for *C. olympianus*.
- The PCGP Project would affect four of 52 BLM- and Forest Service-managed sites of *C. olympianus*, representing approximately 8 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the four sites, a moderate-high number of sites (48) would continue to be documented on BLM and NFS

lands in the region with a wide, but scattered, distribution across Washington, Oregon, and California. One site would remain in the local vicinity of the analysis area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would affect site persistence at four sites in LSRs, but the percentage of sites in reserves would be about the same (54 percent). Of the remaining sites, 15 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 11 are in Congressionally Reserved areas where management activities that may adversely affect *C. olympianus* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 170 acres of coniferous forests (less than 1 percent of the total regional acreage). An estimated 11.1 million acres (68 percent) of coniferous forests and 3.2 million acres (63 percent) of LSOG coniferous forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. olympianus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.15.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. olympianus* at four sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 48 sites would remain on BLM and NFS lands across the region, and one site would remain on NFS land in the local area. Although the PCGP Project would affect site persistence of *C. olympianus* at four sites, these sites are part of a larger group sites in the Cascade Range. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. olympianus* would persist in the region without considering the four sites as part of the population.
- The PCGP Project would remove approximately 750 acres of coniferous forests and 200 acres of LSOG coniferous forests (a negligible amount of the forests). An estimated 72 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 11.1 million acres (68 percent) of coniferous forests and 3.2 million acres (63 percent) of LSOG coniferous forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect

a significant portion of sites in the Cascade Range, other sites are scattered across the region and are less likely to be affected by a single event.

The PCGP Project would not be able to avoid impacts to all *C. olympianus* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the four *C. olympianus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *C. olympianus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.16 CRATERELLUS TUBAEFORMIS

Craterellus tubaeformis is a chanterelle fungus in the Cantharellaceae family. It is commonly known as winter chanterelle. *Cantharellus tubaeformis* is a synonym. Studies of chanterelle mushrooms indicate that the species known as *C. tubaeformis* in the NSO range may actually be an undescribed species and is a distinct taxon from the chanterelle fungus known by the same name in eastern North America and Europe (ORBIC 2004). Identification of *C. tubaeformis* in the NSO range is being reviewed, but this discussion presents information on *C. tubaeformis* as it has been known by that name in the NSO range because it is still on the S&M list, pending an annual species review.

2.16.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. tubaeformis* as a Category D (uncommon) species. The ORBIC evaluated *C. tubaeformis* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be widespread, abundant, and secure globally (G5?), although the rank was uncertain. In Oregon, the species was between not rare and apparently secure, but with cause for long-term concern, and widespread, abundant, and secure (S4S5). The species is not currently on the ORBIC Lists. *C. tubaeformis* is not a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.16.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

C. tubaeformis is a symbiotic mycorrhizal species, obtaining its nutrients from its association with a host tree. It is most easily detected in the fall through winter, during its main fruiting season (Castellano et al. 2003), and can also be found in the spring (ORBIC 2004). *C. tubaeformis* is presumed to be less dependent on spore dispersal for reproduction than other fungus species, instead utilizing mycelial interactions with other individuals and their host trees (ORBIC 2004). Based on the presumed dispersal capability, extirpated populations may become re-established through natural recolonization and may recover from decreased abundance over a period of several years (ORBIC 2004).

Range

C. tubaeformis is found in the Pacific Northwest region of North America, with most occurrences in Washington's Cascade Range and the northern coast of the Olympic Peninsula (ORBIC 2004). A similar species known by the same name is also found in eastern North America and Europe, but the species may actually be distinct taxa. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across the Pacific Northwest. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under the Threats section below.

Population Status

The ORBIC reported *C. tubaeformis* from approximately 200 element occurrences across the NSO range in 2004, including an estimated 15 in Washington and 24 in California. The species' status in Oregon was not evaluated in 2004, although it was noted to be common (ORBIC 2004). Populations of the species appeared to be stable in the Pacific Northwest, unless natural catastrophes (fire) or human interference (removal of rotted wood) takes place (ORBIC 2004). The species was found in 78 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 243 new sites of *C. tubaeformis* in the NSO range between 1998–2006, and 329 total sites were documented by 2006, including 182 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 325 sites in the NSO range, all of which were on federal lands.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area, and persistence surveys were conducted for some species in nearby LSRs (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category D species were recorded during these surveys, and resulted in 22 new observations of individuals or populations of *C. tubaeformis*. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (4-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and

distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. tubaeformis occurs as small, yellow-brown sporocarps, fruiting on the soil surface in mixed-coniferous forests (Castellano et al. 2003). It occurs most frequently on wet soil, often near streams, streams, bogs, and rotten logs. *C. tubaeformis* appears to be dependent on the presence of western hemlock, generally occurring in stands of western hemlock with well-decomposed woody debris (ORBIC 2004). *C. tubaeformis* may form mycorrhizae with Douglas-fir only when western hemlock is not present (Trappe 2004). *C. tubaeformis* prefers old-growth or late-seral forests, as well as forests with a high amount of well-decayed coarse woody debris (Trappe 2004); however, it has been found in forests of all different ages (ORBIC 2004). Based on available information, *C. tubaeformis* may prefer specific microclimate conditions of LSOG forests, but it may not be restricted to these conditions.

Threats

Threats to *C. tubaeformis* are presumably those actions that disrupt western hemlock and the woody substrate the fungus uses, including fire, road construction, clearcutting, and other development (ORBIC 2004). The species appears to withstand light to moderate thinning. The species appears to be resilient to irreversible changes, so the decline of LSOG forests is not deemed a major threat.

Management Recommendations

As a Category D S&M species, the direction from the 2001 ROD is to manage high priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). No management recommendations have been developed for *C. tubaeformis*.

2.16.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. tubaeformis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CRTU-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 679 observations from BLM and Forest Service geodatabases were converted into 295 sites in the NSO range (region). Table CRTU-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CRTU-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the

regional, local, and analysis areas. Figure CRTU-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CRTU-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE CRTU-1

Number of *Craterellus tubaeformis* Sites (2013)

Location*	Number of Sites
Regional Area	295
Local Area	39
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CRTU-2

Distribution of *Craterellus tubaeformis* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	132	38	1
Forest Service	149	-	-
NPS	2	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	32	11	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CRTU-3

Distribution of *Craterellus tubaeformis* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	14	-	-
Adaptive Management Reserves (AMR)	7	-	-
Administratively Withdrawn (AW)	11	-	-
Congressionally Reserved (CR)	**28**	**-**	**-**
Late Successional Reserve (LSR)	**128**	**18**	**1**
Marbled Murrelet Area (LSR3)	**14**	**9**	**1**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	9	-	-
Other (Matrix, Riparian Reserve, Other)	86	20	-
Riparian Reserve**	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

C. tubaeformis is widely distributed across 10 physiographic provinces in Washington (Western Cascades, and Olympic Peninsula), Oregon (Coast Range, Cascades West, Klamath Mountains, and Willamette Valley), and California (Coast and Klamath). Most sites are found along the western Cascade Range, Coast Range, and Klamath Mountains, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in other outlying areas. *C. tubaeformis* appears to be well distributed in the western Cascade Range, Coast Range, and Klamath Mountains, where the species is most abundant and sites are distributed in several clusters across the mountain ranges.



Figure CRTU-1.
Regional Distribution of
Craterellus tubaeformis

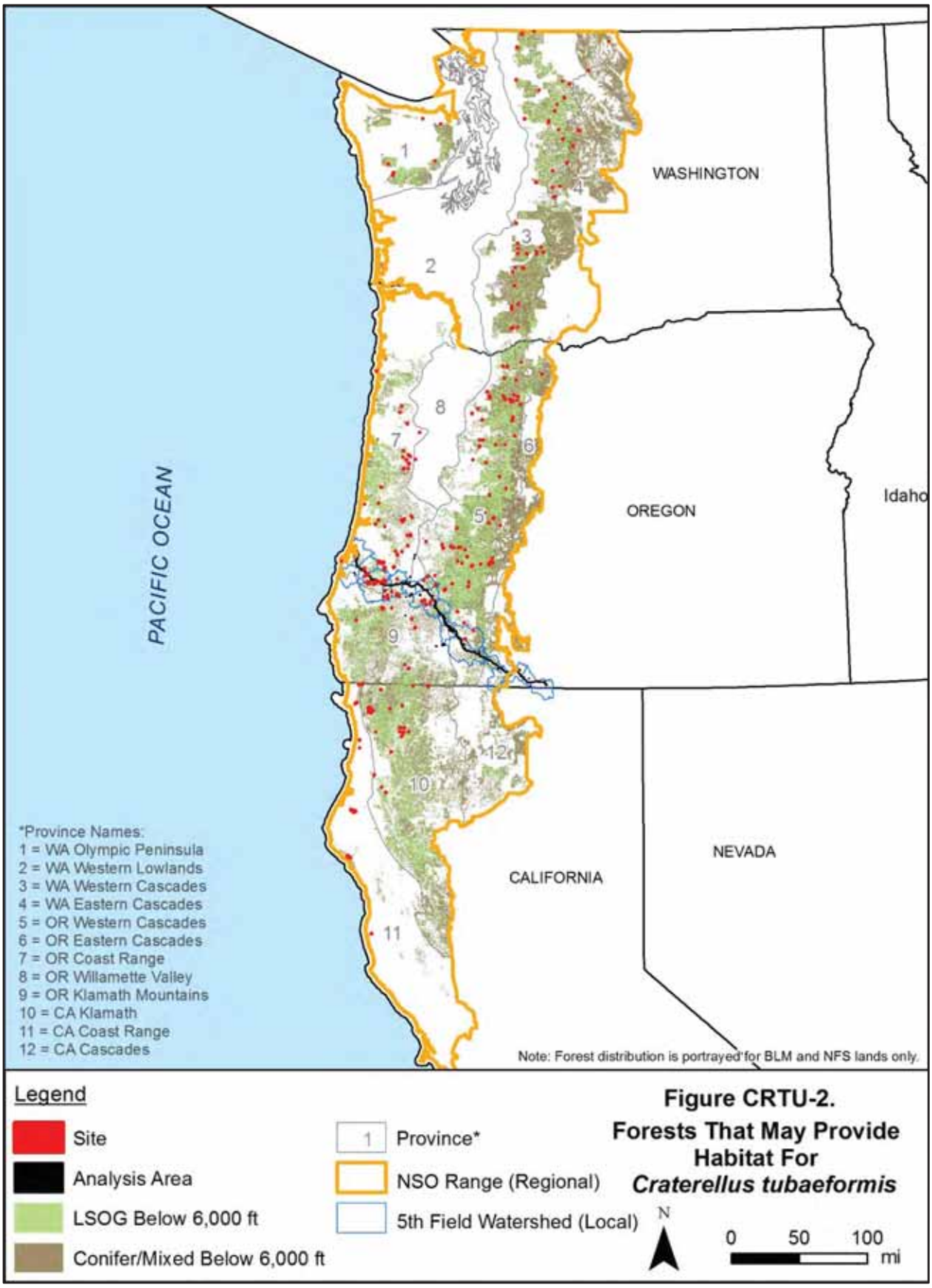


Figure CRTU-2.
Forests That May Provide Habitat For *Craterellus tubaeformis*

Thirty-two of 295 sites are located on private, state, or other lands (at least partially); two sites are on NPS lands (Mount Rainier and Redwood National Parks); and 281 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 22 sites in the Coos Bay District, 14 sites in the Medford District, and 46 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include three sites on the Rogue River National Forest and 21 sites on the Umpqua National Forest. The remaining 175 sites on BLM and NFS lands are in the Arcata and Salem Districts and on the Gifford Pinchot, Klamath, Mt. Baker-Snoqualmie, Okanogan, Olympic, Siskiyou, Siuslaw, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 169 sites are located on reserve lands managed by BLM and the Forest Service, including 128 in LSRs (at least partially), 14 in Marbled Murrelet Areas (at least partially), two in a Known Owl Activity Center, and 28 in Congressionally Reserved areas. This represents 60 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The two NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

C. tubaeformis is more commonly found in LSOG forests based on available data (254 of 295 total sites are in LSOG), but it is somewhat common in non-LSOG forests and has also been found in younger forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *C. tubaeformis* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the NSO range, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table CRTU-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure CRTU-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CRTU-4

Extent of Forests that Could Provide Habitat for *Craterellus tubaeformis* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	500	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. tubaeformis* is found in eight 5th field watersheds that overlap the project area (see Table CRTU-5 and Figure CRTU-3). The sites are near one another in the Coast Range and Klamath Mountains in the western portion of the local area, and a couple are

found in the Big Butte Creek watershed in the western Cascade Range. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Several regional sites are located in the vicinity of the local area.

Thirty-eight of the 39 sites in the local area are on BLM lands, with 11 sites at least partially on private lands. The local sites are on land designated as Other (Matrix) or LSRs; 24 sites are in LSRs, representing 63 percent of the BLM-managed sites. The sites in LSRs are distributed across the watersheds (Table CRTU-5).

Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also exist in the Cascade Range in the local area where surveys have not been completed, based on the number of sites concentrated in the mountain range in the local and nearby regional areas and the extent of forests that may provide suitable habitat (see Figures CRTU-2 and CRTU-3).

TABLE CRTU-5

Distribution of *Craterellus tubaeformis* in Local 5th Field Watersheds

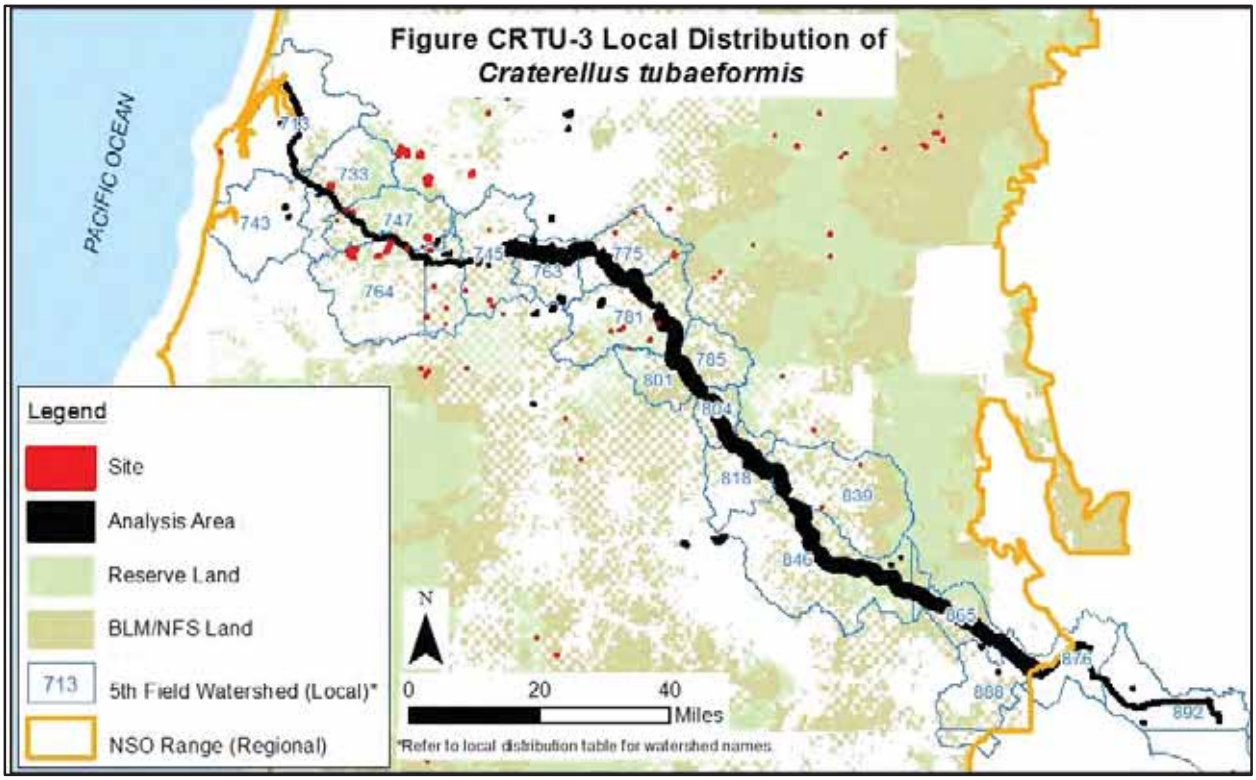
Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	2	-
Coos Bay Frontal (713)	1	-
East Fork Coquille River (747)	7*	4
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	13*	10
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	4**	-
North Fork Coquille River (733)	1	-
Olalla Creek-Lookingglass Creek (745)	4	4
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	9**	7
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Notes:
*One site is in the East Fork and Middle Fork Coquille River watersheds.
**One site is in the Myrtle Creek and South Umpqua River watersheds.

Analysis/Project Area Distribution

The analysis and project areas contain one site of *C. tubaeformis*. This site is on BLM-managed land (Coos Bay District) and is partially in an LSR and partially in a Marbled Murrelet Area. It is on the border of the Middle Fork and East Fork Coquille River watersheds. Several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 51 total observations of the species in 22 locations in and near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). One of these recorded observations comprises the site in the analysis area; the other observations are in sites outside the analysis area. The site is at MP 41.9.



Project Impacts

Analysis

The PCGP Project would affect one site out of the 281 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 295 total sites on all lands in the NSO range). Table CRTU-6 presents an overview of the features of the PCGP Project that would affect the *C. tubaeformis* site. The construction corridor and associated work area would affect approximately 1.0 acre within the site (about 37 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. tubaeformis* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.8 acre of vegetation and soils within the site and could remove individuals of *C. tubaeformis*. Disturbance in a TEWA would result in similar impacts on 0.2 acre of the site. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and host trees and disturbance to soil could negatively affect *C. tubaeformis* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWA could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would

result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE CRTU-6

Impacts to *Craterellus tubaeformis* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.8 ac
Temporary Extra Work Area (TEWA)	1	0.2 ac
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *C. tubaeformis*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of the forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, 37 sites of *C. tubaeformis* would remain on BLM lands in the local area, with 23 in reserves, and 280 sites, including 168 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 168 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 60 percent of the remaining *C. tubaeformis* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. tubaeformis* is a Category D (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New

information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:

  - This species was removed from the S&M Standards and Guidelines in Oregon via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M. The species remained on the list as Category D in Washington and California.
  - *C. tubaeformis* has a wide, but scattered, distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (281 on BLM and NFS lands). The species is well distributed in the western Cascade Range, Klamath Mountains, and Coast Range. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites recorded in 2007, but is still moderate-high. Also, many sites were documented during the PCGP Project surveys.
  - An estimated 60 percent of the sites (169 sites) are in reserves, which is about the same proportion of sites in reserves as in 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *C. tubaeformis*.
- The PCGP Project would affect one of 281 BLM- and Forest Service-managed sites of *C. tubaeformis*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (280) would continue to be documented on BLM and NFS lands in the region with a wide distribution across the NSO range. Many sites (37) would remain in the local vicinity of the analysis area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in a reserve. Of the remaining sites, 140 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 28 are in Congressionally Reserved areas where management activities that may adversely affect *C. tubaeformis* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. tubaeformis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category D species for which pre-disturbance surveys are not practical and have not been extensively conducted; however,

it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.16.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. tubaeformis* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 280 sites would remain on BLM and NFS lands across the region, and 37 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *C. tubaeformis* at one site, this site is part of a large group of sites in the Coast Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. tubaeformis* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *C. tubaeformis* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *C. tubaeformis* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *C. tubaeformis* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.17 GALERINA VITTAEFORMIS

Galerina vittaeformis is a litter saprobe in the Hymenogastraceae family (formerly in Cortinariaceae) and does not have a common name.

2.17.1 Regulatory Status and Ranking

The 2001 ROD identifies *G. vittaeformis* as a Category B (rare) species. The ORBIC did not evaluate *G. vittaeformis* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. In 2007, the species was considered to be not rare and apparently secure, but with cause for long-term concern globally (G4) and between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern in Oregon (S3S4) (USDA and USDI 2007). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.17.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

G. vittaeformis is a litter saprobe and is most easily detected in late summer and fall (Castellano et al. 2003). *G. vittaeformis* is closely associated with living bryophytes, and it may be a parasite on living material (Holthausen et al. 1994) or a saprophyte on dead material (Gulden and Shalchian-Tabrizi 2005). Little specific information is known about the reproductive biology of *Galerina* species. Other litter saprobe fungi are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997), and the same may be true of *G. vittaeformis.*

Range

G. vittaeformis is widely distributed in the northern hemisphere, including the Pacific Northwest (Holthausen et al. 1994, Castellano et al. 2003). In the Pacific Northwest, *G. vittaeformis* has been found in Washington, Oregon, and California (Castellano et al. 2003). Little is known about the species' range outside of North America, but it has been documented in northern Europe, including Greenland and Norway (Gulden and Shalchian-Tabrizi 2005). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across the northern hemisphere. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

G. vittaeformis is considered to be abundant, with many populations located throughout the Pacific Northwest, particularly in the Coast and Cascade Ranges in Oregon (Castellano et al. 2003). *G. vittaeformis* was not documented at any sites before 1994, and it was documented at 28 new sites between 1994–2000 (USDA and USDI 2000). The species was found in 99 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 126 new sites of *G. vittaeformis* in the NSO range between 1998–2006, and 144 total sites were documented by 2006, including 93 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 61 sites on federal lands and 68 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *G. vittaeformis*, and resulted in 12 new observations of individuals or populations of *G. vittaeformis*. Based on the increased number of sites since 1998 with increased surveys (8-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range, particularly in the Coast and Cascade Ranges where most observations have been reported. It should also be noted that this species was removed from post-2001 S&M lists because it was considered to be common. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

G. vittaeformis occurs as solitary to gregarious sporocarps, occurring along with mosses on soil or logs (Castellano et al. 2003). Based on data available in 1994, *G. vittaeformis* was primarily found in late-successional forests in moist habitats, closely associated with mosses (Holthausen et al. 1994). The species is documented in many seral stages, both young and old (Hibler et al. 2001a). *G. vittaeformis* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *G. vittaeformis* are presumably similar to threats to other litter saprobes, including species in the same family (e.g., *Hebeloma olympianum*). Threats may include those actions that disrupt stand conditions necessary for its survival, particularly damage to mycorrhizal hosts and removal of litter, duff, or large woody debris (Castellano and O'Dell 1997). Typical threats to fungi species in forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). Logging may reduce late-successional habitats for *G. vittaeformis*; this may not be a great threat, as *G. vittaeformis* occupies a variety of habitats and is widely distributed (Holthausen et al. 1994). Activities that cause mortality of individuals or groups of individuals can threaten the species' genetic diversity in localized areas (USDA and USDI 2000).

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *G. vittaeformis* because it was removed from the S&M list after 2001.

2.17.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. vittaeformis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table GAVI-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 191 observations from BLM and Forest Service geodatabases were converted into 127 sites in the NSO range (region). Table GAVI-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table GAVI-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure GAVI-1 displays the regional distribution of the species across BLM and NFS lands, and Figure GAVI-2 displays the species' regional distribution with the extent of all forests and LSOG forests on BLM and NFS lands.

TABLE GAVI-1

Number of *Galerina vittaeformis* Sites (2013)

Location*	Number of Sites
Regional Area	127
Local Area	3
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE GAVI-2

Distribution of *Galerina vittaeformis* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	28	2	-
Forest Service	98	1	1
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	11	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.



Figure GAVI-1. Regional Distribution of *Galerina vittaeformis*

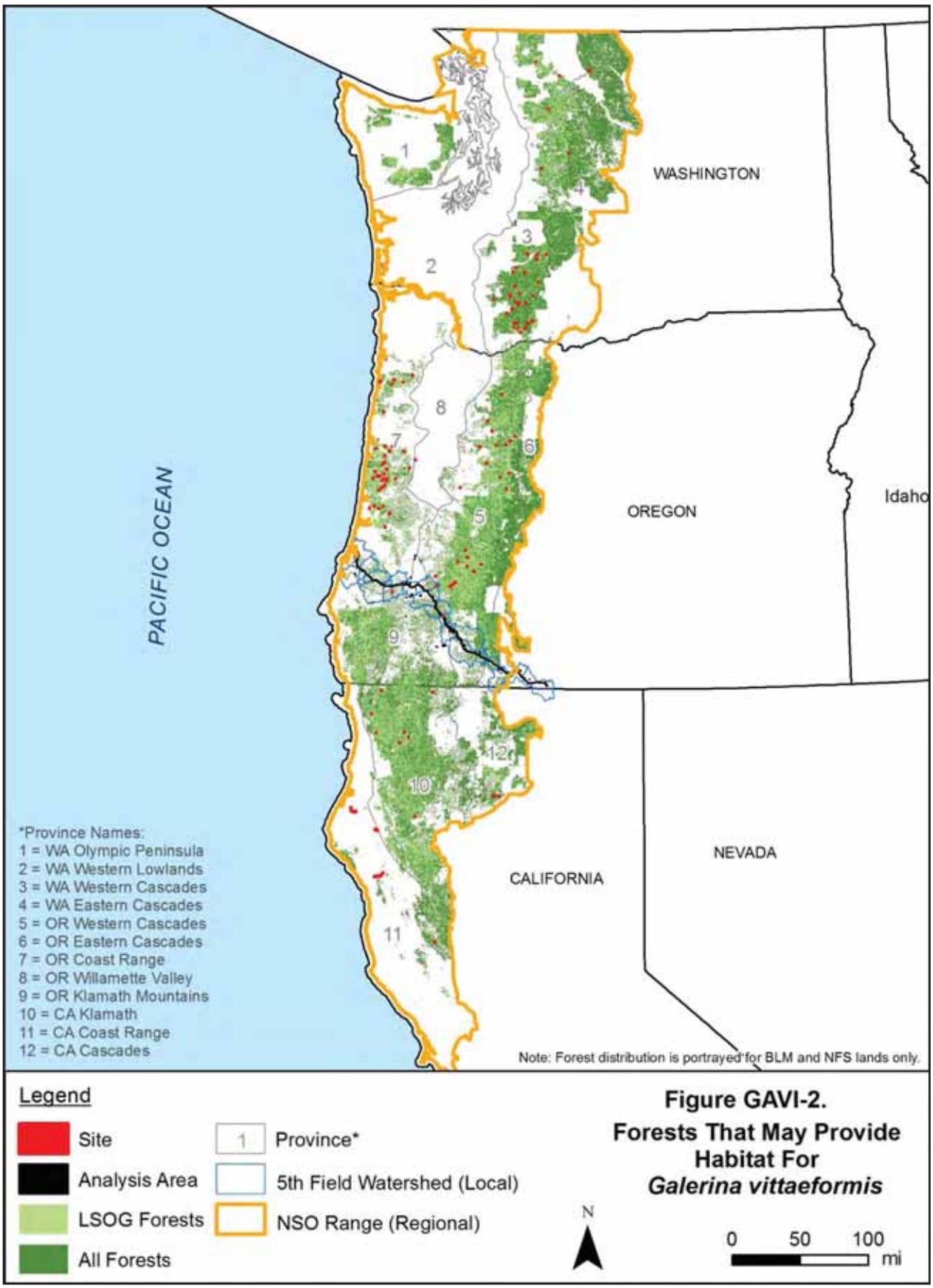


Figure GAVI-2.
Forests That May Provide Habitat For
Galerina vittaeformis

TABLE GAVI-3

Distribution of *Galerina vittaeformis* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	7	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	8	-	-
Congressionally Reserved (CR)	**7**	**-**	**-**
Late Successional Reserve (LSR)	**74**	**1**	**-**
Marbled Murrelet Area (LSR3)	**4**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**3**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	5	-	-
Other (Matrix, Riparian Reserve, Other)	23	2	1
Riparian Reserve**	**1**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

G. vittaeformis has a wide distribution across nine physiographic provinces in Washington (Cascades West and East), Oregon (Coast Range, Willamette Valley, Cascades West, and Klamath Mountain), and California (Coast, Klamath, and Cascades). The sites are most abundant along the Coast Range in Oregon and the western Cascade Range in Oregon and Washington. Many sites are clustered or relatively close to one another in groups in the Coast Range in Oregon and the Cascade Range in Oregon and Washington. Sites in California are more scattered, with a few small clusters. *G. vittaeformis* appears to be well distributed in the Coast Range in Oregon and western Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of the species across forests that may provide suitable habitat in the mountain ranges.

Two of 127 sites are located on private lands (at least partially), and 126 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include three sites in the Roseburg District and two sites in the Coos Bay District. Sites managed by the National Forests that encompass the project area include 10 sites on the Umpqua National Forest. The remaining 111 sites on BLM and NFS lands are in the Arcata and Eugene Districts and on the Gifford-Pinchot, Siuslaw, Shasta-Trinity, Mendocino, Six Rivers, and Willamette National Forests.

Across the NSO range, 88 sites are located on reserve lands managed by BLM and the Forest Service, including seven in Congressional Reserved areas, 74 in LSRs, four in Marbled Murrelet areas, three at least partially in Known Owl Activity Centers, and one at least partially in Riparian Reserves. This represents 70 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

G. vittaeformis is more commonly found in LSOG forests based on available data (106 of 127 total sites are in LSOG), but is also found in non-LSOG forests and may not be restricted to

LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in all forest types across a wide elevation range and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests, including the LSOG component of these forests, across the NSO range could provide habitat for *G. vittaeformis* and support additional sites. These forests encompass an estimated 20.4 million acres on BLM and NFS lands in the region, including an estimated 13.0 million acres in reserve land allocations (64 percent of the forests; Table GAVI-4). Of this acreage, an estimated 6.25 million acres are LSOG (see Figure GAVI-2), including 3.9 million acres in reserve land allocations (62 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE GAVI-4

Extent of Forests that Could Provide Habitat for *Galerina vittaeformis* on BLM and NFS Lands*

Location	All Forests		LSOG Forests	
	Total	Reserves	Total	Reserves
Regional Area	20,361,510	12,989,640	6,247,290	3,852,520
Local Area	1,492,090	208,950	187,020	82,370
Project Area	1,460	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *G. vittaeformis* is found in three 5th field watersheds that overlap the project area (see Table GAVI-5 and Figure GAVI-3). The sites are scattered in the Klamath Mountains and western Cascade Range near the middle of the local area. Avenues of connectivity appear to be available between the site in the Myrtle Creek watershed and other sites in the Cascade Range. Several regional sites are located within 30 miles to the northeast in the Cascade Range.

All of the sites in the local area are on BLM or NFS lands, including two on BLM lands (Roseburg District) and one on NFS land (Umpqua National Forest). One of the sites on BLM lands is in an LSR in the Olalla Creek-Lookingglass Creek watershed (Table GAVI-5), while the other two sites are on land designated as Other (Matrix). The site in a reserve represents 33 percent of the local area sites.

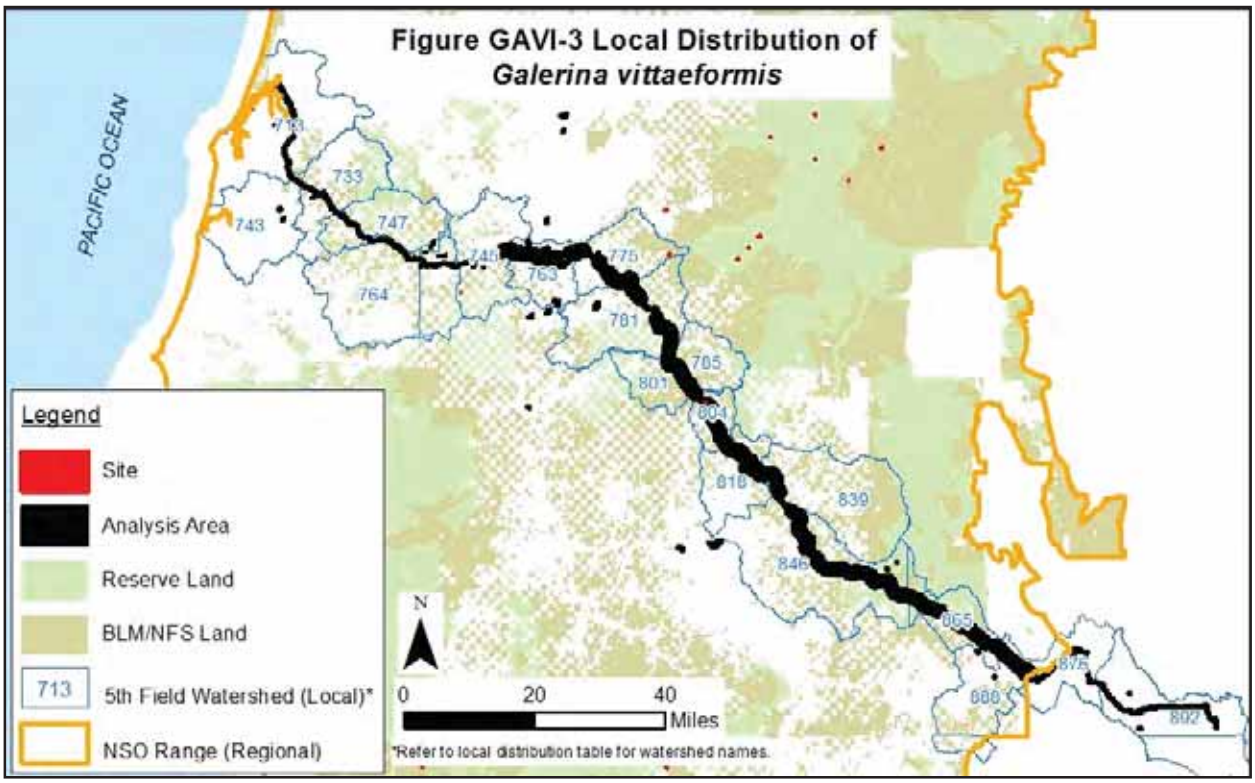
Coniferous, mixed hardwood-coniferous, and hardwood forests encompass approximately 1.5 million acres on BLM and NFS lands in the local area, including 208,950 acres in reserve land allocations (14 percent of the forests). Of this acreage, an estimated 187,020 acres are LSOG, including 82,370 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area, particularly in the Coast and Cascade Ranges, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures GAVI-2 and GAVI-3).

TABLE GAVI-5

Distribution of *Galerina vittaeformis* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	1	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	1	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *G. vittaeformis*. This site is on BLM-managed land in the Medford District. It is on land designated as Other (Matrix) in the Trail Creek watershed. This site is isolated, with other sites scattered in the Klamath Mountains and Cascade Range to the northwest and northeast (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 18 total observations of the species in 12 locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). One of these recorded observations comprises the site in the analysis area; the other observations are in sites outside the analysis area. The site is located between MPs 113 and 113.1.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 126 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 127 total sites on all lands in the NSO range). Table GAVI-6 presents an overview of the features of the PCGP Project that would affect the *G. vittaeformis* site. The construction corridor and associated work and storage areas would affect approximately 1.9 acres within the site (about 68 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. vittaeformis* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.9 acre of vegetation and soil within the site and could result in the removal of *G. vittaeformis* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.8 acre within the site. The establishment of the corridor could modify microclimate conditions around individuals adjacent to the corridor. The removal of forests and woody debris and disturbance to soil could negatively affect *G. vittaeformis* in adjacent areas by removing its habitat, disturbing soil and woody debris around trees, and affecting its association with mosses on soil or logs and other understory components, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.2 acre of understory habitat in the site, which could modify microhabitats near extant individuals, potentially making the habitat no longer suitable for the species.

TABLE GAVI-6

Impacts to *Galerina vittaeformis* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.9 ac
Temporary Extra Work Area (TEWA)	1	0.8 ac
Uncleared Storage Area (UCSA)	1	0.2 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres

Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests, including 220 acres of LSOG forests. These

impacts would result in a reduction of habitat that may be suitable for *G. vittaeformis*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests. This loss of forests represents less than 1 percent of the total estimated area of all forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, two sites of *G. vittaeformis* would remain on BLM and NFS lands in the local area, including one in reserves, and 125 sites, including 88 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 88 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 70 percent of the remaining *G. vittaeformis* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *G. vittaeformis* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *G. vittaeformis* has a wide distribution across nine physiographic provinces and three states in the region and a moderate-high number of overall sites (126 on BLM and NFS lands). The species appears to be well distributed in the Coast Range in Oregon and western Cascade Range in Oregon and Washington. The currently known number of sites on BLM and NFS lands is an increase of 65 sites on BLM and NFS lands since 2007, with several sites documented during the PCGP Project surveys.

  - An estimated 70 percent of the sites (88 sites) are in reserves. This is an increase in the proportion of sites in reserves since 2006 per Molina (2008).

- Coniferous, mixed hardwood-coniferous, and hardwood forests (general habitat for the species) are widely distributed across the region and encompass approximately 20.4 million acres on BLM and NFS lands with an estimated 64 percent in reserves. These forests are primarily found in the Cascade Range and Coast Range, where most sites are documented. The Klamath Mountains and other areas also contain these forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *G. vittaeformis*.
- The PCGP Project would affect one of 126 BLM- and Forest Service-managed sites of *G. vittaeformis*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (125) would continue to be documented on BLM and NFS lands in the region with a wide distribution. Two sites would remain in the local vicinity of the analysis area in two 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would remain the same (70 percent). Of the remaining sites, 81 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and seven are in Congressionally Reserved areas where management activities that may adversely affect *G. vittaeformis* are unlikely. One other site is at least partially in a Riparian Reserve where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests (less than 1 percent of the total regional acreage). An estimated 13.0 million acres (64 percent) of coniferous, mixed hardwood-coniferous, and hardwood forests and 3.9 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *G. vittaeformis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.17.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. vittaeformis* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 125 sites would remain on BLM and NFS lands across the region, and two sites would remain on BLM lands in the local area. Although the PCGP

Project would affect site persistence of *G. vittaeformis* at one site, this site is part of the many sites in the western Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *G. vittaeformis* would persist in the region without considering the site as part of the population.

- The PCGP Project would remove approximately 1,160 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 13.0 million acres (64 percent) of coniferous, mixed hardwood-coniferous, and hardwood forests and 3.9 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *G. vittaeformis* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *G. vittaeformis* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to the affected site would waive implementation of Management Recommendations for the *G. vittaeformis* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.18 GASTROBOLETUS SUBALPINUS

Gastroboletus subalpinus is a bolete mushroom species in the Boletaceae family and does not have a common name.

2.18.1 Regulatory Status and Ranking

The 2001 ROD identifies *G. subalpinus* as a Category B (rare) species. The ORBIC evaluated *G. subalpinus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is a BLM and Forest Service Sensitive species in Oregon.

2.18.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *G. subalpinus*. It forms sequestrate sporocarps in soil that develop and mature beneath the surface (Castellano and O'Dell 1997). As a presumed ectomycorrhiza former, mycorrhiza of *G. subalpinus* form symbiotic associations with host plant roots. Spores of *G. subalpinus* are assumed to disperse through mycophagy (i.e., through animal consumption). The species has been documented fruiting in September and October (Castellano et al. 1999).

Range

G. subalpinus is endemic to California and Oregon (Holthausen et al. 1994, Castellano and O'Dell 1997, Castellano et al. 1999). Based on data available in 1994, the species' range was restricted to the Cascade Range in Oregon and the northern Sierra Nevada Range in California (Holthausen et al. 1994). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, may have reduced available habitat and further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *G. subalpinus* from an estimated 22 element occurrences in the NSO range in 2004. An estimated 11 of these occurrences were in Oregon, and 11 occurrences were in California (ORBIC 2004). In 2004, *G. subalpinus* had a limited range, and populations trends were unknown (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 27 new sites of *G. subalpinus* in the NSO range between 1998–2006, and 48 total sites were documented by 2006, including 24 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 38 sites on federal lands and 39 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *G. subalpinus*, and resulted in one new observation of

G. subalpinus. Based on the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range, particularly in the Cascade Range where the species is most abundant. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

G. subalpinus grows in association with the roots of assorted Pinaceae, particularly mountain hemlock, red fir, lodgepole pine, or whitebark pine (*Pinus albicaulis*) (Castellano and O'Dell 1997). Based on data available in 1994, it was found in coniferous forests above 4,500 feet msl (Holthausen et al. 1994). *G. subalpinus* has been documented in disturbed areas, such as campgrounds and roadsides, and appears to be resilient to low intensity fire (Trappe, pers. comm. 2013). *G. subalpinus* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *G. subalpinus* include actions that disturb soil and remove overstory host trees, such as logging (Castellano and O'Dell 1997). Trampling and soil compaction from recreational uses may threaten the species because many occurrences are found in high recreational use areas (Holthausen et al. 1994); however, the species appears to adapt to such disturbance (Trappe, pers. comm. 2013). Fire is not considered a specific threat to the species because it is found at higher elevations in cool, wet areas that are less prone to fire (Castellano and O'Dell 1997).

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *G. subalpinus* with several other species (Group 2 of Castellano and O'Dell 1997). The primary guidance is to maintain current habitat and microclimatic conditions and avoid disturbance at all known locations on federal lands. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *G. subalpinus*:

- As a mycorrhizal species, *G. subalpinus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.18.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. subalpinus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table GASU-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 75 observations from BLM and Forest Service geodatabases were converted into 62 sites in the NSO range (region). Table GASU-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table GASU-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure GASU-1 displays the regional distribution of the species across BLM and NFS lands, and Figure GASU-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests between 2,000–7,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE GASU-1

Number of *Gastroboletus subalpinus* Sites (2013)

Location*	Number of Sites
Regional Area	62
Local Area	1
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE GASU-2

Distribution of *Gastroboletus subalpinus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	1	-	-
Forest Service	53	1	1
NPS	7	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	1	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011

TABLE GASU-3

Distribution of *Gastroboletus subalpinus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	-	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	15	-	-
Congressionally Reserved (CR)	**13**	**-**	**-**
Late Successional Reserve (LSR)	**6**	**-**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	27	1	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).


WASHINGTON
OREGON
CALIFORNIA
NEVADA
Idaho
PACIFIC OCEAN
1
2
3
4
5
6
7
8
9
10
11
12
*Province Names:
1 = WA Olympic Peninsula
2 = WA Western Lowlands
3 = WA Western Cascades
4 = WA Eastern Cascades
5 = OR Western Cascades
6 = OR Eastern Cascades
7 = OR Coast Range
8 = OR Willamette Valley
9 = OR Klamath Mountains
10 = CA Klamath
11 = CA Coast Range
12 = CA Cascades
Legend
Site
Analysis Area
Reserve Land
BLM/NFS Land
5th Field Watershed (Local)
1 Physiographic Province*
NSO Range (Regional)
Figure GASU-1.
Regional Distribution of
Gastroboletus subalpinus
N
0 50 100
mi

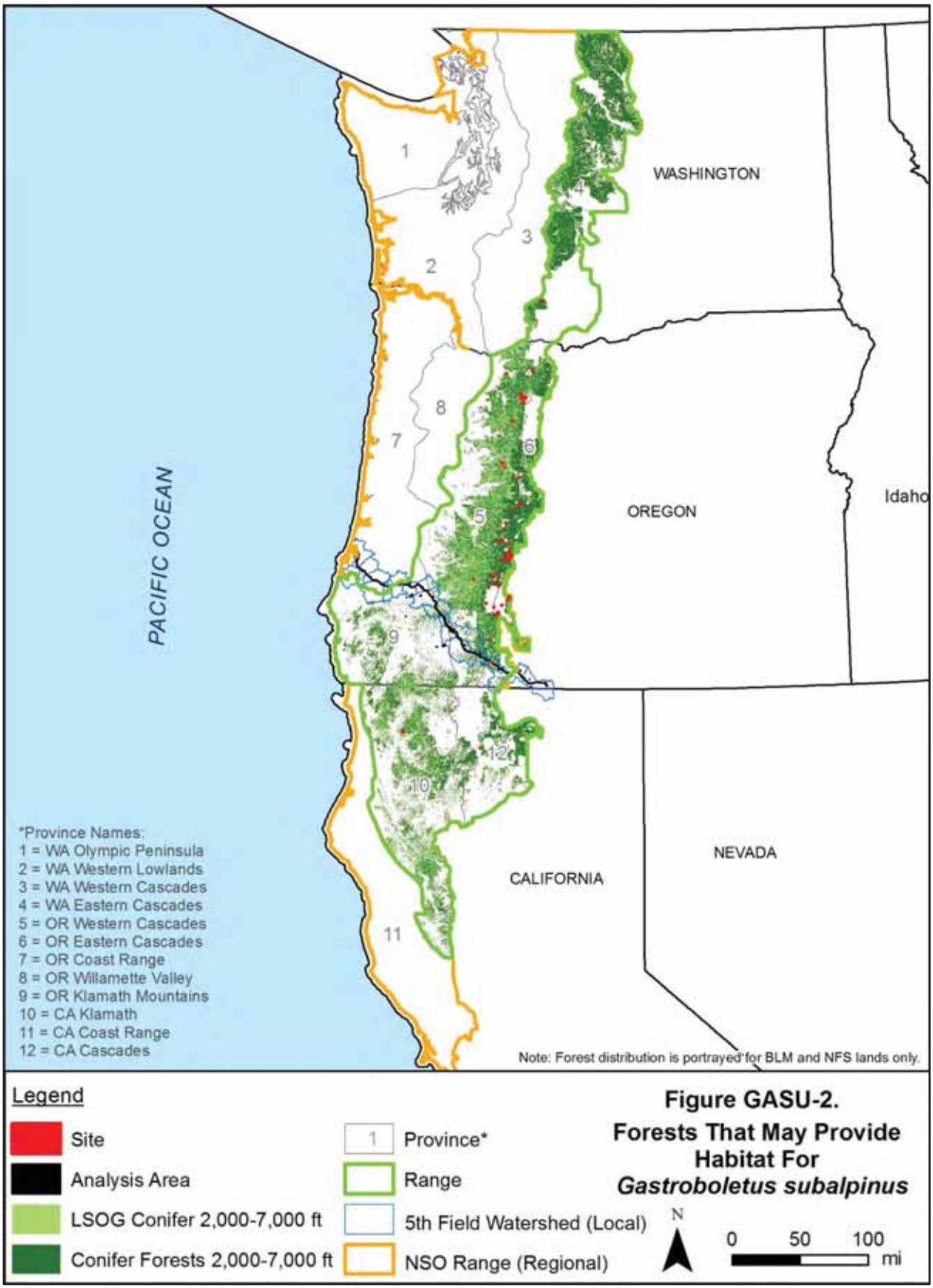


Figure GASU-2.
Forests That May Provide Habitat For *Gastroboletus subalpinus*

Regional Distribution

G. subalpinus has a somewhat wide distribution across five physiographic provinces in Washington (Eastern Cascades), Oregon (Cascades East and West), and California (Klamath and Cascades). Most sites are found along the Cascade Range in Oregon, with a few scattered sites in the Klamath Mountains and Cascade Range in California and Cascade Range in Washington. The sites in Oregon are distributed across the Cascade Range in several clusters. The sites in California appear to be somewhat isolated from other sites in the region. *G. subalpinus* appears to be well distributed in the eastern Cascade Range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of the species across forests that may provide suitable habitat in the mountain range.

One of the 62 sites in the region is on other land (at least partially); seven sites are on NPS lands (Crater Lake National Park); and 54 sites are on BLM and NFS lands across the region. Sites managed by the National Forests that encompass the project area include six sites on the Winema National Forest and seven sites on the Umpqua National Forest. The remaining 41 sites on BLM and NFS lands are in the Salem District and on the Deschutes, Klamath, Mt. Hood, Six Rivers, and Willamette National Forests.

Across the NSO range, 20 sites are located on reserve lands managed by BLM and the Forest Service, including six in LSRs (at least partially), 13 in Congressionally Reserved areas (at least partially), and two in Known Owl Activity Centers. This represents 37 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The seven NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

G. subalpinus is more commonly found in LSOG forests based on available data (40 of 62 total sites are in LSOG), but it is also relatively common in non-LSOG forests and is found in areas that have been disturbed by recreational activities. Based on current site locations, the species has been found in coniferous forests between about 2,000–7,000 feet msl and has only been documented in parts of the NSO range. Coniferous forests, including the LSOG component of these forests, in the Cascade Range and Klamath Mountains of Oregon and California and eastern Cascade Range of Washington could provide habitat for *G. subalpinus* and support additional sites. These forests encompass an estimated 11.2 million acres on BLM and NFS lands, including an estimated 6.2 million acres in reserve land allocations (55 percent of the forests; Table GASU-4). Of this acreage, an estimated 3.1 million acres are LSOG (see Figure GASU-2), including 1.8 million acres in reserve land allocations (57 percent of the forests). Although coniferous forests between 2,000–7,000 feet msl are widespread across the mountain ranges, LSOG coniferous forests are less common.

TABLE GASU-4

Extent of Forests that Could Provide Habitat for *Gastroboletus subalpinus* on BLM and NFS Lands*

Location	Coniferous Forests between 2,000-7,000 feet		LSOG Forests between 2,000-7,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	11,243,360	6,157,570	3,134,120	1,789,200
Local Area	304,010	98,560	99,110	38,240
Project Area	740	370	230	130

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *G. subalpinus* is found in one 5th field watershed (Spencer Creek) that overlaps the project area (see Table GASU-5 and Figure GASU-3). The site is on NFS land designated as Other (Matrix) in the Umpqua National Forest. This site is in the eastern Cascade Range and is one of many sites in the region that are scattered across the Cascade Range in Oregon. Although the nearest site is more than 16 miles north in the Cascade Range, dispersal opportunities may exist between sites via animal vectors based on the extent of forests that may provide suitable habitat within the Cascade Range.

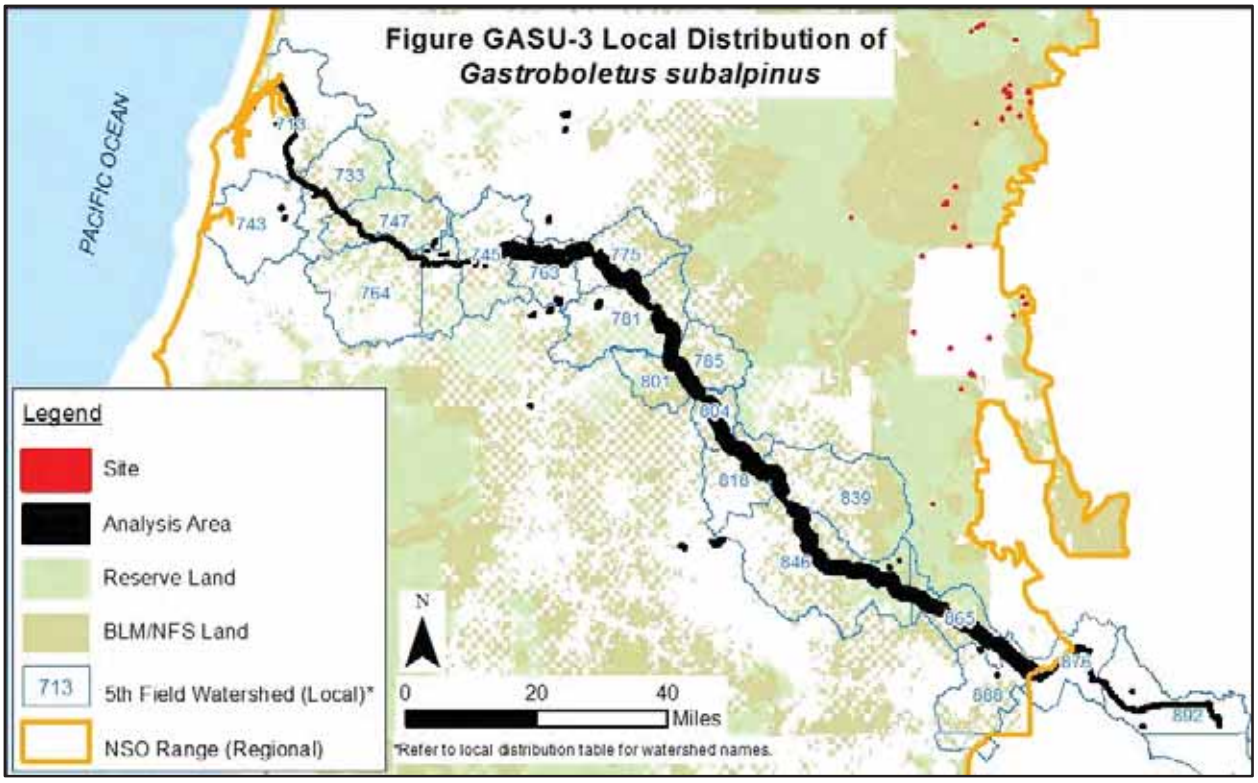
Coniferous forests between 2,000–7,000 feet msl encompass approximately 304,010 acres on BLM and NFS lands in the local area, with 98,560 acres in reserve land allocations (32 percent of the forests). Of this acreage, an estimated 99,110 acres are LSOG, including 38,240 acres in reserve land allocations (39 percent of the forests). Other sites may be located in the Cascade Range and Klamath Mountains in areas that have not been previously surveyed.

TABLE GASU-5

Distribution of *Gastroboletus subalpinus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	1	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *G. subalpinus*. This site is the same one as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in one observation of *G. subalpinus* in the survey area during fall 2011 (Siskiyou BioSurvey LLC 2012a). This recorded observation was near MP 172.5 and comprises the single site in the analysis area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 54 sites on BLM- and Forest Service-managed lands in the region, representing approximately 2 percent of the sites (or one out of 62 total sites on all lands in the NSO range). Table GASU-6 presents an overview of the features of the PCGP Project that would affect the *G. subalpinus* site. The construction corridor would affect approximately 0.2 acre within the site (about 7 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. subalpinus* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.2 acre of vegetation and soils within the site and could remove individuals of *G. subalpinus*. The establishment of the corridor could modify microclimate conditions in the site after the corridor

is established. The removal of forests and host trees and disturbance to soil could negatively affect *G. subalpinus* individuals outside the corridor by removing its habitat and disturbing the roots of host trees and other understory components. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE GASU-6

Impacts to *Gastroboletus subalpinus* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.2 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 590 acres of coniferous forests between 2,000–7,000 feet msl, including 190 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *G. subalpinus*. Within this impact area, about 420 acres (71 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 130 acres of coniferous forests between 2,000–7,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests between 2,000–7,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, no sites of *G. subalpinus* would remain on BLM or NFS lands in the local area, and 53 sites, including 20 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 20 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 38 percent of the remaining *G. subalpinus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the

persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *G. subalpinus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *G. subalpinus* has a somewhat wide distribution in five physiographic provinces and three states in the NSO range and has a moderate-high number of overall sites (54 on BLM and NFS lands). The species appears to be well distributed in the eastern Cascade Range in Oregon. The currently known number of sites on BLM and NFS lands is an increase of 16 sites on BLM and NFS lands since 2007, with one site documented during the PCGP Project surveys.
    - An estimated 37 percent of the sites (20 sites) are in reserves, which is about the same number of sites in reserves as in 2006 per Molina (2008).
- Coniferous forests between 2,000–7,000 feet msl (general habitat for the species) are widespread across the Cascade Range and Klamath Mountains, where all sites are documented, and encompass approximately 11.2 million acres on BLM and NFS lands with an estimated 55 percent in reserves. A subcomponent of these forests likely provides habitat for *G. subalpinus*.
- The PCGP Project would affect one of 54 BLM- and Forest Service-managed sites of *G. subalpinus*, representing approximately 2 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (53) would continue to be documented on BLM and NFS lands in the Cascade Range and Klamath Mountains. No sites would remain in the local vicinity of the analysis area, although many other sites would remain in the nearby Cascade Range. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, eight are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 13 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *G. subalpinus* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 130 acres of coniferous forests between 2,000–7,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 6.2 million acres (55 percent) of coniferous forests and 1.8 million acres (57 percent) of LSOG coniferous forests between 2,000–7,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *G. subalpinus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have

not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.18.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. subalpinus* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 53 sites would remain on BLM and NFS lands across the region, but no sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *G. subalpinus* at one site, this site is part of the many sites in the Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *G. subalpinus* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 590 acres of coniferous forests and 190 acres of LSOG coniferous forests between 2,000–7,000 feet msl (a negligible amount of the forests). An estimated 71 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 6.2 million acres (55 percent) of coniferous forests and 1.8 million acres (57 percent) of LSOG coniferous forests between 2,000–7,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed across the Cascade Range and Klamath Mountains in Oregon and California.

The PCGP Project would not be able to avoid impacts to the *G. subalpinus* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *G. subalpinus* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *G. subalpinus* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.19 GOMPHUS CLAVATUS

Gomphus clavatus is a chanterelle mushroom species in the Gomphaceae family and is commonly known as pig's ears or the pig's ear gomphus.

2.19.1 Regulatory Status and Ranking

The 2001 ROD identifies *G. clavatus* as a Category B (rare) species. The ORBIC evaluated *G. clavatus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.19.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

G. clavatus is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). It grows closely gregarious to caespitose in clusters or arcs (Castellano et al. 2003, The Fungi of California 2010). According to the ORBIC (2004), individuals are presumed to be dispersed through mycelial interactions with other individuals and their mycorrhizal partners, rather than spore dispersal. Longevity of individuals and specific biological requirements are unknown. *G. clavatus* has been documented fruiting in autumn or from late fall to mid-winter, depending on its location within its range (Castellano et al. 2003, The Fungi of California 2010). Fruiting may not occur annually (ORBIC 2004).

Range

G. clavatus is widely distributed across northern temperate forests in North America and Europe (Castellano et al. 2003). Based on data available in 2004, *G. clavatus* was considered widely distributed and was most common in Oregon in the Cascade Range and along the Pacific coast from Oswald West State Park south to the California border (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across North America and Europe. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *G. clavatus* from about 197 element occurrences in North America in 2004, with an estimated 121 of these occurrences in the Pacific Northwest and 78–95 in the range of the NSO. Most of the occurrences in the Pacific Northwest were in Oregon (estimated 57), with fewer in California (34) and Washington (36) (ORBIC 2004). In 2004, the species was considered uncommon with a spotty distribution, but had a relatively stable population (ORBIC 2004). The species was found in 11 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 68 new sites of *G. clavatus* in the NSO range between 1998–2006, and 118 total sites were documented by 2006, including 60 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 85 sites on federal lands and 110 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *G. clavatus*, and resulted in six new observations of individuals or populations of *G. clavatus*. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

G. clavatus is found in LSOG forests and appears to be restricted to fairly complex habitats (ORBIC 2004). It is typically found partially hidden in deep humus in coniferous forests (Castellano et al. 2003, Cushman and Huff 2007). *G. clavatus* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *G. clavatus* are those that affect its host tree. Natural catastrophes or human activities that imperil the health of conifers compromise both tree and fungus (ORBIC 2004). Catastrophic events, such as hot fires that might extirpate the community, and other activities that threaten the forest habitat, such as drought, insect infestations, road construction, development, and clear-cutting, also threaten the species. Unprotected populations are specifically at risk to road construction or other development and heavy logging, such as clean- or clear-cutting or heavy thinning. This mushroom is considered edible, but responsible harvesting is not viewed as a major threat to known populations.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *G. clavatus*:

- As a mycorrhizal species, *G. clavatus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.19.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. clavatus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table GOCL-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 276 observations from BLM and Forest Service geodatabases were converted into 159 sites in the NSO range (region). Table GOCL-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table GOCL-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure GOCL-1 displays the regional distribution of the species across BLM and NFS lands, and Figure GOCL-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE GOCL-1

Number of *Gomphus clavatus* Sites (2013)

Location*	Number of Sites
Regional Area	159
Local Area	12
Analysis Area (Project Area)	5 (5)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE GOCL-2

Distribution of *Gomphus clavatus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	46	6	-
Forest Service	90	5	5
NPS	9	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	17	2	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE GOCL-3

Distribution of *Gomphus clavatus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	11	-	-
Adaptive Management Reserves (AMR)	1	-	-
Administratively Withdrawn (AW)	9	-	-
Congressionally Reserved (CR)	**13**	**-**	**-**
Late Successional Reserve (LSR)	**38**	**4**	**2**
Marbled Murrelet Area (LSR3)	**2**	**2**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**9**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	9	-	-
Other (Matrix, Riparian Reserve, Other)	54	5	3
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

G. clavatus is widely distributed across 10 physiographic provinces in Washington (Olympic Peninsula, Western Lowlands, and Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Coast and Klamath). Most sites are found along the western Cascade Range, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the Klamath Mountains, Coast Range, and other outlying areas with some clusters of sites in western Oregon and northwestern California. *G. clavatus* appears to be well distributed in the western Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Seventeen of 159 sites are located on private, state, or other lands (at least partially); nine sites are on NPS lands (Mount Rainier, Redwood, and Olympic National Parks); and 136 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Klamath Falls Resource Area of the Lakeview District, five sites in the Coos Bay District, three sites in the Medford District, and four sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest, one site on the Winema National Forest, and 20 sites on the Umpqua National Forest. The remaining 101 sites on BLM and NFS lands are in the Salem and Arcata Districts and on the Gifford Pinchot, Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Siskiyou, Siuslaw, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 62 sites are located on reserve lands managed by BLM and the Forest Service, including 38 in LSRs, two in Marbled Murrelet Areas, nine in Known Owl Activity Centers, and 13 in Congressionally Reserved areas. This represents 46 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The nine NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.



Figure GOCL-1. Regional Distribution of *Gomphus clavatus*



Figure GOCL-2.
Forests That May Provide Habitat For *Gomphus clavatus*

G. clavatus is more common in LSOG forests based on available data (131of 159 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, within this range could provide habitat for *G. clavatus* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the region, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table GOCL-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure GOCL-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE GOCL-4

Extent of Forests that Could Provide Habitat for *Gomphus clavatus* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *G. clavatus* is distributed across eight 5th field watersheds that overlap the project area (see Table GOCL-5 and Figure GOCL-3). The sites are somewhat scattered across the watersheds, with sites in the Middle Fork Coquille River and Elk Creek-South Umpqua/Upper Cow Creek/Trail Creek watersheds clustered and near one another and sites in other watersheds more scattered. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 20 miles to the north in the Cascade Range and to the north in the Coast Range.

Of the 12 sites in the local area, 11 sites are on BLM and NFS lands. These sites are located on lands designated as Other (Matrix) and LSR. Two sites are at least partially on private lands. Of the 11 sites in the local area on BLM and NFS lands, seven sites are on reserve lands (LSRs), representing 64 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table GOCL-5 and on Figure GOCL-3. Most of the sites in the Elk Creek-South Umpqua, Middle Fork Coquille River, Spencer Creek, and Upper Cow Creek watersheds are in reserves.

Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also

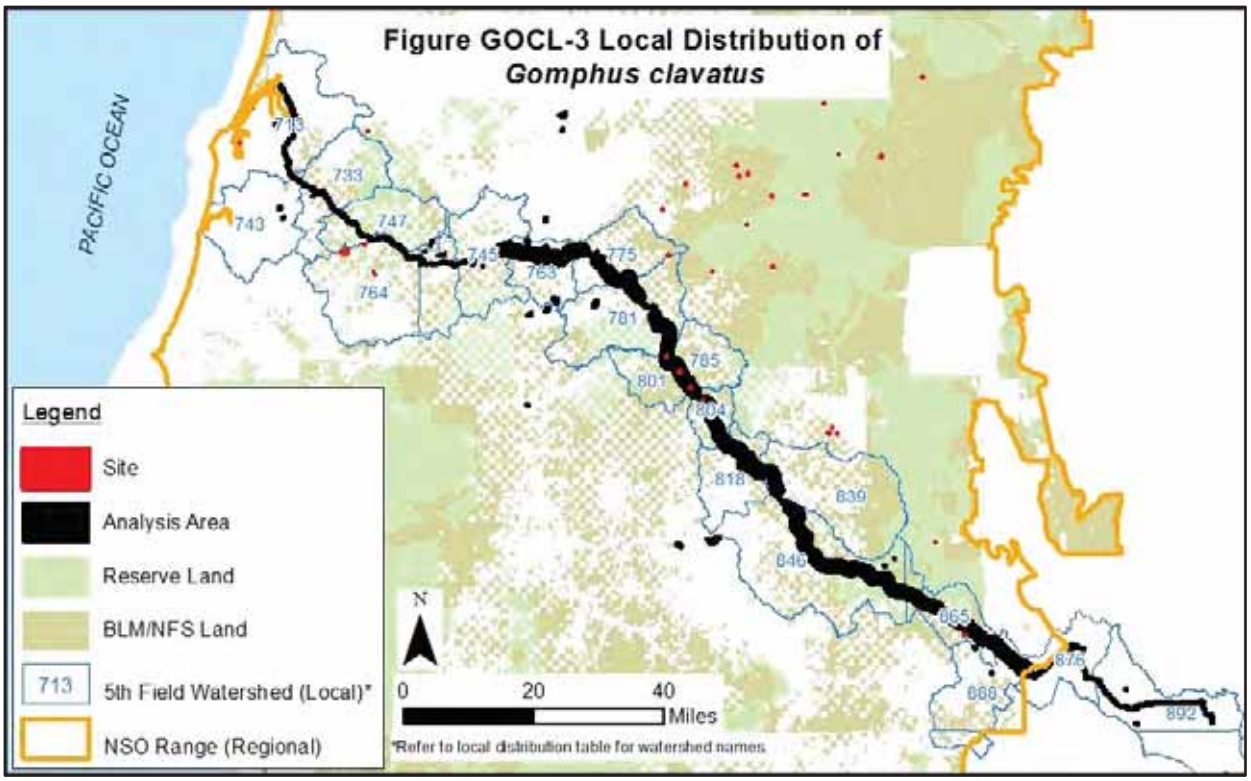
exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures GOCL-2 and GOCL-3).

TABLE GOCL-5

Distribution of *Gomphus clavatus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	1	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	3*	2**
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	4	4
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	1	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1*	-
Spencer Creek (865)	1	1
Trail Creek (804)	1	-
Upper Cow Creek (801)	3	2**

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*One site is in the Elk Creek-South Umpqua and South Umpqua River watersheds.
**Two sites in reserves are in the Elk Creek-South Umpqua and Upper Cow Creek watersheds.



Analysis/Project Area Distribution

The analysis and project areas contain five sites of *G. clavatus*. These sites are on Forest Service-managed lands (Umpqua National Forest), and one site is partially on private land. The analysis area sites are found in four 5th field watersheds (Elk Creek-South Umpqua, South Umpqua River, Trail Creek, and Upper Cow Creek). The sites are relatively close to one another, and a couple are clustered near each other in the Upper Cow Creek watershed. All of the sites are in the central portion of the analysis area. Some sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

The sites in the analysis area are located on lands designated as Other (Matrix) and LSR. Of the five sites in the analysis area, two sites are on reserve lands.

Surveys for the PCGP Project resulted in 10 total observations of the species in six locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). These recorded observations comprise the five sites in the analysis area. Within the project area, the five sites are between MPs 102.4 and 113.3.

Project Impacts

Analysis

The PCGP Project would affect five sites out of the 136 sites on BLM- and Forest Service-managed lands in the region, representing approximately 4 percent of the sites (or five out of 159 total sites on all lands in the NSO range). Table GOCL-6 presents an overview of the features of the PCGP Project that would affect the *G. clavatus* sites. The construction corridor and associated work and storage areas would affect approximately 5.4 acres within the sites (about 31 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. clavatus* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

TABLE GOCL-6

Impacts to *Gomphus clavatus* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	5	4.7 ac
Temporary Extra Work Area (TEWA)	4	0.6 ac
Uncleared Storage Area (UCSA)	1	0.1 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Vegetation removal and grading activities in the construction corridor would disturb about 4.7 acres of vegetation and soil within five sites and could result in the removal of *G. clavatus* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.6 acre within four sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *G. clavatus* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site

is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.1 acre of understory habitat in one site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *A. ellisii*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the five sites as a result of the PCGP Project, six sites of *G. clavatus* would remain on BLM and NFS lands in the local area, including five in reserves, and 131 sites, including 60 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 60 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 46 percent of the remaining *G. clavatus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *G. clavatus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:

  - *G. clavatus* has a wide distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (136 on BLM and NFS lands). The species appears to be well distributed in the western Cascade Range in Oregon and Washington and is fairly common and widespread outside this mountain range. The currently known number of sites on BLM and NFS lands is an increase of 51 sites since 2007, with many sites documented during the PCGP Project surveys.
  - An estimated 46 percent of the sites (62 sites) are in reserves, which is about the same number of sites in reserves as in 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *G. clavatus*.
- The PCGP Project would affect five of 136 BLM- and Forest Service-managed sites of *G. clavatus*, representing approximately 4 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the five sites, a moderate-high number of sites (131) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Some sites (six sites) would remain in the local vicinity of the analysis area; these sites would have a scattered distribution across four 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at two sites in LSRs, but the percentage of sites in reserves would remain about the same (46 percent). Of the remaining sites, 47 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 13 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *G. clavatus* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *G. clavatus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.19.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. clavatus* at five sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 131 sites would remain on BLM and NFS lands across the region, and six sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *G. clavatus* at five sites, these sites are part of the many sites in the Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *G. clavatus* would persist in the region without considering the five sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *G. clavatus* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the five *G. clavatus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *G. clavatus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species near affected sites and adjacent habitat over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.20 GOMPHUS KAUFFMANII

Gomphus kauffmanii is a chanterelle mushroom species in the Gomphaceae family and is commonly known as Kauffman's gomphus. It is also known as *Turbinellus kauffmanii*.

2.20.1 Regulatory Status and Ranking

The 2001 ROD identifies *G. kauffmanii* as a Category B (rare) species. The ORBIC evaluated *G. kauffmanii* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010), and

again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2010, the species was considered to be rare, uncommon, or threatened, but not immediately imperiled, within its global range and in Oregon (G3?, S3, respectively), although its global ranking was uncertain. In 2013, the species was considered to be too common and was removed from the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive species in Oregon, but it is a Strategic species.

2.20.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

G. kauffmanii is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). It grows into the soil matrix and forms symbiotic associations with the fine root systems of plants (Cushman and Huff 2007). It grows closely gregarious to caespitose and is typically partially hidden in deep humus under pine and fir trees (Castellano et al. 2003). According to the ORBIC (2004), individuals are presumed to be dispersed through mycelial interactions with other individuals and their mycorrhizal partners, rather than spore dispersal. Longevity of individuals and specific biological requirements are unknown. The mushroom has been documented fruiting between autumn and early winter in western North America and in the summer in eastern North America, but it does not always fruit annually (ORBIC 2004).

Range

G. kauffmanii is endemic to North America, where it is found on the west and east coasts (ORBIC 2004). In the West, the mushroom has been reported from British Columbia south through California, Nevada, and Arizona. In the East, it has been reported in Connecticut, North Carolina, and Tennessee. In Oregon in 2004, *G. kauffmanii* was known from populations near Coos Bay and in the Coast and Cascade Ranges. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed in western and eastern North America. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *G. kauffmanii* from an estimated 54 element occurrences in the Pacific Northwest in 2004. An estimated 22 of these occurrences were in Oregon, and fewer were in California (10) and Washington (14) (ORBIC 2004). The ORBIC estimated that 53 of

the element occurrences were in protected areas in the NSO range in 2004. In 2004, *G. kauffmanii* was considered to be uncommon to rare with a spotty distribution, although it had a relatively stable population in the Pacific Northwest (ORBIC 2004). The species was found in two locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 37 new sites of *G. kauffmanii* in the NSO range between 1998–2006, and 74 total sites were documented by 2006, including 45 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 59 sites on federal lands and 70 total sites lands.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *G. kauffmanii*, and resulted in six new observations of individuals or populations of *G. kauffmanii*. Additional persistence surveys for other species in LSRs in nearby areas resulted in 10 additional incidental observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by about 20 percent. Based on the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

G. kauffmanii is found in LSOG forests as well as younger forests and is primarily associated with fir (*Abies* spp.), Douglas-fir, pine (*Pinus* spp.), and hemlock (*Tsuga* spp.) trees (ORBIC 2004, Castellano et al. 2003, Holthausen et al. 1994, Trappe, pers. comm. 2013). It is typically found partially hidden in deep humus in coniferous forests (Castellano et al. 2003), but can grow to be about 10 inches tall (Trappe, pers. comm. 2013). Based on data available in 2007, it was found between about 200–7,000 feet msl (Cushman and Huff 2007). *G. kauffmanii* may prefer specific microclimate conditions of LSOG forests, but it is also found in younger forests and may not be as restricted to these conditions.

Threats

Threats to *G. kauffmanii* are those that affect its host tree. Natural catastrophes or human activities that imperil the health of conifers compromise both tree and fungus (ORBIC 2004). Catastrophic events, such as hot fires that might extirpate the community, and other activities that threaten the forest habitat, such as drought, insect infestations, road construction, development, and clear-cutting, also threaten the species. Unprotected populations are specifically at risk to road construction or other development and heavy logging, such as clean- or clear-cutting or heavy thinning. This mushroom is considered edible, but responsible harvesting is not viewed as a major threat to the species.

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007

Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *G. kauffmanii*:

- As a mycorrhizal species, *G. kauffmanii* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.20.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. kauffmanii* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table GOKA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 210 observations from BLM and Forest Service geodatabases were converted into 124 sites in the NSO range (region). Table GOKA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table GOKA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure GOKA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure GOKA-2 displays the species' regional distribution with the extent of all forest types and LSOG forests on BLM and NFS lands.

TABLE GOKA-1

Number of *Gomphus kauffmanii* Sites (2013)

Location*	Number of Sites
Regional Area	124
Local Area	16
Analysis Area (Project Area)	6 (5)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE GOKA-2

Distribution of *Gomphus kauffmanii* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	16	2	-
Forest Service	87	13	6
NPS	10	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	14	2	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE GOKA-3

Distribution of *Gomphus kauffmanii* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	26	1	-
Congressionally Reserved (CR)	**7**	**-**	**-**
Late Successional Reserve (LSR)	**46**	**12**	**6**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**4**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	28	3	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

G. kauffmanii is widely distributed across 11 physiographic provinces in Washington (Olympic Peninsula, Western Lowlands, and Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Coast, Cascades, and Klamath). Most sites are found along the western Cascade Range, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the Klamath Mountains, Coast Range, and other outlying areas with some clusters of sites in western Oregon and northwestern California. *G. kauffmanii* appears to be well distributed in the western Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Fourteen of 124 sites are located on private, state, or other lands (at least partially); 10 sites are on NPS lands (Mount Rainier, Redwood, and Olympic National Parks); and 103 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Coos Bay District, six sites in the Medford District, and one site in the Roseburg District. Sites managed by the National Forests that encompass the project area include 14 sites on the Rogue River National Forest, 20 sites on the Winema National Forest, and eight sites on the Umpqua National Forest. The remaining 53 sites on BLM and NFS lands are in the Salem District and on the Gifford Pinchot, Klamath, Modoc, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Olympic, Shasta-Trinity, Siuslaw, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 57 sites are located on reserve lands managed by BLM and the Forest Service, including 46 in LSRs, four in Known Owl Activity Centers, and seven in Congressionally Reserved areas. This represents 55 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The 10 NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.



Figure GOKA-1. Regional Distribution of *Gomphus kauffmanii*

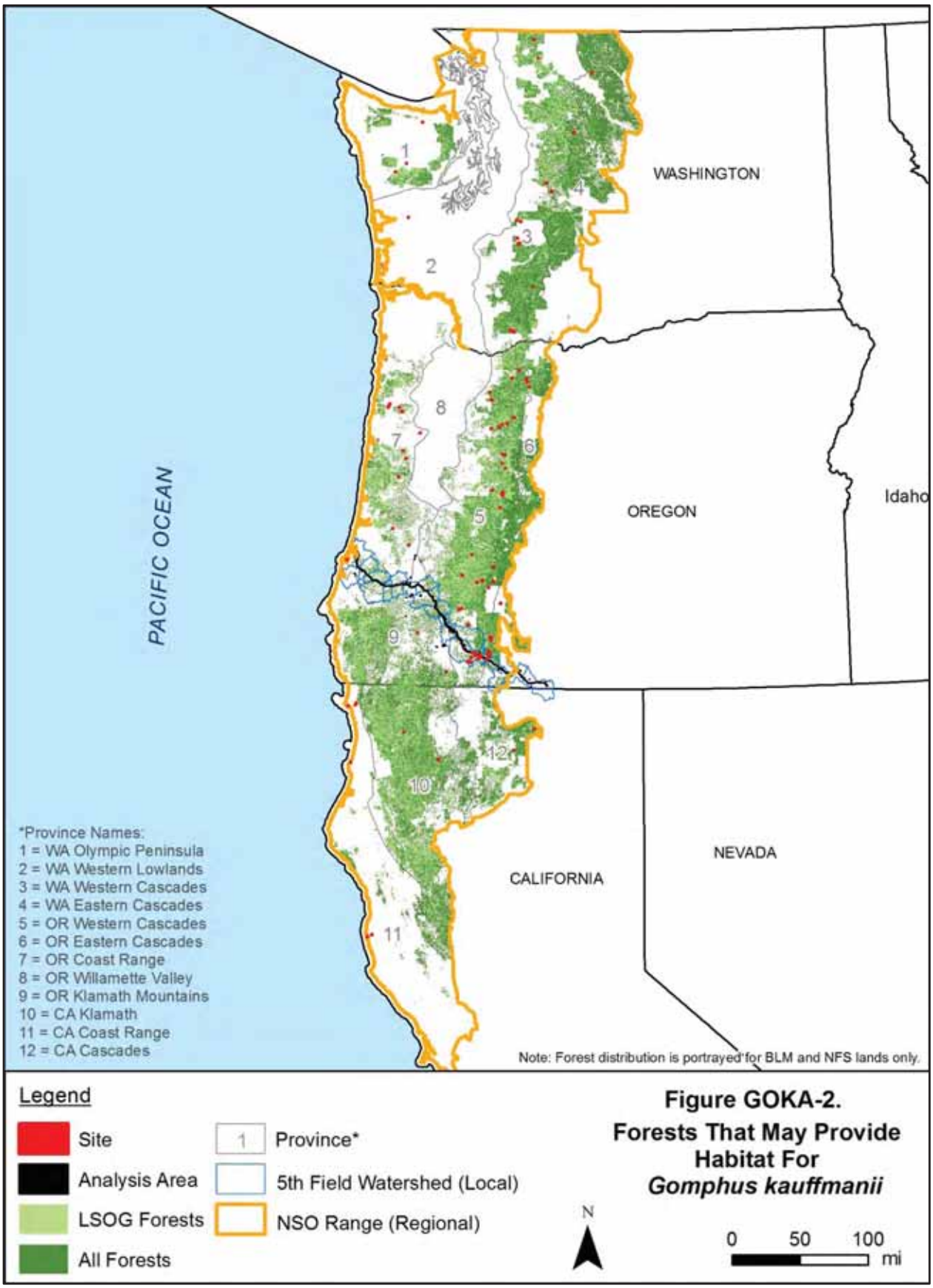


Figure GOKA-2.
Forests That May Provide Habitat For *Gomphus kauffmanii*

G. kauffmanii is more common in LSOG forests based on available data (100 of 124 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and has been documented in younger forests. It may not be as restricted to LSOG conditions. Based on current site locations, the species is found in all forest types across a wide elevation range and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests, including the LSOG component of these forests, across the NSO range could provide habitat for *G. kauffmanii* and support additional sites. These forests encompass an estimated 20.4 million acres on BLM and NFS lands in the region, including an estimated 13.0 million acres in reserve land allocations (64 percent of the forests; Table GOKA-4). Of this acreage, an estimated 6.25 million acres are LSOG (see Figure GOKA-2), including 3.9 million acres in reserve land allocations (62 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE GOKA-4

Extent of Forests that Could Provide Habitat for *Gomphus kauffmanii* on BLM and NFS Lands*

Location	All Forests		LSOG Forests	
	Total	Reserves	Total	Reserves
Regional Area	20,361,510	12,989,640	6,247,290	3,852,520
Local Area	1,492,090	208,950	187,020	82,370
Project Area	1,460	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *G. kauffmanii* is found in three 5th field watersheds that overlap the project area (see Table GOKA-5 and Figure GOKA-3). Most of the sites are clustered and near one another in the Cascade Range in the Little Butte Creek and Spencer Creek watersheds. The site in the Coos Bay Frontal watershed is distant from the other local sites and from others in the region (the nearest site is 40 miles northeast). Within the Cascade Range, multiple avenues of connectivity appear to be available between sites based on the extent of forests and abundance of sites in the mountain range, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 20 miles to the northeast in the Cascade Range.

Of the 16 sites in the local area, 15 sites are on BLM or NFS lands, including 12 sites in LSRs, one site in an Administratively Withdrawn area, and three sites on land designated as Other (Matrix). The site in the Coos Bay Frontal watershed is on private land. The 12 sites in LSRs represent 80 percent of the sites on BLM and NFS lands. Most of the sites in the Little Butte Creek watershed are in reserves.

Coniferous, mixed hardwood-coniferous, and hardwood forests encompass approximately 1.5 million acres on BLM and NFS lands in the local area, including 208,950 acres in reserve land allocations (14 percent of the forests). Of this acreage, an estimated 187,020 acres are LSOG, including 82,370 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites

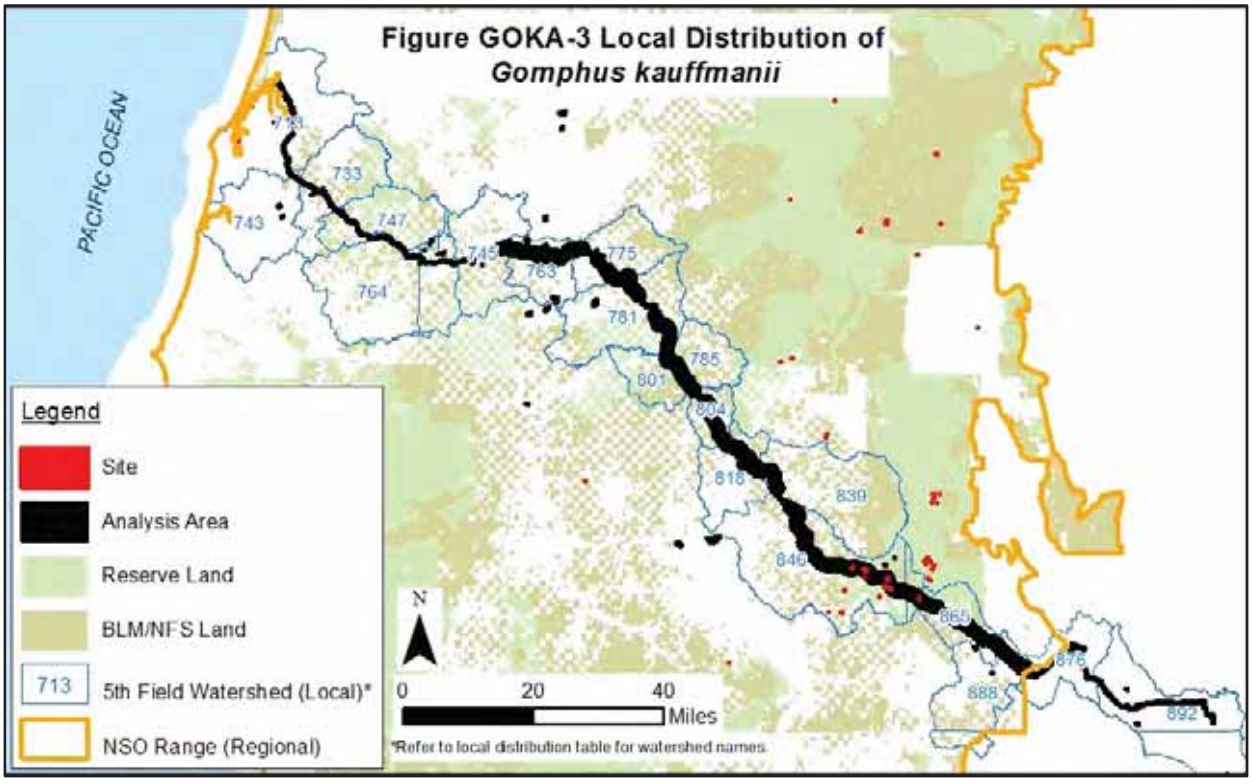
in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures GOKA-2 and GOKA-3).

TABLE GOKA-5

Distribution of *Gomphus kauffmanii* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	1	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	14	12
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	1	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis area contains six sites of *G. kauffmanii*, and the project area contains five sites. The analysis area sites are on Forest Service-managed lands (Rogue River and Winema National Forests) in one 5th field watershed (Little Butte Creek). All sites are in an LSR. The sites are

relatively close to one another in the eastern portion of the analysis area. Some sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 35 total observations of the species in 16 locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). An estimated 25 of these recorded observations comprise the six sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, the five sites are between MPs 155.8 and 162.7.

Project Impacts

Analysis

The PCGP Project would affect six sites out of the 103 sites on BLM- and Forest Service-managed lands in the region, representing approximately 6 percent of the sites (or six out of 124 total sites on all lands in the NSO range). Table GOKA-6 presents an overview of the features of the PCGP Project that would affect the *G. kauffmanii* sites. The construction corridor and associated work and storage areas would affect approximately 11.9 acres within five sites (about 26 percent of all sites in the analysis area); the sixth site may be indirectly affected by nearby PCGP Project activities. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. kauffmanii* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 7.0 acres of vegetation and soil within five sites and could result in the removal of *G. kauffmanii* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1.2 acres within three sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *G. kauffmanii* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 3.6 acres of understory habitat in five sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Road improvements and establishment would disturb approximately 0.3 acre within one site and could remove habitat and extant populations or individuals of *G. kauffmanii*.

TABLE GOKA-6

Impacts to *Gomphus kauffmanii* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	5	7.0 ac
Temporary Extra Work Area (TEWA)	3	1.2 ac
Uncleared Storage Area (UCSA)	5	3.6 ac
Roads (TMP)	1	0.3 ac
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,160 acres of coniferous, mixed hardwood-coniferous, and hardwood forests, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *G. kauffmanii*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of forests. This loss of forests represents less than 1 percent of the total estimated area of all forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the six sites as a result of the PCGP Project, seven sites of *G. kauffmanii* would remain on NFS lands in the local area, including six in reserves, and 97 sites, including 51 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 51 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 53 percent of the remaining *G. kauffmanii* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *G. kauffmanii* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *G. kauffmanii* has a wide distribution across 11 physiographic provinces and three states in the region and a moderate-high number of overall sites (103 on BLM and NFS lands). The species appears to be well distributed in the western Cascade

Range in Oregon and Washington and is fairly common and widespread outside this mountain range. The currently known number of sites on BLM and NFS lands is an increase of 44 sites since 2007, with most sites documented during the PCGP Project surveys.

  - An estimated 55 percent of the sites (57 sites) are in reserves, which is an increase of about 12 sites in reserves since 2006 per Molina (2008).

- Coniferous, mixed hardwood-coniferous, and hardwood forests (general habitat) are widely distributed across the region and encompass approximately 20.4 million acres on BLM and NFS lands with an estimated 64 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented. The Klamath Mountains, Coast Range, and other areas also contain conifer, mixed, and hardwood forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *G. kauffmanii*.
- The PCGP Project would affect six of 103 BLM- and Forest Service-managed sites of *G. kauffmanii*, representing approximately 6 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the six sites, a moderate-high number of sites (97) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Some sites (seven sites) would remain in the local vicinity of the analysis area; these sites would have a scattered distribution across three 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at six sites in LSRs, but the percentage of sites in reserves would be about the same (53 percent). Of the remaining sites, four are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and seven are in Congressionally Reserved areas where management activities that may adversely affect *G. kauffmanii* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests (less than 1 percent of the total regional acreage). An estimated 13.0 million acres (64 percent) of all forests and 3.9 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *G. kauffmanii*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.20.1 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. kauffmanii* at six sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 97 sites would remain on BLM and NFS lands across the region, and seven sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *G. kauffmanii* at six sites, these sites are part of the many sites in the Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *G. kauffmanii* would persist in the region without considering the six sites as part of the population.
- The PCGP Project would remove approximately 1,160 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 51 percent of the forests would be restored to similar conditions or shrublands, but the other 49 percent would remain as an unforested corridor. An estimated 13.0 million acres (64 percent) of all forests and 3.9 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *G. kauffmanii* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the six *G. kauffmanii* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *G. kauffmanii* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.21 GYMNOMYCES ABIETIS

Gymnomyces abietis is a sequestrate mushroom species in the Russulaceae family and does not have a common name.

2.21.1 Regulatory Status and Ranking

The 2001 ROD identifies *G. abietis* as a Category B (rare) species. The ORBIC evaluated *G. abietis* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with a cause for long-term concern, within its global range and in Oregon (G3G4, S3S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.21.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *G. abietis*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) and forms sporocarps beneath the soil surface (ORBIC 2004, Castellano et al. 1999). Although no specific information on its reproductive biology is known, it is presumed to be dependent on mycophagy for dispersal of spores, similar to other sequestrate fungi (Castellano and O'Dell 1997). Mycophagy is consumption of fungi by animals, which eat the sporocarp and transport and excrete the spores. The mushroom has been documented fruiting from July through October (Castellano et al. 1999).

Range

G. abietis is endemic to the Pacific Northwest, where it was known only from Washington, Oregon, and California in 2004 (ORBIC 2004). In 2007, it was known from the Cascade Range in Oregon and Washington, Coast Range in Oregon and California, and Klamath Mountains in California (Cushman and Huff 2007). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *G. abietis* from an estimated 22 element occurrences within the Pacific Northwest in 2004. Most of these occurrences were in Oregon (11) and California (10), with only one reported in Washington (ORBIC 2004). In 2004, *G. abietis* was reported as being frequently collected in Oregon and California, although population trends across its range were unknown (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range between 2001–2004 (USDA and USDI 2007). Molina (2008) reported two new sites of *G. abietis* in the NSO range between 1998–2006, and 24 total sites were documented by 2006, including 19 in reserves or protected areas. These two new sites are likely the same two new sites reported between 2004–2006 in the 2007 FSEIS (USDA and USDI 2007), indicating that no new sites were recorded between 1998–2004. In the 2007 Final SEIS (USDA and USDI 2007), the Forest Service and BLM reported a total of 23 sites, all on federal lands.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *G. abietis*, and resulted in one new observation of the species in 2011 on the Rogue River National Forest. *G. abietis* has not been found in high numbers during past survey efforts, although limited fungi surveys have been conducted across the NSO range, and more survey effort may locate additional populations of the species. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

G. abietis grows in association with the roots of conifer trees, including fir (*Abies* spp.), mountain hemlock, and possibly other species of Pinaceae, primarily above 3,000 feet msl (Castellano and O'Dell 1997, Castellano et al. 1999). Specific habitat requirements are not known. The species was reported only from mature to old-growth coniferous stands in the *Results of Additional Species Analysis* in support of the NWFP ROD (Holthausen et al. 1994). It has been found in recently burned areas (Trappe, pers. comm. 2013). *G. abietis* may prefer specific microclimate conditions of LSOG coniferous forests, but it may not be as restricted to these conditions.

Threats

Threats to *G. abietis* are those that affect its host tree and disturb the soil, such as road and trail construction, logging and fire management activities, and recreational activities (Castellano and O'Dell 1997). For populations in or near recreation areas, trampling and other ground disturbance can affect the species (Holthausen et al. 1994). Fire is also a potential threat. Other specific threats to the species are not currently known.

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *G. abietis* with several other species (Group 3 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites, which will maintain viable populations of the species until additional information on the effects of various management activities can be obtained and evaluated. Populations on federal land should be managed to maintain population viability. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized, and damage to or removal of host trees should be prevented. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *G. abietis*:

- As a mycorrhizal species, *G. abietis* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.21.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. abietis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table GYAB-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 28 observations from BLM and Forest Service geodatabases were converted into 19 sites in the NSO range (region). Table GYAB-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table GYAB-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure GYAB-1 displays the regional distribution of the species across BLM and NFS lands, and Figure GYAB-2 displays the species' regional distribution with the extent of coniferous and LSOG coniferous forests above 3,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE GYAB-1

Number of *Gymnomyces abietis* Sites (2013)

Location*	Number of Sites
Regional Area	19
Local Area	1
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE GYAB-2

Distribution of *Gymnomyces abietis* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	-	-	-
Forest Service	16	1	1
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	-	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011

TABLE GYAB-3

Distribution of *Gymnomyces abietis* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	4	-	-
Congressionally Reserved (CR)	**5**	**-**	**-**
Late Successional Reserve (LSR)	**5**	**1**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	1	-	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, September 2009; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Bolded allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

G. abietis is somewhat widely distributed across five physiographic provinces in Washington (Eastern Cascades), Oregon (Coast Range, Cascades East and West), and California (Klamath), despite a low overall number of sites (see Figure GYAB-1). Most sites are found along the Cascade Range, with scattered sites in the Coast Range and Klamath Mountains. Sites in the Oregon Cascade Range are relatively close to one another, but other sites appear isolated. The species appears to have a limited distribution outside the Oregon Cascade Range based on the lower number of sites and isolated nature of most sites. *G. abietis* does not appear to be well distributed within its range in the NSO range.

Three sites are on NPS lands within the Crater Lake National Park, and the remainder (16) are on NFS lands in the region (no sites are on BLM lands). Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest (the only site in the local and analysis areas). Sites managed by other National Forests include two sites on the Deschutes National Forest, one site on the Klamath National Forest, one site on the Mt. Hood National Forest, one site on the Okanogan National Forest, three sites on the Siuslaw National Forest, one site on the Six Rivers National Forest, and six sites on the Willamette National Forest.

Across the NSO range, 10 sites are located on reserve lands managed by the Forest Service, including five sites in LSRs and five sites in Congressionally Reserved areas. This represents 63 percent of the total Forest Service-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.



Figure GYAB-1. Regional Distribution of *Gymnomyces abietis*

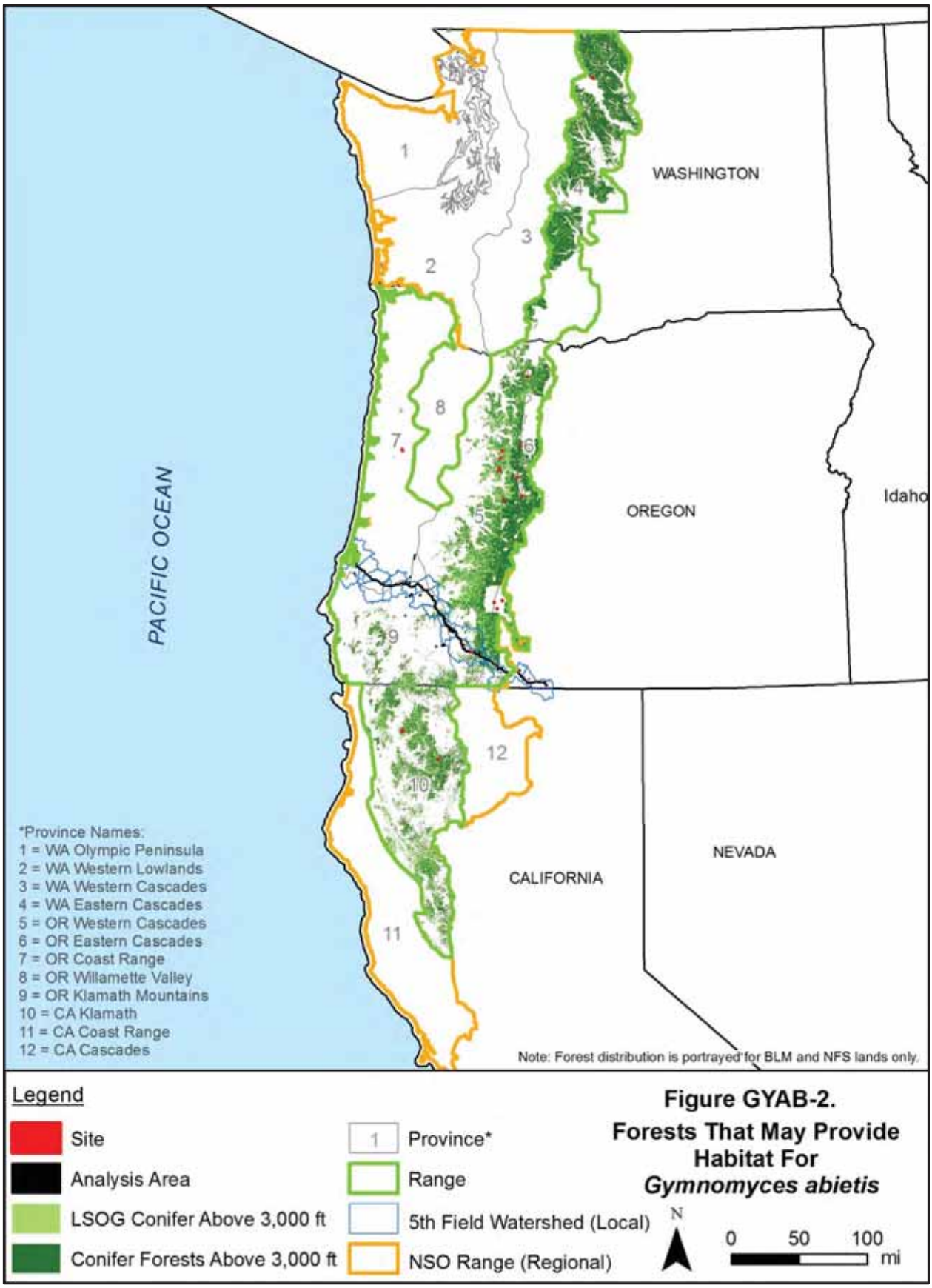


Figure GYAB-2.
Forests That May Provide Habitat For *Gymnomyces abietis*

G. abietis is more commonly found in LSOG forests based on available data (11 of 19 total sites are in LSOG), but it has also been found in recently burned areas and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous forests above about 3,000 feet msl and has only been documented in part of the NSO range. Coniferous forests above 3,000 feet msl in the Cascade Range and Klamath Mountains in Oregon and California, eastern Cascade Range in Washington, and Coast Range in Oregon could provide habitat for *G. abietis* and support additional sites. These forests encompass an estimated 9.3 million acres on BLM and NFS lands in the species' range, including an estimated 5.5 million acres in reserve land allocations (58 percent of the forests; Table GYAB-4). Of this acreage, an estimated 2.3 million acres are LSOG (see Figure GYAB-2), including 1.4 million acres in reserve land allocations (60 percent of the forests). Although coniferous forests are widespread across the species' range, LSOG coniferous forests above 3,000 feet are less common.

TABLE GYAB-4

Extent of Forests that Could Provide Habitat for *Gymnomyces abietis* on BLM and NFS Lands*

Location	Coniferous Forests above 3,000 feet		LSOG Coniferous Forests above 3,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	9,341,130	5,456,200	2,324,400	1,383,940
Local Area	229,570	79,120	68,660	28,430
Project Area	580	310	190	100

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *G. abietis* is found in one 5th field watershed (Little Butte Creek) that overlaps the project area (see Table GYAB-5 and Figure GYAB-3). The only site in the local area is in an LSR on the Rogue River National Forest. This site is in the western Cascade Range and appears to be isolated from other sites in the region because the nearest site is more than 35 miles northeast on the east side of the Cascade Range. Limited connectivity appears available between the local site and other sites in the region based on the distance between the sites, although animals could transport spores across suitable habitat within the local area.

Coniferous forests above 3,000 feet msl encompass approximately 229,570 acres on BLM and NFS lands in the local area, with 79,120 acres in reserve land allocations (35 percent of the forests). Of this acreage, an estimated 68,660 acres are LSOG, including 28,430 acres in reserve land allocations (41 percent of the forests). Other sites may be located in the Cascade Range in areas that have not been previously surveyed.

TABLE GYAB-5

Distribution of *Gymnomyces abietis* in Local 5th Field Watersheds

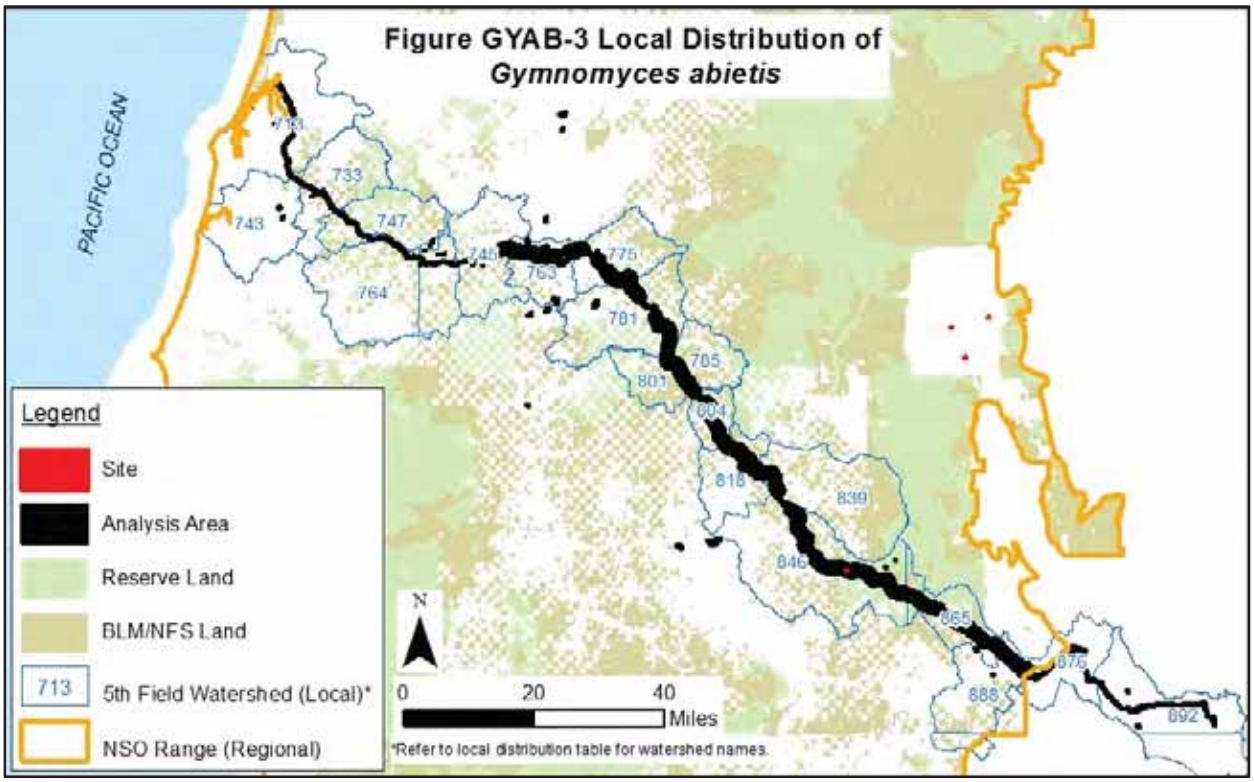
Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	1	1
Lower Coquille River (743)	-	-

TABLE GYAB-5

Distribution of *Gymnomyces abietis* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *G. abietis*. This site is the same one as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in one observation of *G. abietis* in the survey area during spring 2011 (Siskiyou BioSurvey LLC 2012a). This recorded observation was at MP 154.8 and comprises the single site in the analysis area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 16 sites on Forest Service-managed lands in the region, representing approximately 6 percent of the sites (or one out of 19 total sites on all

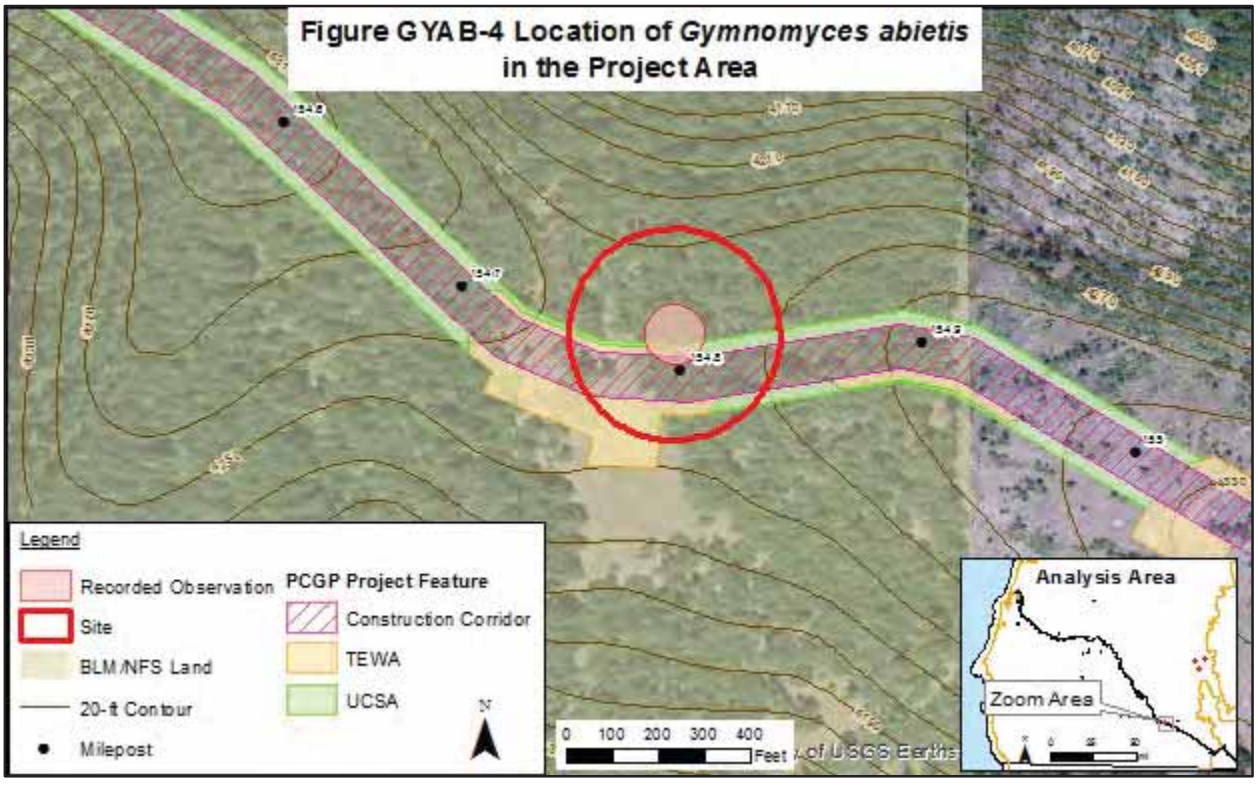
lands in the NSO range). Table GYAB-6 presents an overview of the features of the PCGP Project that would affect the *G. abietis* site. The construction corridor and associated work and storage areas would affect approximately 1.6 acres (42 percent) of the site (the site is approximately 3.8 acres), and the corridor would cross through the southern half of the site (see Figure GYAB-4). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. abietis* in and near the project area. Due to the scattered distribution of the species and few sites near the project area, the effects on one site could potentially alter the distribution of the species in the NSO range if site persistence is affected. This discussion presents a detailed analysis of the features of the PCGP Project that could affect site persistence.

TABLE GYAB-6

Impacts to *Gymnomyces abietis* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	1.0 ac
Temporary Extra Work Area (TEWA)	1	0.4 ac
Uncleared Storage Area (UCSA)	1	0.3 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because the same site would be subject to impacts from multiple project activities.



The PCGP Project would result in ground disturbance and vegetation removal in the southern half of the site near MP 154.8. The recorded observation of the species is along the northern side of the project area and may be avoided by activities within the corridor and TEWA, but fruiting bodies, if present, could be disturbed during material storage within a UCSA (see Figure GYAB-

4). The species would also be subject to indirect effects associated with the PCGP Project based on the proximity of project activities to the observation.

Establishment of the construction corridor and a TEWA would disturb vegetation and soils within 100 feet around the recorded observation within the site. The area within the site is mostly forested with a small open area in the southwest portion, and the establishment of the corridor could modify microclimate conditions around the recorded observation. The removal of forests and host trees and disturbance to soil could negatively affect *G. abietis* by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees, affecting site persistence. In addition, modification of shading, moisture, and habitat conditions within 100 feet of the observation as a result of the corridor and TEWA would likely make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within a UCSA could damage individuals and would disturb understory habitat within the site, which could modify microhabitats near individual(s) that are not removed or damaged, potentially making the habitat no longer suitable for the species.

Based on this analysis, *G. abietis* is not likely to persist at the site following project implementation. This site is the only site in the local area and is the southernmost site in Oregon. It may be important for dispersal of the species between other sites to the north in the Cascade Range and sites to the southwest in the Klamath Mountains in California. If the species does not persist at this site, *G. abietis* would still be found in the Cascade Range in Oregon, but opportunities for dispersal into the southern portion of the NSO range may be limited.

Across the project area, the PCGP Project would remove an estimated 480 acres of coniferous forests above 3,000 feet msl, including 150 acres of LSOG coniferous forests above 3,000 feet msl. These impacts would result in a reduction of habitat that may be suitable for *G. abietis*. Within this impact area, about 360 acres (75 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 110 acres of coniferous forests above 3,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests above 3,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, no sites of *G. abietis* would remain in the local area, and 15 sites, including nine in reserves, would remain on NFS lands in the NSO range. The remaining 15 sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and management recommendations for the species with regard to agency-related actions. The nine sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts,

approximately 60 percent of the remaining *G. abietis* sites on NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *G. abietis* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - Although *G. abietis* is somewhat widely distributed across five physiographic provinces and three states in the region, the total number of sites is low (16 on NFS lands). *G. abietis* does not appear to be well distributed in any part of its range because sites are scattered and its distribution is spotty. The currently known number of sites is a decrease in the number of sites recorded in 2007.
    - An estimated 63 percent of the sites (10 sites) are in reserves, which is a decrease in the proportion of sites in reserves since 2006 per Molina (2008).
- Coniferous forests above 3,000 feet msl (general habitat for the species) are widely distributed across the species' range and encompass approximately 9.3 million acres on BLM and NFS lands with an estimated 58 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented, and in the Klamath Mountains, where two sites are documented. A subcomponent of these forests likely provides habitat for *G. abietis*.
- The PCGP Project would affect one of 16 Forest Service-managed sites of *G. abietis*, representing approximately 6 percent of the sites on NFS lands in the NSO range (no sites are on BLM lands). Assuming site persistence cannot be maintained at the site, a low number of sites (15) would continue to be documented on NFS lands in the region, with most sites in Oregon and few sites in California and Washington. No sites would remain in the local area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project could be modified as a result of reduced dispersal opportunities and the reduction in sites on NFS lands.
- The PCGP Project would affect site persistence at one site in an LSR, but the percentage of sites in reserves would be about the same (60 percent). Of the remaining sites, four are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and five are in Congressionally Reserved areas where management activities that may adversely affect *G. abietis* are unlikely.

- The PCGP Project would result in a permanent loss of an estimated 110 acres of coniferous forests above 3,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 5.5 million acres (58 percent) of coniferous forests and 1.4 million acres (60 percent) of LSOG coniferous forests above 3,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *G. abietis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites may exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.21.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. abietis* at one site and could modify the distribution of the species within the range of the NSO. The remaining sites may not provide a reasonable assurance of species persistence because:

- With project implementation, 15 sites would remain on NFS lands across the region, but no sites would remain in the local area. Although only one *G. abietis* site would be affected, the low overall number of sites indicates that each site may be important for the persistence of the species in the NSO range, and the lack of other sites in the local area indicates that the site may be important for dispersal opportunities in the local area and between sites in the Cascade Ranges and Klamath Mountains of Oregon and California. The species' distribution and range within the NSO range could be modified if site persistence is affected.
- The PCGP Project would remove approximately 480 acres of coniferous forests and 150 acres of LSOG coniferous forests above 3,000 feet msl (a negligible amount of the forests). An estimated 75 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 5.5 million acres (58 percent) of coniferous forests and 1.4 million acres (60 percent) of LSOG coniferous forests below 6,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Oregon Cascade Range, other sites are scattered across the region and are less likely to be collectively affected by a single event.

Based on these conclusions, the single *G. abietis* site in the analysis area is necessary for the persistence of the species in the NSO range, and the PCGP Project must avoid impacts to the site. The segment of the construction corridor, along with associated TEWAs and UCSAs, should be moved at least 180 feet (55 meters) to the south of the currently proposed alignment, such that most of the work area is shifted outside the site boundary (see Figure GYAB-4 for reference). The nearest edge of the corridor should be entirely outside of the site (the large red

circle depicted in Figure GYAB-4). A no-disturbance buffer of at least 60 meters should be provided between the *G. abietis* observation point (centroid of site) and the outside edge of disturbance caused by clearing and construction activities. The TEWA near the *G. abietis* site should be located to the west of the meadow where a BLM and Forest Service sensitive plant (Bellinger's meadowfoam [*Limnanthes floccosa* ssp. *belligeriana*]) population has been documented. In addition, the applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the site and adjacent habitat over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.22 GYROMITRA ESCULENTA

Gyromitra esculenta is a cup fungus in the Discinaceae family. It is commonly known as false morel, brain mushroom, or beefsteak morel.

2.22.1 Regulatory Status and Ranking

The 2001 ROD identifies *G. esculenta* as a Category F (uncommon) species. The ORBIC did not evaluate *G. esculenta* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. The species is not currently on the ORBIC Lists. *G. esculenta* is not a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.22.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

G. esculenta is a soil saprobe, presumably feeding on decaying matter in the soil (Holthausen et al. 1994). It is most easily detected in the spring (Castellano et al. 2003). Little specific information is known about the reproductive biology of *G. esculenta*, but as with other cup fungi, the species is presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997).

Range

G. esculenta is found in northern temperate forests in North America and Europe (Castellano et al. 2003). In the Pacific Northwest, the species is widely distributed in Washington, Oregon, and California. The currently known range of the species within the NSO range based on 2014 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across North America and Europe. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under the Threats section below.

Population Status

G. esculenta is known from many dozen locations within the NSO range (Castellano et al. 2003). *G. esculenta* was documented at 111 sites between 1994–2000 (USDA and USDI 2000). The species was found in 21 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 308 new sites of *G. esculenta* in the NSO range between 1998–2006, and 354 total sites were documented by 2006, including 98 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 281 sites on federal lands and 380 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area, and persistence surveys were conducted for some species in nearby LSRs (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category F species were recorded during these surveys, and resulted in 16 new observations of populations of *G. esculenta*. Based on the increased number of sites since 1998 with increased surveys (more than 7-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2014 data are presented below under the Species Distribution discussion.

Habitat

G. esculenta occurs as solitary, scattered, or gregarious sporocarps on the ground under conifer trees and occasionally under hardwoods in undisturbed or disturbed coniferous, mixed hardwood-coniferous, and hardwood forests and occasionally on urban lawns (Castellano et al. 2003, The Fungi of California 2010). It is found in and may actually prefer second-growth forests, and past harvests may create habitat for this species (Holthausen et al. 1994). *G. esculenta* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *G. esculenta* are presumably similar to threats to other saprophytic fungi. Threats include actions that disrupt stand conditions necessary for its survival, such as disturbance of large woody debris, litter, and duff (Castellano and O'Dell 1997). Typical threats to fungi species in coniferous and other forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). Activities that cause mortality of individuals or groups of individuals can threaten the species' genetic diversity in localized areas (USDA and USDI 2000). *G. esculenta* may also be collected for commercial use or human consumption, although it contains a toxic compound that makes it inedible raw (Holthausen et al. 1994).

Management Recommendations

For Category F S&M species, known sites are not required to be managed per the 2001 ROD, but the species are expected to be assigned to another category or be removed from the list (USDA and USDI 2001). Management recommendations have not been developed for *G. esculenta* because it was removed from the S&M list after 2001.

2.22.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. esculenta* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table GYES-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 428 observations from BLM and Forest Service geodatabases were converted into 290 sites in the NSO range (region). Table GYES-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table GYES-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure GYES-1 displays the regional distribution of the species across BLM and NFS lands, and Figure GYES-2 displays the species' regional distribution with the extent of all forests and LSOG forests on BLM and NFS lands.

TABLE GYES-1

Number of *Gyromitra esculenta* Sites (2014)

Location*	Number of Sites
Regional Area	290
Local Area	121
Analysis Area (Project Area)	23 (23)

Data Source: Processed BLM and Forest Service GIS data, April 7, 2014
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE GYES-2

Distribution of *Gyromitra esculenta* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	147	96	1
Forest Service	134	25	22
NPS	5	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	44	21	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.



Figure GYES-1. Regional Distribution of *Gyromitra esculenta*

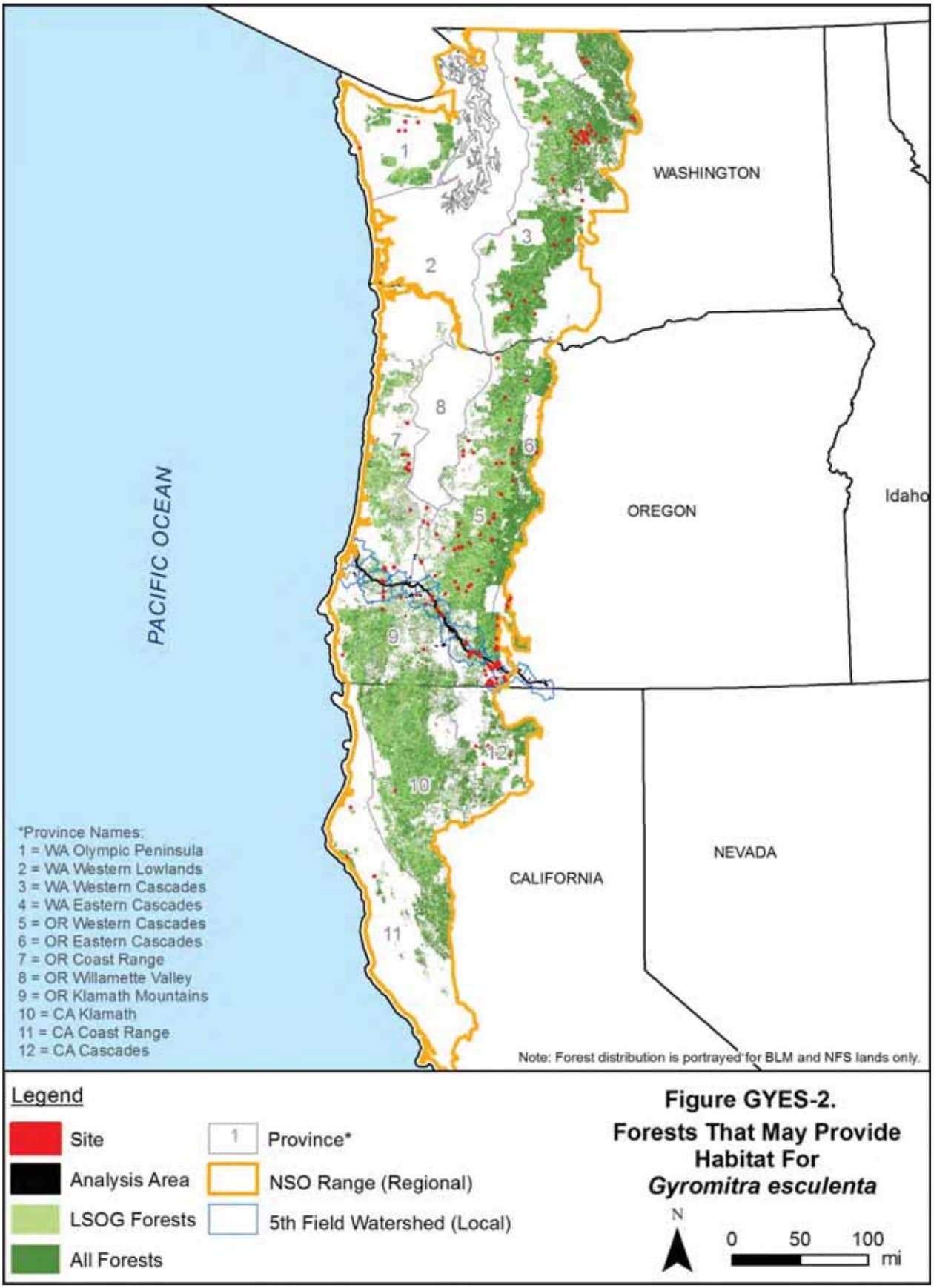


Figure GYES-2.
Forests That May Provide Habitat For *Gyromitra esculenta*

TABLE GYES-3

Distribution of *Gyromitra esculenta* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	4	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	10	-	-
Congressionally Reserved (CR)	**14**	**-**	**-**
Late Successional Reserve (LSR)	**69**	**15**	**11**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**10**	**3**	**-**
Managed Late Successional Area (MLSA)	3	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	173	103	12
Riparian Reserve**	**3**	**3**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

G. esculenta has a wide distribution across 11 physiographic provinces in Washington (Eastern and Western Cascades and Olympic Peninsula), Oregon (Coast Range, Willamette Valley, Cascades East and West, and Klamath Mountain), and California (Coast, Klamath, and Cascades). The sites are most abundant along the Cascade Range in Oregon and Washington, where the sites are clustered or relatively close to one another in groups. Sites are also clustered or relatively close to one another in groups in the Coast Range and Klamath Mountains in Oregon. The Olympic Peninsula in Washington contains a group of sites. Sites in California are scattered and few in number. *G. esculenta* appears to be well distributed in Oregon and Washington, based on the abundance and size of sites, proximity of sites to one another, and distribution of the species across forests that may provide suitable habitat in the mountain ranges.

Of the 290 sites in the region, 44 sites are located on private, state, or other lands (at least partially), five sites are on NPS land (Olympic National Park), and 279 sites are on BLM and NFS lands (at least partially). Sites managed by the BLM Districts that encompass the project area include 13 sites in the Roseburg District, nine sites in the Medford District, five sites in the Coos Bay District, and 98 sites in the Klamath Falls Resources Area of the Lakeview District. Sites managed by the National Forests that encompass the project area include 30 sites on the Umpqua National Forest, 17 sites on the Winema National Forest, and nine sites on the Rogue River National Forest. The remaining 111 sites on BLM and NFS lands are in the Eugene and Salem Districts and on the Gifford-Pinchot, Deschutes, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Shasta-Trinity, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 95 sites are located on reserve lands managed by BLM and the Forest Service, including 14 in Congressional Reserved areas, 69 in LSRs, 10 in Known Owl Activity Centers, and three in Riparian Reserves (one site overlaps two types of reserves). This represents 34 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan

components. The five NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

G. esculenta is more commonly found in LSOG forests based on available data (157 of 290 total sites are in LSOG), but is also fairly common in non-LSOG forests and may not be restricted to LSOG conditions. Based on current site locations, the species is found in all forest types across a wide elevation range and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests, including the LSOG component of these forests, across the NSO range could provide habitat for *G. esculenta* and support additional sites. These forests encompass an estimated 20.4 million acres on BLM and NFS lands in the region, including an estimated 13.0 million acres in reserve land allocations (64 percent of the forests; Table GYES-4). Of this acreage, an estimated 6.25 million acres are LSOG (see Figure GYES-2), including 3.9 million acres in reserve land allocations (62 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE GYES-4

Extent of Forests that Could Provide Habitat for *Gyromitra esculenta* on BLM and NFS Lands*

Location	All Forests		LSOG Forests	
	Total	Reserves	Total	Reserves
Regional Area	20,361,510	12,989,640	6,247,290	3,852,520
Local Area	1,492,090	208,950	187,020	82,370
Project Area	1,460	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *G. esculenta* is found in nine 5th field watersheds that overlap the project area (see Table GYES-5 and Figure GYES-3). The sites are clustered or relatively close to one another in groups throughout the local area. The majority of the sites are found in two large clusters in the eastern Cascade Range. Avenues of connectivity appear to be available between the local sites. Several regional sites are located within 20 miles to the northeast in the Cascade and Coast Ranges.

Of the 121 sites in the local area, 120 are at least partially on BLM or NFS lands, including 96 on BLM lands (Roseburg, Medford, Coos Bay, and Lakeview Districts) and 25 on NFS land (Umpqua, Winema, and Rogue River National Forests). The majority of the sites in the local area are on land designated as Other (Matrix). Twenty-one sites are at least partially on private or other lands. Three of the sites on BLM lands are in Known Owl Activity Centers in the Klamath River-John C Boyle Reservoir watershed, and another three sites on BLM lands are in Riparian Reserves in the Spencer Creek watershed. The other 15 sites in reserves are in LSRs in several watersheds (Table GYES-5). The 21 sites in reserves represent 18 percent of the local area sites on BLM and NFS lands.

Coniferous, mixed hardwood-coniferous, and hardwood forests encompass approximately 1.5 million acres on BLM and NFS lands in the local area, including 208,950 acres in reserve land

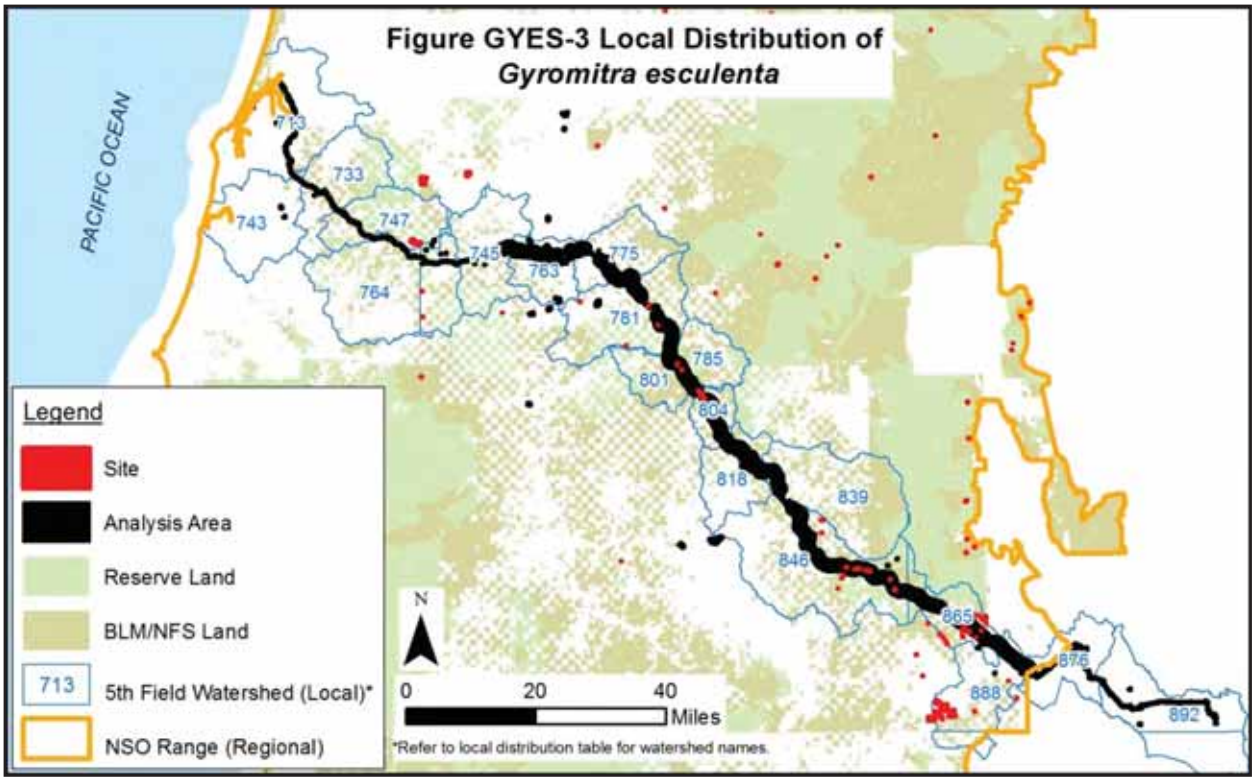
allocations (14 percent of the forests). Of this acreage, an estimated 187,020 acres are LSOG, including 82,370 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area, particularly in the Coast and Cascade Ranges, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures GYES-2 and GYES-3).

TABLE GYES-5

Distribution of *Gyromitra esculenta* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	2	2
Elk Creek-South Umpqua (785)	2	2
Klamath River-John C Boyle Reservoir (888)	63	3*
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	16	9
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	2	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	4	2
Spencer Creek (865)	21	3
Trail Creek (804)	11	-
Upper Cow Creek (801)	2	2*

Data Sources: Processed BLM and Forest Service GIS data, April 7, 2014; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*Two sites in reserves are in the Elk Creek-South Umpqua and Upper Cow Creek watersheds.



Analysis/Project Area Distribution

The analysis and project areas contain 23 sites of *G. esculenta*. One site is located on BLM-managed lands in the Roseburg District. The other 22 sites are on NFS managed lands on the Umpqua and Rogue River National Forests. Eleven sites are in LSRs, and 12 sites are on land designated as Other (Matrix). The sites are distributed across several watersheds. Many sites are located within the immediate vicinity of the eastern portion of the analysis area within the Cascade Range (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 45 total observations of the species in 16 locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). These recorded observations comprise the 23 sites in the analysis area. The sites are located in two groups between MPs 91.4 and 113.0 and MPs 154.2 and 164.4.

Project Impacts

Analysis

The PCGP Project would affect 23 sites out of the 279 sites on BLM- and Forest Service-managed lands in the region, representing approximately 8 percent of the sites (or 23 out of 290 total sites on all lands in the NSO range). Table GYES-6 presents an overview of the features of the PCGP Project that would affect the *G. esculenta* sites. The construction corridor and associated work and storage areas would affect approximately 42 acres within 23 sites (about 40 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. esculenta* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 26.9 acres of vegetation and soil within 23 sites and could result in the removal of *G. esculenta* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 4.8 acres within 10 sites. The establishment of the corridor could modify microclimate conditions around individuals adjacent to the corridor. The removal of forests and woody debris and disturbance to soil could negatively affect *G. esculenta* in adjacent areas by removing its habitat, disturbing soil and woody debris around trees, and affecting its association with mosses on soil or logs and other understory components, potentially affecting site persistence even if the entire sites are not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 10.3 acres of understory habitat in 20 sites, which could modify microhabitats near extant individuals, potentially making the habitat no longer suitable for the species. Road improvements and establishment would disturb approximately 0.3 acre within one site and could remove habitat and extant populations or individuals of *G. esculenta*.

TABLE GYES-6

Impacts to *Gyromitra esculenta* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	23	26.9 ac
Temporary Extra Work Area (TEWA)	10	4.8 ac
Uncleared Storage Area (UCSA)	20	10.3 ac
Roads (TMP)	1	0.3 ac
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *G. esculenta*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests. This loss of forests represents less than 1 percent of the total estimated area of all forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 23 sites as a result of the PCGP Project, 97 sites of *G. esculenta* would remain on BLM and NFS lands in the local area, including 10 in reserves, and 256 sites, including 84 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 84 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 33 percent of the remaining *G. esculenta* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *G. esculenta* is a Category F (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, information on Category F species is insufficient to determine what level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:

  - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
  - *G. esculenta* has a wide distribution across 11 physiographic provinces and three states in the region and a moderate-high number of overall sites (279 on BLM and NFS lands). The species appears to be well distributed in Oregon and Washington. The currently known number of sites on BLM and NFS lands is approximately the same number sites as recorded in 2007. Many sites were documented during the PCGP Project surveys.
  - An estimated 34 percent of the sites (95 sites) are in reserves. This is an increase in the proportion of sites in reserves since 2006 per Molina (2008).

- Coniferous, mixed hardwood-coniferous, and hardwood forests (general habitat for the species) are widely distributed across the region and encompass approximately 20.4 million acres on BLM and NFS lands with an estimated 64 percent in reserves. These forests are primarily found in the Cascade Range and Coast Range, where most sites are documented. The Klamath Mountains and other areas also contain these forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *G. esculenta*.
- The PCGP Project would affect 23 of 279 BLM- and Forest Service-managed sites of *G. esculenta*, representing approximately 8 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the sites, a moderate-high number of sites (256) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (97) would remain in the local vicinity of the analysis area; these sites would be distributed across four 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect 11 sites in reserves, and the percentage of sites in reserves would remain approximately the same (33 percent). Of the remaining sites, 68 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 14 are in Congressionally Reserved areas where management activities that may adversely affect *G. esculenta* are unlikely. Three other sites are at least partially in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests (less than 1 percent of the total regional acreage). An estimated 13.0 million acres (64 percent) of coniferous, mixed hardwood-coniferous, and hardwood forests and 3.9 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *G. esculenta*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category F species for which pre-

disturbance surveys are not applicable and have not been extensively conducted across the NSO range; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.22.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. esculenta* at 23 sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 256 sites would remain on BLM and NFS lands across the region, and 97 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *G. esculenta* at 23 sites, these sites are a part of the many sites in the Cascade Range and the Klamath Mountains in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *G. esculenta* would persist in the region without considering the sites as part of the population.
- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 13.0 million acres (64 percent) of coniferous, mixed hardwood-coniferous, and hardwood forests and 3.9 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *G. esculenta* sites in the analysis area, although some individuals within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 23 *G. esculenta* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to the affected sites would waive implementation of Management Recommendations for the *G. esculenta* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.23 GYROMITRA INFULA

Gyromitra infula is a cup fungus in the Discinaceae family. It is commonly known as hooded gyromitra.

2.23.1 Regulatory Status and Ranking

The 2001 ROD identifies *G. infula* as a Category B (rare) species. The ORBIC did not evaluate *G. infula* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. In 2007, the species was considered to be not rare and apparently secure, but with cause for long-term concern globally (G4) and between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern in Oregon (S3S4) (USDA and USDI 2007). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.23.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the reproductive biology of *G. infula.* It is a saprobe that is most easily detected in spring and fall (Castellano et al. 2003). As with other cup fungi, *G. infula* is presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997).

Range

G. infula is found in northern Europe, western North America, Alaska, and Michigan (Castellano et al. 2003). In the Pacific Northwest, the species has a wide distribution across Washington, Oregon, and California. The currently known range of the species within the NSO range based on 2014 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed in northern Europe and parts of North America. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under the Threats section below.

Population Status

G. infula is known from many dozen locations within the NSO range (Castellano et al. 2003). *G. infula* was documented at 23 sites between 1994–2000 (USDA and USDI 2000). The species

was found in eight locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 76 new sites of *G. infula* in the NSO range between 1998–2006, and 121 total sites were documented by 2006, including 52 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 123 sites on federal lands and 135 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *G. infula*, and resulted in 10 new observations of populations of the species. Based on the increased number of sites since 1998 with increased surveys (more than 2-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2014 data are presented below under the Species Distribution discussion.

Habitat

G. infula occurs as sporocarps on well-decayed wood, humus-rich soils, and disturbed ground or in burned areas in coniferous, mixed hardwood-coniferous, and hardwood forests, particularly those with charred or uncharred woody debris (Castellano et al. 2003, The Fungi of California 2010). The species is saprobic on rotten to very rotten wood (Holthausen et al. 1994). The species is documented in both late successional and younger coniferous forests (Hibler et al. 2001b). *G. infula* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *G. infula* are presumably similar to threats to other saprophytic fungi. Threats include actions that disrupt stand conditions necessary for its survival, such as disturbance of rotten woody debris, litter, and duff (Castellano and O'Dell 1997). Typical threats to fungi species in coniferous and other forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). Activities that cause mortality of individuals or groups of individuals can threaten the species' genetic diversity in localized areas (USDA and USDI 2000). Specific threats to *G. infula* are not currently known.

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *G. infula* because it was removed from the S&M list after 2001.

2.23.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on

sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. infula* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table GYIN-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 179 observations from BLM and Forest Service geodatabases were converted into 109 sites in the NSO range (region). Table GYIN-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table GYIN-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure GYIN-1 displays the regional distribution of the species across BLM and NFS lands, and Figure GYIN-2 displays the species' regional distribution with the extent of coniferous, mixed hardwood-coniferous, and hardwood forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE GYIN-1

Number of *Gyromitra infula* Sites (2014)

Location*	Number of Sites
Regional Area	109
Local Area	30
Analysis Area (Project Area)	10 (10)

Data Source: Processed BLM and Forest Service GIS data, April 7, 2014
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE GYIN-2

Distribution of *Gyromitra infula* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	33	21	4
Forest Service	67	9	6
NPS	8	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	7	3	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.



Figure GYIN-1. Regional Distribution of *Gyromitra infula*



Figure GYIN-2.
Forests That May Provide Habitat For *Gyromitra infula*

TABLE GYIN-3

Distribution of *Gyromitra infula* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	1	-	-
Congressionally Reserved (CR)	**11**	**-**	**-**
Late Successional Reserve (LSR)	**24**	**8**	**5**
Marbled Murrelet Area (LSR3)	**3**	**3**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**2**	**2**
Managed Late Successional Area (MLSA)	4	-	-
Not Designated (ND)	2	-	-
Other (Matrix, Riparian Reserve, Other)	57	21	4
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

G. infula has a wide distribution across 11 physiographic provinces in Washington (Eastern and Western Cascades and Olympic Peninsula), Oregon (Coast Range, Willamette Valley, Cascades West and East, and Klamath Mountain), and California (Coast, Klamath, and Cascades). Most sites are found along the Cascade Range, where the sites tend to be clustered or relatively close to one another in groups. Sites are also abundant in the Klamath Mountains and Coast Range in southern Oregon, where sites tend to be clustered. Scattered sites are found in other outlying areas, including in California and in the Olympic Peninsula in Washington. *G. infula* appears to be well distributed in the Cascade Range in Oregon and Washington based on the proximity of sites to one another, which provides opportunities for dispersal, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Seven of 109 sites are located on private, state, or other lands (at least partially); eight sites are on NPS lands (Mt. Rainier National Park, Olympic National Park, and Oregon Caves National Monument); and 100 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 12 sites in the Roseburg District, eight sites in the Klamath Falls Resources Area of the Lakeview District, and eight sites in the Coos Bay District. Sites managed by the National Forests that encompass the project area include 19 sites on the Umpqua National Forest, nine sites on the Winema National Forest, and three sites on the Rogue River National Forest. The remaining 41 sites on BLM and NFS lands are in the Salem District and on the Gifford-Pinchot, Klamath, Okanogan, Olympic, Shasta-Trinity, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 40 sites are located on reserve lands managed by BLM and the Forest Service, including 24 in LSRs, 11 in Congressionally Reserved areas, three in Marbled Murrelet Areas, and two in Known Owl Activity Centers. This represents 40 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The eight NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

G. infula is more commonly found in LSOG forests based on available data (73 of 109 total sites are in LSOG), but it is also found in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in all forest types below about 6,000 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *G. infula* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 10.4 million acres in reserve land allocations (54 percent of the forests; Table GYIN-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure GYIN-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although all forests below 6,000 feet msl are widespread across the NSO range, LSOG forests are less common and primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE GYIN-4

Extent of Forests that Could Provide Habitat for *Gyromitra infula* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	19,194,850	10,381,240	6,092,570	3,750,320
Local Area	611,850	199,720	185,170	80,260
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *G. infula* is found in nine 5th field watersheds that overlap the project area (see Table GYIN-5 and Figure GYIN-3). The sites are clustered or relatively close to one another in groups throughout the nine watersheds, with a few scattered sites in the center. Many regional sites are located within 10 miles to the northeast, along the Cascade Range (see Regional Distribution discussion above). The sites are most abundant in the eastern Cascade Range and the Coast Range. Throughout the local area, multiple avenues of connectivity appear to be available between sites based on the extent of forests that could provide suitable habitat, and opportunities for dispersal exist between the watersheds and to nearby regional areas.

All 30 sites in the local area are at least partially on BLM and NFS lands, with three sites partially on private land. Most of the local sites are on land designated as Other (Matrix); 13 sites are on reserve lands, representing 43 percent of the BLM- and Forest Service-managed sites. Five out of nine watersheds contain at least one site that is located on reserve lands (Table GYIN-5).

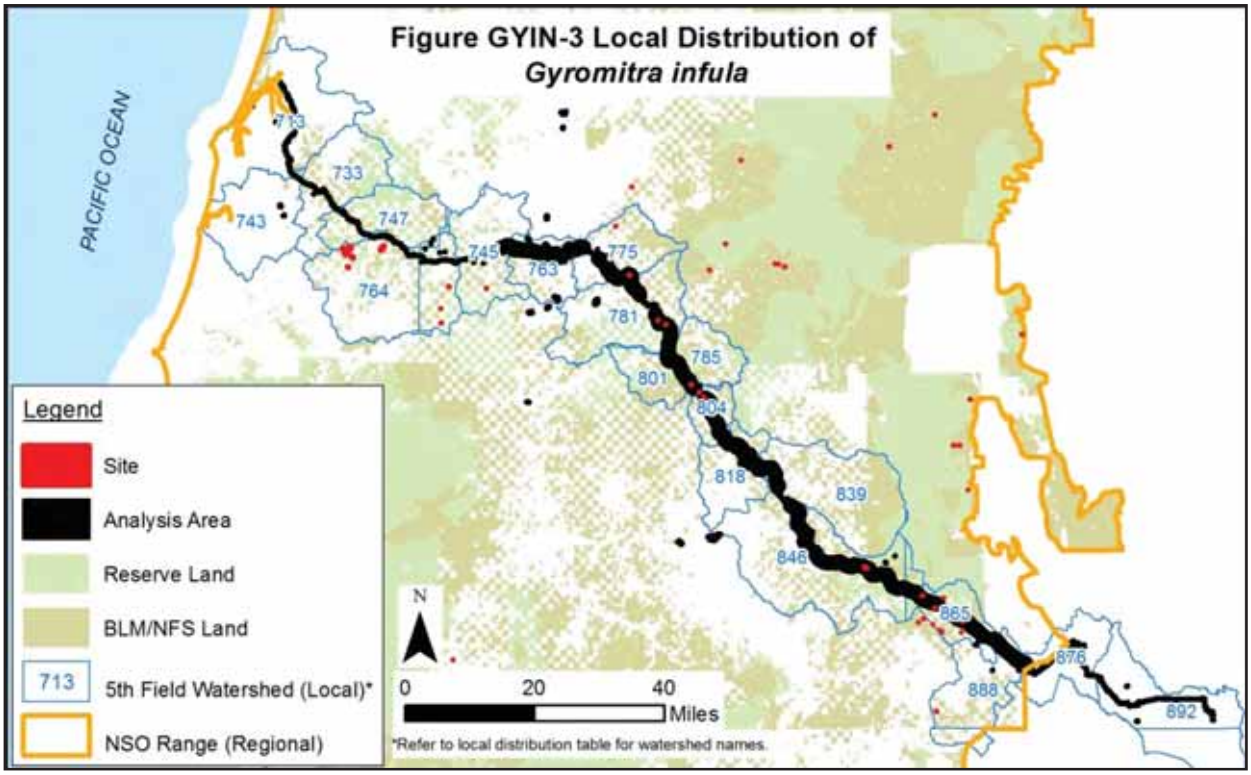
Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 611,850 acres on BLM and NFS lands in the local area, including 199,720 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 185,170 acres are LSOG, including 80,260 acres in reserve land allocations (43 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures GYIN-2 and GYIN-3).

TABLE GYIN-5

Distribution of *Gyromitra infula* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	1	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	3	3
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	10	5
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	3	2*
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	4	4*
Spencer Creek (865)	7	-
Trail Creek (804)	2	-
Upper Cow Creek (801)	1	-

Data Sources: Processed BLM and Forest Service GIS data, April 7, 2014; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*Two sites in reserves are in the Myrtle Creek and South Umpqua River watersheds.



Analysis/Project Area Distribution

The analysis and project areas contain 10 sites of *G. infula*. These sites are distributed across five 5th field watersheds in the Roseburg and Medford Districts and on the Umpqua and Rogue River National Forests. The sites are distributed across the central to eastern portion of the analysis area, with a group of sites that are relatively close to one another in the Klamath

Mountains and another clustered group of sites in the Cascade Range. Several sites are located within 10 miles of the eastern and western sites in the analysis area (see Local Distribution discussion above).

All 10 sites are at least partially on BLM and NFS lands, including four sites on BLM lands and six sites on NFS lands. Seven sites are at least partially in reserves, including four sites on NFS lands and three sites on BLM lands. Four sites are at least partially on lands designated as Other (Matrix).

Surveys for the PCGP Project resulted in 10 total observations of the species in 10 locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). These observations comprise the sites in the analysis area. The sites are located in two groups between MPs 85.9 and 113.1 and between MPs 157.7 and 158.4.

Project Impacts

Analysis

The PCGP Project would affect 10 sites out of the 100 sites on BLM- and Forest Service-managed lands in the region, representing approximately 10 percent of the sites (or 10 out of 109 total sites on all lands in the NSO range). Table GYIN-6 presents an overview of the features of the PCGP Project that would affect the *G. infula* sites. The construction corridor and associated work and storage areas would affect approximately 11.5 acres within 10 sites (about 38 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. infula* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 6.3 acres of vegetation and soil within nine sites and could result in the removal of *G. infula* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1.3 acres within six sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and disturbance to soil could negatively affect *G. infula* in adjacent areas by removing its habitat, disturbing soil or decaying material, and affecting its ability to survive, potentially affecting site persistence even if the entire sites are not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 3.9 acres of understory habitat in six sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Hydrostatic testing would take place on less than 0.1 acre of one site and is not likely to affect individuals or populations of the species because it would be done after the pipeline is installed and ground disturbance would have already affected the site.

TABLE GYIN-6

Impacts to *Gyromitra infula* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	9	6.3 ac
Temporary Extra Work Area (TEWA)	6	1.3 ac
Uncleared Storage Area (UCSA)	6	3.9 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	1	<0.1 ac

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *G. infula*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 10 sites as a result of the PCGP Project, 20 sites of *G. infula* would remain on BLM and NFS lands in the local area, including six in reserves, and 90 sites, including 33 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 33 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 37 percent of the remaining *G. infula* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *G. infula* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:

  - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
  - *G. infula* has a wide distribution across 11 physiographic provinces and three states in the region and a moderate-high number of overall sites (100 on BLM and NFS lands). The species appears to be well distributed in the Cascade Range in Oregon and Washington. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites documented since 2007, but is still moderate-high. Several sites were documented during PCGP Project surveys.
  - An estimated 40 percent of the sites (40 sites) are in reserves, which is about the same proportion of sites in reserves as in 2006 per Molina (2008).

- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 54 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain the forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *G. infula*.
- The PCGP Project would affect 10 of the 100 BLM- and Forest Service-managed sites of *G. infula*, representing approximately 10 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the sites, a moderate-high number of sites (90) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (20) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across three 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect seven sites in LSRs, which would reduce the percentage of sites in reserves to 37 percent. Of the remaining sites, 22 sites are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 11 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *G. infula* are unlikely.
- The PCGP Project would result in the permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *G. infula*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have

not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.23.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. infula* at 10 sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 90 sites would remain on BLM and NFS lands across the region, and 20 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *G. infula* at 10 sites, the sites are part of the many sites in southern Oregon where the species is relatively common. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *G. infula* would persist in the region without considering the 10 sites as part of the population.
- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *G. infula* sites in the analysis area, although some individuals within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 10 *G. infula* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *G. infula* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.24 GYROMITRA MELALEUCOIDES

Gyromitra melaleucoides is a false morel in the Discinaceae family and does not have a common name.

2.24.1 Regulatory Status and Ranking

The 2001 ROD identifies *G. melaleucoides* as a Category B (rare) species. The ORBIC did not evaluate *G. melaleucoides* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. In 2007, the species was considered to be not rare and apparently secure, but with cause for long-term concern globally (G4) and between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern in Oregon (S3S4) (USDA and USDI 2007). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.24.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

G. melaleucoides is a false morel and saprophyte, commonly found on soil that contains decaying material (Holthausen et al. 1994). It is most easily detected in the spring (Castellano et al. 2003). Little specific information is known about the reproductive biology of *Gyromitra* species. Other false morels are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997), and the same may be true of *G. melaleucoides.*

Range

G. melaleucoides is endemic to western North America, ranging from British Columbia south to California and east to Colorado (Castellano et al. 2003, Holthausen et al. 1994). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

G. melaleucoides is considered to be abundant, with many populations located throughout the Pacific Northwest. The species is most often located in the Cascade Range and is found scattered across the Coast Range in Oregon and Washington (Castellano et al. 2003). *G. melaleucoides* was not documented at any sites prior to 1994, and it was documented at 12 new

sites between 1994–2000 (USDA and USDI 2000). The species was found in eight locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 87 new sites of *G. melaleucoides* in the NSO range between 1998–2006, and 115 total sites were documented by 2006, including 44 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 108 sites on federal lands and 126 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *G. melaleucoides*, and resulted in 44 new observations of individuals or populations of *G. melaleucoides*. Based on the increased number of sites since 1998 with increased surveys (4-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. It should also be noted that this species was removed from post-2001 S&M lists because it was considered to be common. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

G. melaleucoides occurs on or adjacent to well-rotted wood in moist coniferous forests (Castellano et al. 2003). Based on data available in 1994, *G. melaleucoides* was commonly found on soil that contains decaying material and preferred older forests (Holthausen et al. 1994). In a study on *G. melaleucoides* in 1980, every specimen of *G. melaleucoides* was collected from coniferous forests (Pfister 1980). Based on available information, *G. melaleucoides* may prefer certain components of LSOG forests, but it may not be restricted to LSOG forests.

Threats

Typical threats to fungi species in coniferous forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). These general threats may apply to *G. melaleucoides*, but little information is known about more specific threats. *G. melaleucoides* is collected for food, which may be a threat at the local level (Holthausen et al. 1994).

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *G. melaleucoides* because it was removed from the S&M list after 2001.

2.24.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. melaleucoides* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table GYME-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 173 observations from BLM and Forest Service geodatabases were converted into 86 sites in the NSO range (region). Table GYME-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table GYME-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure GYME-1 displays the regional distribution of the species across BLM and NFS lands, and Figure GYME-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests on BLM and NFS lands.

TABLE GYME-1

Number of *Gyromitra melaleucoides* Sites (2013)

Location*	Number of Sites
Regional Area	86
Local Area	40
Analysis Area (Project Area)	1 (0)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE GYME-2

Distribution of *Gyromitra melaleucoides* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	41	37	-
Forest Service	33	2	1
NPS	8	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	18	13	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.



Figure GYME-1.
Regional Distribution of
Gyromitra melaleucoides

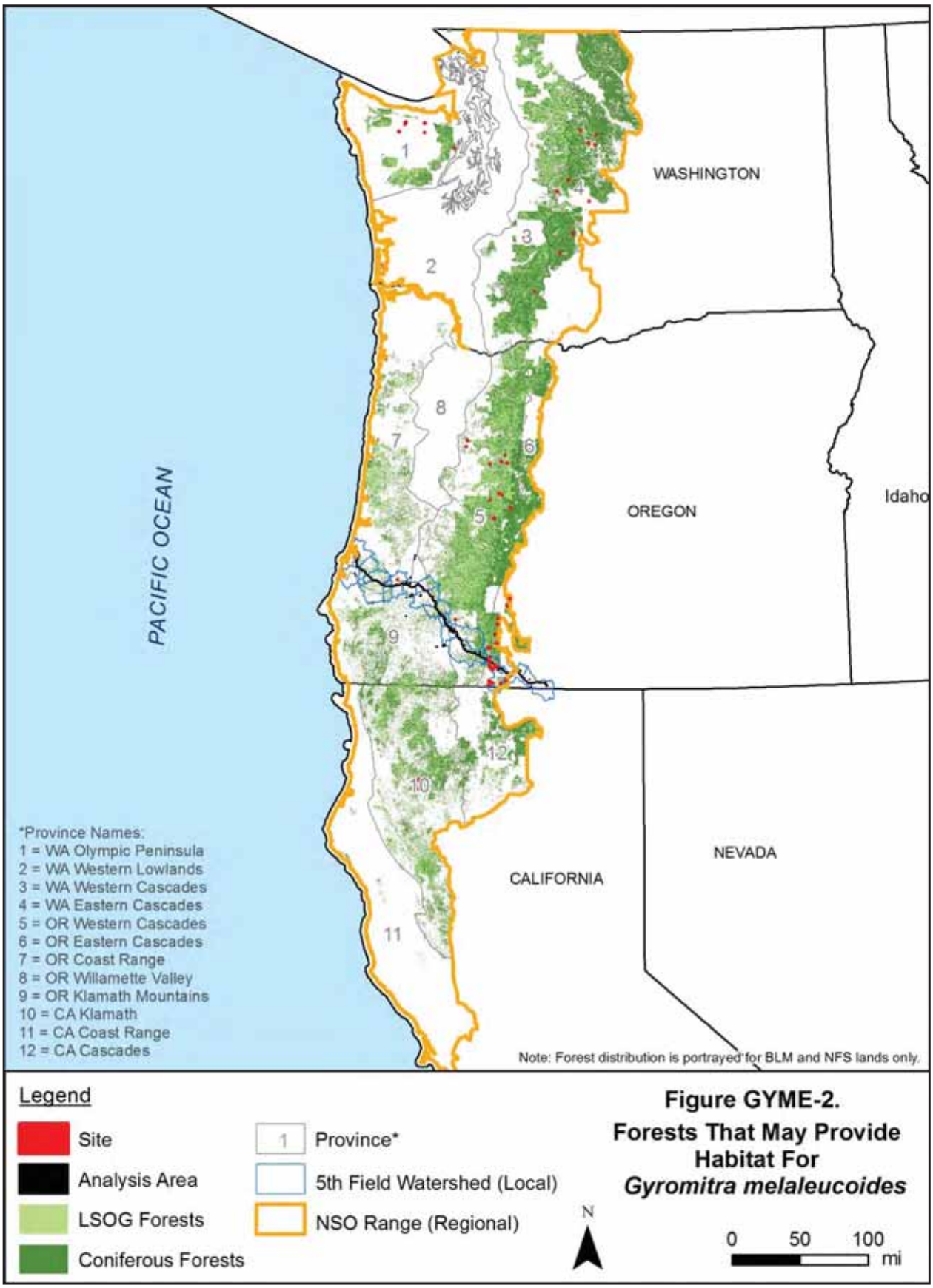


Figure GYME-2.
Forests That May Provide Habitat For *Gyromitra melaleucoides*

TABLE GYME-3

Distribution of *Gyromitra melaleucoides* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	2	-	-
Congressionally Reserved (CR)	**5**	**-**	**-**
Late Successional Reserve (LSR)	**14**	**1**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**7**	**7**	**-**
Managed Late Successional Area (MLSA)	1	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	45	33	1
Riparian Reserve**	**4**	**4**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

G. melaleucoides has a wide distribution across eight physiographic provinces in Washington (Olympic Peninsula and Eastern and Western Cascades), Oregon (Coast Range, Willamette Valley, and Cascades West and East), and California (Klamath). Most sites are found along the Cascade Range, where the sites tend to be clustered or relatively close to one another in three groups. A large cluster of sites is found in the eastern Cascade Range in southern Oregon, where the species appears to be locally abundant. Scattered sites are found in other areas outside the Cascade Range. *G. melaleucoides* appears to be well distributed in the Cascade Range in Oregon and Washington based on the proximity of sites to one another, which provides opportunities for dispersal, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Seventeen of 86 sites are located on private lands (at least partially), and 74 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Roseburg District and 39 sites in the Klamath Falls Resources Area of the Lakeview District. Sites managed by the National Forests that encompass the project area include 11 sites on the Winema National Forest. The remaining 23 sites on BLM and NFS lands are in the Salem District and on the Gifford-Pinchot, Olympic, Shasta-Trinity, Wenatchee, and Willamette National Forests.

Across the NSO range, 30 sites are located on reserve lands managed by BLM and the Forest Service, including 14 in LSRs, five in Congressionally Reserved areas, seven in Known Owl Activity Centers, and four in Riparian Reserves. This represents 41 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The eight NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

G. melaleucoides is more commonly found in LSOG forests based on available data (50 of 86 total sites are in LSOG), but it is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *G. melaleucoides* and support additional sites. These forests encompass an estimated 16.3 million acres on BLM and NFS lands in the region, including an estimated 11.1 million acres in reserve land allocations (68 percent of the forests; Table GYME-4). Of this acreage, an estimated 5 million acres are LSOG (see Figure GYME-2), including 3.15 million acres in reserve land allocations (63 percent of the forests). Although coniferous forests are widespread across the region, LSOG coniferous forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE GYME-4

Extent of Forests that Could Provide Habitat for *Gyromitra melaleucoides* on BLM and NFS Lands*

Location	Coniferous Forests		LSOG Coniferous Forests	
	Total	Reserves	Total	Reserves
Regional Area	16,284,850	11,109,210	5,029,190	3,149,050
Local Area	937,650	161,020	161,540	70,610
Project Area	960	430	270	140

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *G. melaleucoides* is found in three 5th field watersheds that overlap the project area (see Table GYME-5 and Figure GYME-3). The sites are clustered and relatively close to one another in the Cascade Range in the eastern portion of the local area, with one isolated site in the Coast Range in the western portion (see Regional Distribution discussion above). In the eastern portion of the local area, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests, and opportunities for dispersal exist between the watersheds and to nearby regional areas.

Thirty-nine of the 40 sites in the local area are at least partially on BLM and NFS lands, with 13 sites at least partially on private land. Most of the local sites are on land designated as Other (Matrix); 12 sites are on reserve lands, representing 31 percent of the BLM- and Forest Service-managed sites. All three watersheds contain at least one site that is located on reserve lands (Table GYME-5).

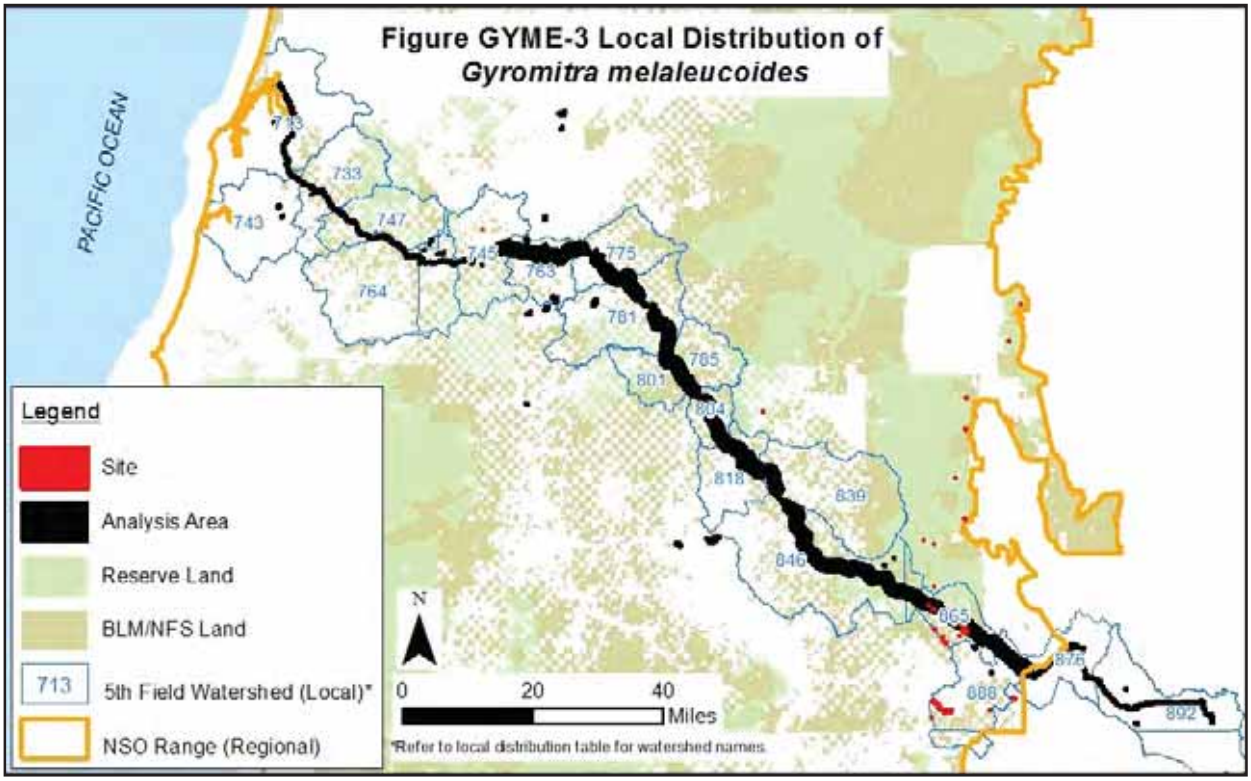
Coniferous forests encompass approximately 937,650 acres on BLM and NFS lands in the local area, with 161,020 acres in reserve land allocations (17 percent of the forests). Of this acreage, an estimated 161,540 acres are LSOG, including 70,610 acres in reserves (44 percent of the forests). Other sites may also exist in the local area, particularly in the Cascade Range, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures GYME-2 and GYME-3).

TABLE GYME-5

Distribution of *Gyromitra melaleucoides* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	21	7
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	18	4
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis area contains one site of *G. melaleucoides*, and no sites are located in the project area. The site is on Forest Service-managed lands (Winema National Forest) and is on land designated as Other (Matrix) in the Spencer Creek watershed. This site is part of a group of sites in the eastern Cascade Range where the species appears to be locally abundant, and several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 83 total observations of the species in 44 locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). All observations of the species from the PCGP Project surveys are in sites outside the analysis area. The recorded observation of the species in the analysis area is from agency databases and was recorded in 2000. The site is located at MP 170.7.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 74 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 86 total sites on all lands in the NSO range). The PCGP Project would not result in any direct effects on *G. melaleucoides* sites, but one site could be indirectly affected by activities related to the construction corridor and associated work areas. Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. melaleucoides* near the project area.

The *G. melaleucoides* site in the analysis area could be indirectly affected by activities within the corridor and TEWAs, but direct effects on the site are not anticipated. The establishment of the corridor could modify microclimate conditions near the site after the corridor is established. The removal of forests could negatively affect *G. melaleucoides* in nearby areas by removing its habitat, reducing humidity levels by opening the canopy, and reducing opportunities for dispersal, potentially affecting site persistence even though the site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

Across the project area, the PCGP Project would remove an estimated 750 acres of coniferous forests, including 200 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *G. melaleucoides*. Within this impact area, about 540 acres (about 72 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 170 acres of coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, 38 sites of *G. melaleucoides* would remain on BLM and NFS lands in the local area, including 12 in reserves, and 73 sites, including 30 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 30 sites in reserves

are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 41 percent of the remaining *G. melaleucoides* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *G. melaleucoides* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *G. melaleucoides* has a wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (74 on BLM and NFS lands). The species appears to be well distributed in the Cascade Range in Oregon and Washington. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites documented since 2007, but is still moderate-high. Many sites were documented during PCGP Project surveys.
    - An estimated 35 percent of the sites (30 sites) are in reserves, which is actually a decrease in the number of sites reported in reserves in 2006 per Molina (2008).
- Coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 16.3 million acres on BLM and NFS lands with an estimated 68 percent in reserves. The forests are primarily found in the Cascade Range, where most sites are documented. The Coast Range, Klamath Mountains, and other areas also contain coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *G. melaleucoides*.
- The PCGP Project would affect one of the 74 BLM- and Forest Service-managed sites of *G. melaleucoides*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (73) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (38 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across three 5th field watersheds. The distribution of

sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 21 sites are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and five are at least partially in Congressionally Reserved areas where management activities that may adversely affect *G. melaleucoides* are unlikely. Four other sites are at least partially in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 170 acres of coniferous forests (less than 1 percent of the total regional acreage). An estimated 11.1 million acres (68 percent) of coniferous forests and 3.2 million acres (63 percent) of LSOG coniferous forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *G. melaleucoides*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.24.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. melaleucoides* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 73 sites would remain on BLM and NFS lands across the region, and 38 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *G. melaleucoides* at one site, the site is part of the many sites in southern Oregon where the species is locally abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *G. melaleucoides* would persist in the region without considering the single site as part of the population.
- The PCGP Project would remove approximately 750 acres of coniferous forests and 200 acres of LSOG coniferous forests (a negligible amount of the forests). An estimated 72 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 11.1 million acres (68 percent) of coniferous forests and 3.2 million acres (63 percent) of LSOG coniferous forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *G. melaleucoides* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *G. melaleucoides* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *G. melaleucoides* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.25 GYROMITRA MONTANA

Gyromitra montana is a saprophyte in the Discinaceae family and is commonly known as snow mushroom.

2.25.1 Regulatory Status and Ranking

The 2001 ROD identifies *G. montana* as a Category F (uncommon) species. The ORBIC did not evaluate *G. montana* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.25.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

G. montana is a false morel and saprophyte, commonly found on soil that contains decaying material (Holthausen et al. 1994). It is most easily detected in the spring (Castellano et al. 2003). Little specific information about the reproductive biology of *Gyromitra* species is known. Other false morels are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997), and the same may be true of *G. montana.*

Range

G. montana is endemic to the Pacific Northwest (Castellano et al. 2003). A collection was recorded from British Columbia in 1991, which extended the species' known range beyond California, Oregon, and Washington (University of Washington Herbarium 2013). The currently

known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across the Pacific Northwest. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

G. montana is considered to be abundant, with many populations located throughout the Pacific Northwest, particularly in the Cascade Range in Oregon (Castellano et al. 2003). The species was not documented at any sites prior to 1994 and was documented at 24–65 sites between 1994–2000 (USDA and USDI 2000). *G. montana* was found in one location during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 1,285 new sites of *G. montana* in the NSO range between 1998–2006, and 1,303 total sites were documented by 2006, including 162 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 1,108 sites on federal lands and 1,334 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category F species were recorded during these surveys and resulted in 21 new observations of individuals or populations of *G. montana*. Based on the increased number of sites since 1998 with increased surveys (more than a 72-fold increase between 1998–2006 per Molina 2008 records) and considering the species is fairly conspicuous, more survey effort would be expected to locate additional populations within the NSO range, particularly in the Cascade Range where most observations have been reported. It should also be noted that this species was removed from post-2001 S&M lists because it was considered to be common. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

G. montana occurs under conifer trees near melting snow or soon after the snow melts (Arora 1986). It grows as solitary, scattered, or gregarious sporocarps in soil or hummus (Castellano et al. 2003). It is occasionally found near well-rotted wood and is usually found at higher elevations (The Fungi of California 2010). Based on data available in 1994, *G. montana* was commonly found on soil that contains decaying material and preferred older forests (Holthausen et al. 1994). Based on available information, *G. montana* may prefer certain components of LSOG forests, but it may not be as restricted to LSOG forests.

Threats

Typical threats to fungi species in coniferous forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). These general threats may apply to *G. montana*, but little

information is known about more specific threats. *G. montana* is collected for food, which may be a threat at the local level (Holthausen et al. 1994, The Fungi of California 2010).

Management Recommendations

As a Category F S&M species, the direction from the 2001 ROD is that management of known sites is not necessary, but a determination needs to be made regarding which S&M category, if any, the species should be assigned to (USDA and USDI 2001). No management recommendations have been developed for *G. montana* because it was removed from the S&M list after 2001.

2.25.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. montana* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table GYMO-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 2,078 observations from BLM and Forest Service geodatabases were converted into 636 sites in the NSO range (region). Table GYMO-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table GYMO-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure GYMO-1 displays the regional distribution of the species across BLM and NFS lands, and Figure GYMO-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests above 2,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE GYMO-1

Number of *Gyromitra montana* Sites (2013)

Location*	Number of Sites
Regional Area	636
Local Area	241
Analysis Area (Project Area)	12 (10)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE GYMO-2

Distribution of *Gyromitra montana* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	240	198	2
Forest Service	398	50	9
NPS	7	-	-
Fish and Wildlife Service	1	-	-
Other (Private, State, etc.)	80	65	4

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE GYMO-3

Distribution of *Gyromitra montana* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	-	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	22	-	-
Congressionally Reserved (CR)	**12**	**-**	**-**
Late Successional Reserve (LSR)	**122**	**4**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**5**	**3**	**-**
Managed Late Successional Area (MLSA)	2	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	496	233	11
Riparian Reserve**	**7**	**7**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

G. montana is somewhat widely distributed across five physiographic provinces in Washington (Eastern and Western Cascades), Oregon (Cascades West and East) and California (Cascades). The majority of the sites are located in the Cascade Range in southern Oregon, where the sites are clustered in groups. Many sites are also located in the eastern Cascade Range in Washington, where they are clustered or relatively close to one another in groups. The remainder of the sites are scattered in the Cascade Range through the rest of Oregon, and a single, isolated site is located in California. *G. montana* is not located outside the Cascade Range based on current site locations. *G. montana* appears to be well distributed in the Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Seventy-seven of 636 sites are located on private lands (at least partially), and 629 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 47 sites in the Medford District and 193 sites in the Klamath Falls Resources Area of the Lakeview District. Sites managed by the National Forests that encompass the project area include seven sites on the Umpqua National Forest and 346 on the Winema National Forest. The remaining 45 sites on NFS lands are on the Gifford Pinchot, Okanogan, Shasta-Trinity, Wenatchee, and Willamette National Forests.



Figure GYMO-1.
Regional Distribution of *Gyromitra montana*

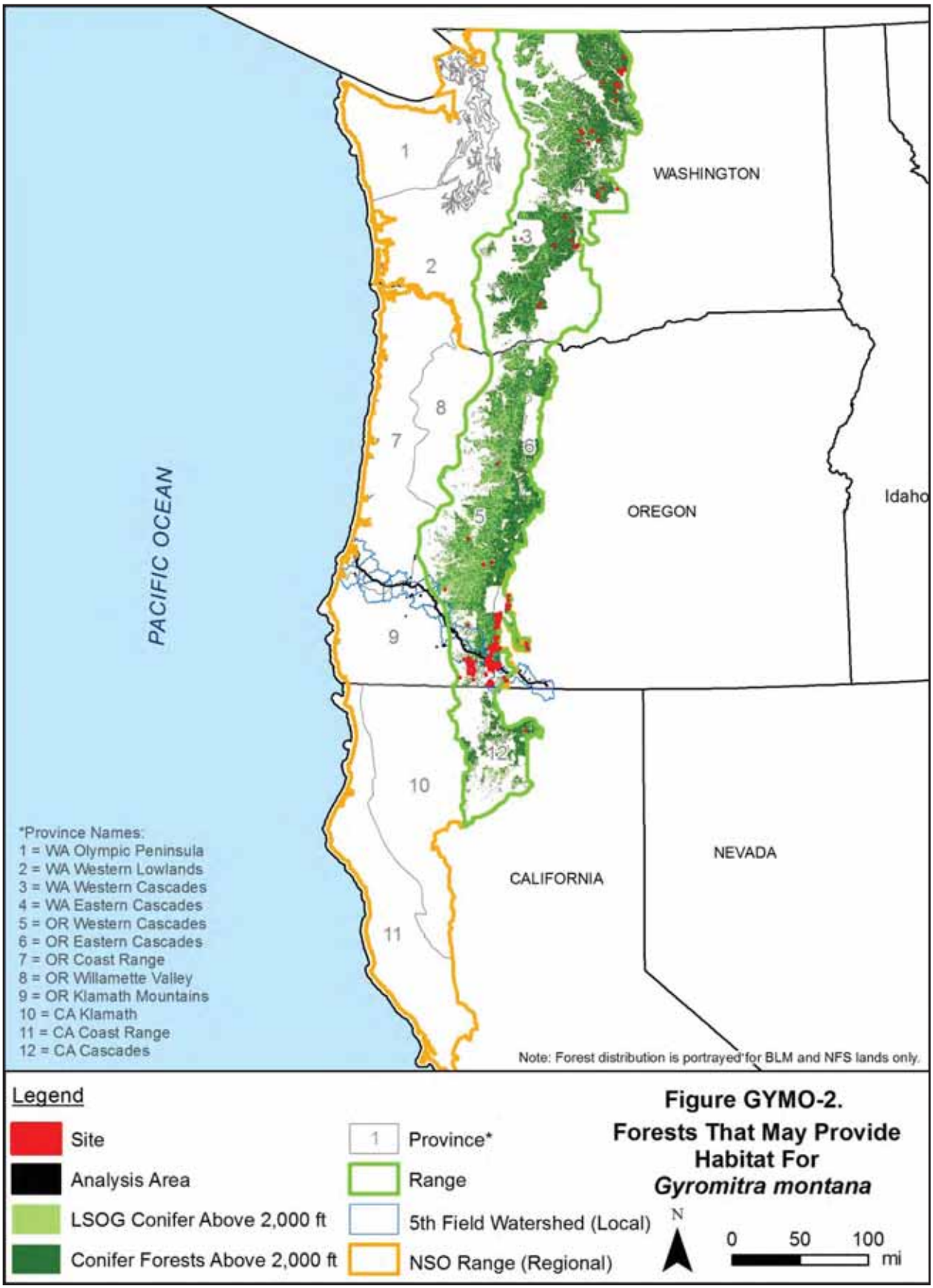


Figure GYMO-2.
Forests That May Provide Habitat For *Gyromitra montana*

Across the NSO range, 144 sites are located on reserve lands managed by BLM and the Forest Service, including 122 at least partially in LSRs, 12 at least partially in Congressionally Reserved areas, five in Known Owl Activity Centers, and seven in Riparian Reserves. This represents 23 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The seven NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

G. montana is not necessarily more commonly found in LSOG forests based on available data (312 of 636 total sites are in LSOG), and it is relatively common in non-LSOG forests. Based on current site locations, the species has been found in coniferous forests above about 2,500 feet msl and has only been documented in the eastern part of the NSO range. Coniferous forests above 2,000 feet msl, including the LSOG component of these forests, in the Cascade Range could provide habitat for *G. montana* and support additional sites. These forests encompass an estimated 10.7 million acres on BLM and NFS lands in the species' range, including an estimated 6 million acres in reserve land allocations (56 percent of the forests; Table GYMO-4). Of this acreage, an estimated 2.9 million acres are LSOG (see Figure GYMO-2), including 1.7 million acres in reserve land allocations (59 percent of the forests). Although coniferous forests are widespread across the species' range, LSOG coniferous forests above 2,000 feet are less common.

TABLE GYMO-4

Extent of Forests that Could Provide Habitat for *Gyromitra montana* on BLM and NFS Lands*

Location	Coniferous Forests above 2,000 feet		LSOG Coniferous Forests above 2,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	10,714,700	6,012,470	2,876,360	1,684,860
Local Area	241,500	75,940	72,450	27,140
Project Area	450	250	120	80

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *G. montana* is found in three 5th field watersheds that overlap the project area (see Table GYMO-5 and Figure GYMO-3). The sites are clustered and near one another in the Cascade Range in the eastern portion of the local area and are part of the large group of sites located in southern Oregon (see Regional Distribution discussion above). Within the Cascade Range, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 10 miles to the north in the Cascade Range.

Of the 241 sites in the local area, 239 sites are at least partially on BLM or NFS lands, including 198 sites on BLM lands (Medford and Lakeview Districts) and 50 sites on NFS lands (Winema National Forest). Sixty-five of 241 sites are at least partially located on private, state, or other lands. Most of the local sites are on land designated as Other (Matrix). Of the 239 sites on BLM

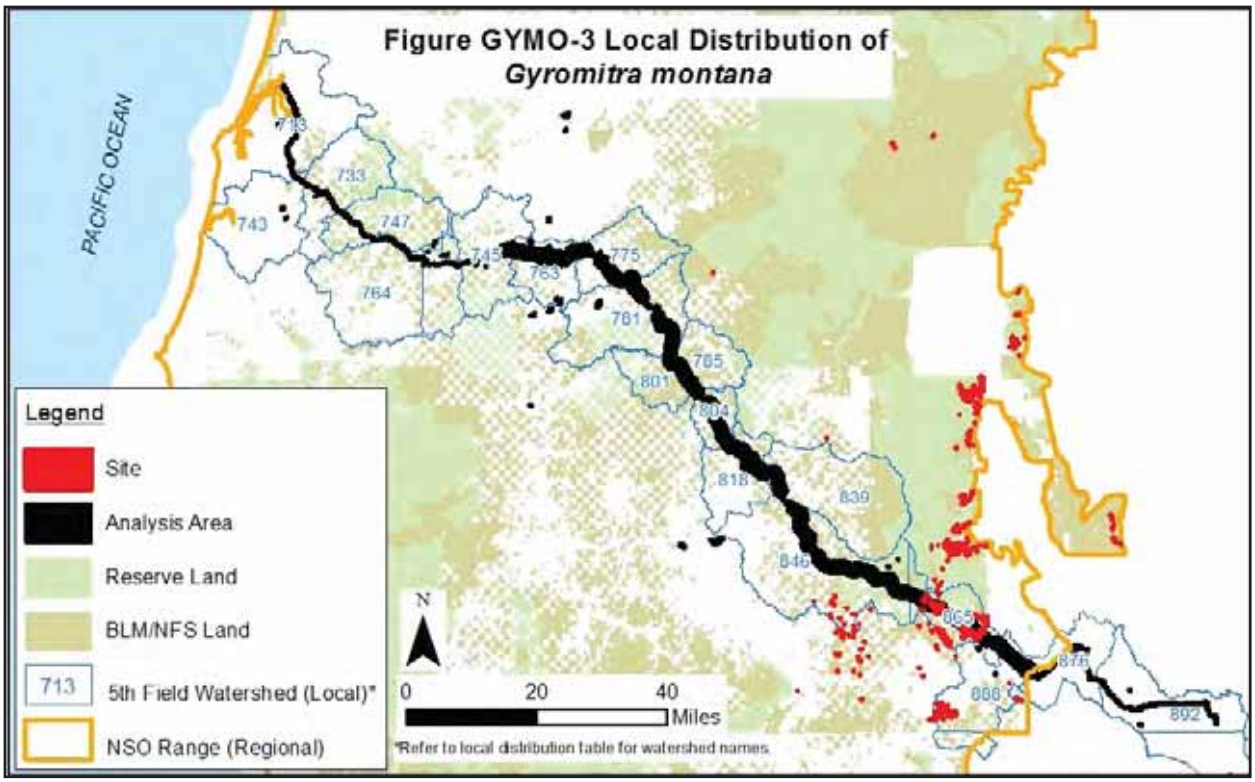
and NFS lands, 14 sites are on reserve lands, including four sites in LSRs, three sites in Known Owl Activity Centers, and seven sites in Riparian Reserves. The number of sites in reserves represents 6 percent of the BLM- and Forest Service-managed sites in the local area. Sites on reserve lands are in the Klamath River-John C Boyle Reservoir and Spencer Creek watersheds (Table GYMO-5).

TABLE GYMO-5

Distribution of *Gyromitra montana* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	96	3
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	31	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	114	11
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous forests above 2,000 feet msl encompass approximately 241,500 acres on BLM and NFS lands in the local area, with 75,940 acres in reserve land allocations (31 percent of the forests). Of this acreage, an estimated 72,450 acres are LSOG, including 27,140 acres in reserves (37 percent of the forests). Other sites may also exist in the local area, particularly in the Cascade Range, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures GYMO-2 and GYMO-3).

Analysis/Project Area Distribution

The analysis area contains 12 sites of *G. montana*, and the project area contains 10 sites. Eleven of the sites are on BLM and NFS lands, including two on BLM-managed lands in the Klamath Falls Resource Area of the Lakeview District and nine on NFS lands on the Winema National Forest. Four sites are at least partially on private lands, including one site in the project area that is entirely on private land. The BLM- and Forest Service- managed sites are on land designated as Other (Matrix) in the Spencer Creek watershed. These sites are a part of a group of sites in the Cascade Range, and several sites are located within the immediate vicinity of the sites (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 44 total observations of the species in 21 locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). All observations of the species from the PCGP Project surveys are outside the analysis area. Recorded observations of the species in the project area are from agency databases from 1998 to 2000. Within the project area, 10 sites are located between MPs 168.7 and 179.2.

Project Impacts

Analysis

The PCGP Project would affect 11 sites out of the 629 sites on BLM- and Forest Service-managed lands in the region, representing approximately 2 percent of the sites (or 12 out of 636 total sites on all lands in the NSO range; one site in the analysis area is entirely on private land). Table GYMO-6 presents an overview of the features of the PCGP Project that would affect the *G. montana* sites. The construction corridor and associated work and storage areas would affect approximately 15.6 acres within nine sites (about 11 percent of all sites in the analysis area). The corridor would also pass through one site on private land, but this analysis focuses on the potential effects on BLM and NFS lands. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. montana* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 13.0 acres of vegetation and soil within nine sites and could result in the removal of *G. montana* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1.5 acres within seven sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and disturbance to soil could negatively affect *G. montana* in adjacent areas by removing its habitat, disturbing soil or decaying material, and affecting its ability to survive, potentially affecting site

persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 1.1 acres of understory habitat in five sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Two additional sites in the analysis area are near the corridor and would not be directly affected by project activities; however, indirect effects discussed above for the construction corridor would apply to these sites and could affect site persistence.

TABLE GYMO-6

Impacts to *Gyromitra montana* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	9	13.0 ac
Temporary Extra Work Area (TEWA)	7	1.5 ac
Uncleared Storage Area (UCSA)	5	1.1 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 360 acres of coniferous forests above 2,000 feet msl, including 90 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *G. montana*. Within this impact area, about 250 acres (about 69 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 90 acres of coniferous forests above 2,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests above 2,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the 11 sites as a result of the PCGP Project, 228 sites of *G. montana* would remain on BLM and NFS lands in the local area, including 14 in reserves, and 618 sites, including 144 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 144 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 23 percent of the remaining *G. montana* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states

"instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *G. montana* is a Category F (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, information on Category F species is insufficient to determine what level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *G. montana* has a somewhat wide distribution across five physiographic provinces and three states in the region and a moderate-high number of overall sites (629 on BLM and NFS lands). The species appears to be well distributed in the Cascade Range in Oregon and Washington. The currently known number of sites on BLM and NFS lands is actually a decrease of sites documented since 2007, but is still moderate-high. Many sites were documented during PCGP Project surveys.
    - An estimated 23 percent of the sites (144 sites) are in reserves, which is an increase in the proportion of sites in reserves since 2006 per Molina (2008).
- Coniferous forests above 2,000 feet msl (general habitat for the species) are widespread across the species' range and encompass approximately 10.7 million acres on BLM and NFS lands with an estimated 56 percent in reserves. A subcomponent of these forests likely provides habitat for *G. montana*.
- The PCGP Project would affect 11 of 629 BLM- and Forest Service-managed sites of *G. montana*, representing approximately 2 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the 11 sites, a moderate-high number of sites (618) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (228 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across three 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the proportion of sites in reserves would remain the same. Of the remaining sites, 127 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 12 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *G. montana* are unlikely. Seven other sites are in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.

- The PCGP Project would result in a permanent loss of an estimated 90 acres of coniferous forests above 2,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 6 million acres (56 percent) of coniferous forests and 1.7 million acres (59 percent) of LSOG forests above 2,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *G. montana*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category F species for which pre-disturbance surveys are not applicable in part of the NSO range and have not been extensively conducted across the NSO range; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.25.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. montana* at 11 sites on BLM and NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 618 sites would remain on BLM and NFS lands across the region, and 228 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *G. montana* at 11 sites, these sites are part of the many sites in Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *G. montana* would persist in the region without considering the 11 sites as part of the population.
- The PCGP Project would remove approximately 360 acres of coniferous forests and 90 acres of LSOG coniferous forests above 2,000 feet msl (a negligible amount of the forests). An estimated 69 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 6 million acres (56 percent) of coniferous forests and 1.7 million acres (59 percent) of LSOG coniferous forests above 2,000 feet would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *G. montana* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 11 *G. montana* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to

affected sites would waive implementation of Management Recommendations for *G. montana* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.26 HELVELLA MACULATA

Helvella maculata is a cup fungus in the Helvellaceae family and is commonly known as elfin saddle.

2.26.1 Regulatory Status and Ranking

The 2001 ROD identifies *H. maculata* as a Category B (rare) species. The ORBIC did not evaluate *H. maculata* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.26.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

H. maculata is a cup fungus that produces scattered to gregarious sporpcarps and is most easily detected from fall through spring (Castellano et al. 1999). It is also considered to be a false morel (Castellano and O'Dell 1997). Little specific information is known about the reproductive biology of *H. maculata*. False morels, including *H. maculata*, are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997). The species is either a saprophyte on decaying material or a mycorrhizal species that forms associations with plant roots. Other *Helvella* species are considered to be mycorrhizal, and the same may be true of *H. maculata* (Cushman and Huff 2007).

Range

H. maculata is endemic to western North America and has been documented from Alaska south to New Mexico (Castellano and O'Dell 1997, University of Washington Herbarium 2013). In the Pacific Northwest, it is primarily found along the Coast Range. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

In the Pacific Northwest, *H. maculata* has been found most often in the Coast Range in California and Oregon (Castellano et al. 1999). The species was documented at 14 sites by 1994 and at only three new sites between 1994–2000 (USDA and USDI 2000). *H. maculata* was found in one location during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 76 new sites of *H. maculata* in the NSO range between 1998–2006, and 122 total sites were documented by 2006, including 16 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 88 sites on federal lands and 115 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *H. maculata*, and resulted in one new observation of a population of *H. maculata*. Based on the increased number of sites since 1998 with increased surveys (more than 2-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. It should also be noted that this species was removed from post-2001 S&M lists because it was considered to be common. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

H. maculata occurs as scattered to gregarious sporocarps on the soil surface in coniferous or mixed hardwood-coniferous forests (Castellano et al. 1999, Holthausen et al. 1994). It usually occurs at low to mid-elevation ranges (Castellano et al. 1999). Based on data available in 1994, *H. maculata* was primarily found in open sites along paths or streams (Holthausen et al. 1994). The species may not be dependent on old-growth forest conditions, as it is commonly found in suburban habitats and variable-aged conifer stands (Castellano and O'Dell 1997).

Threats

Typical threats to fungi species in coniferous and other forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). Little information is known about specific threats to *H. maculata*. *H. maculata* occurs in gardens in suburban settings (Castellano and O'Dell 1997), so this species may be somewhat resilient to disturbance.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *H. maculata* because it was removed from the S&M list after 2001.

2.26.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *H. maculata* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table HEMA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 241 observations from BLM and Forest Service geodatabases were converted into 110 sites in the NSO range (region). Table HEMA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table HEMA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure HEMA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure HEMA-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE HEMA-1

Number of *Helvella maculata* Sites (2013)

Location*	Number of Sites
Regional Area	110
Local Area	31
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE HEMA-2

Distribution of *Helvella maculata* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	82	30	-
Forest Service	15	1	1
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	24	3	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE HEMA-3

Distribution of *Helvella maculata* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	15	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	-	-	-
Congressionally Reserved (CR)	**3**	**-**	**-**
Late Successional Reserve (LSR)	**23**	**3**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	59	28	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

H. maculata is widely distributed across eight physiographic provinces in Washington (Olympic Peninsula, Western Cascades), Oregon (Coast Range, Willamette Valley, Cascades West, and Klamath Mountain), and California (Coast and Klamath). The sites are clustered or relatively close to one another in Oregon and in the Coast Range in California. *H. maculata* is less abundant in Washington, with a single site located in the Olympic Peninsula and another single site located in the western Cascade Range. The species appears to be well distributed in its range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Twenty-four of 110 sites are located on private, state, or other lands (at least partially); one site is on NPS lands (Olympic National Park); and 97 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Coos Bay District, seven sites in the Roseburg District, and 33 sites in the Medford District. Sites managed by the National Forests that encompass the project area include eight sites on the Umpqua National Forest. The remaining 61 sites on BLM and NFS lands are in the Salem, Eugene, and Arcata Districts and on the Gifford-Pinchot and Willamette National Forests.

Across the NSO range, 27 sites are located on reserve lands managed by BLM and the Forest Service, including 23 in LSRs, three in Congressionally Reserved areas, and two in Known Owl Activity Centers (at least partially). This represents 28 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.



Figure HEMA-1.
Regional Distribution of *Helvella maculata*



Figure HEMA-2.
Forests That May Provide Habitat For *Helvella maculata*

H. maculata is more commonly found in LSOG forests based on available data (88 of 110 total sites are in LSOG), but it is also found in non-LSOG forests, including suburban areas and young forests. It may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 5,000 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *H. maculata* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the NSO range, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table HEMA-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure HEMA-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE HEMA-4

Extent of Forests that Could Provide Habitat for *Helvella maculata* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *H. maculata* is found in seven 5th field watersheds that overlap the project area (see Table HEMA-5 and Figure HEMA-3). The sites are clustered and near one another in the western Cascade Range and scattered in the Klamath Mountains and Coast Range (see Regional Distribution discussion above). Within the Little Butte Creek and Big Butte Creek watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests and opportunities for dispersal exist within the local area and to nearby regional areas. Several regional sites are located to the north in the Cascade Range and to the south and west in the Klamath Mountains, relatively close to the western-most sites in the local area.

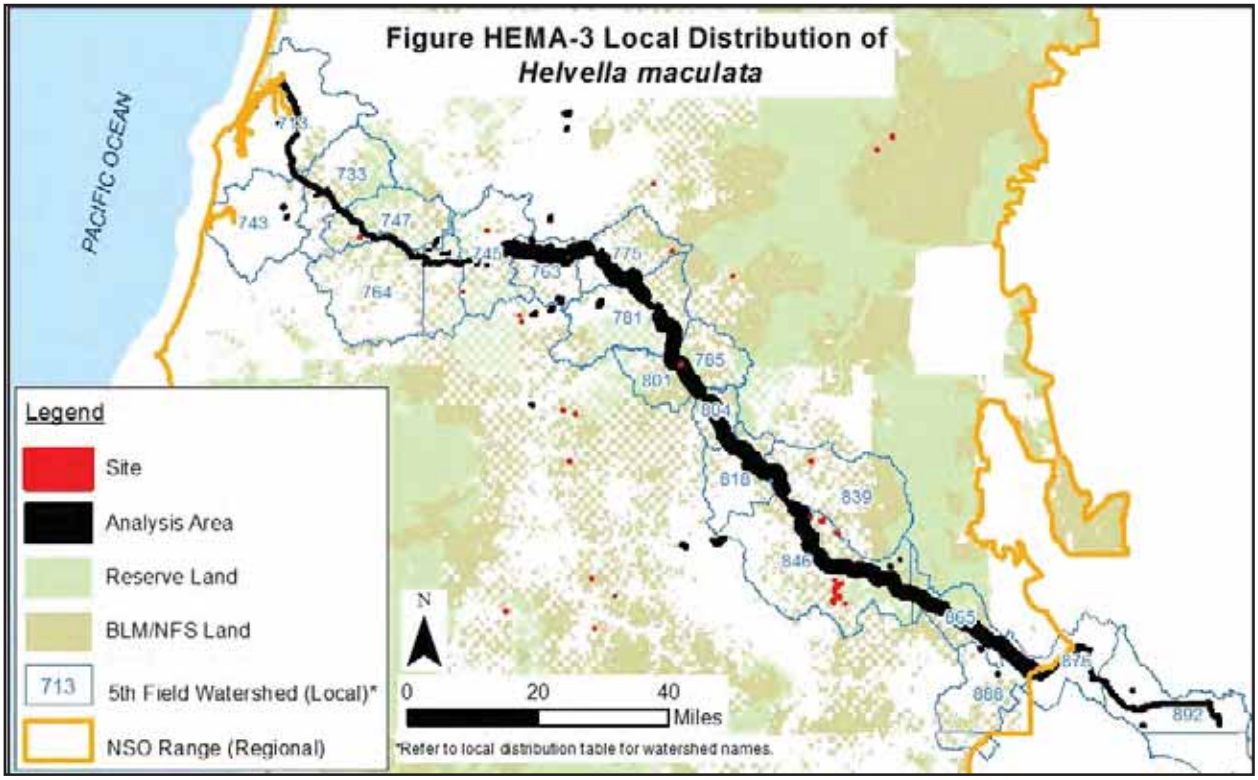
All of the 31 sites in the local area are on BLM or NFS lands, including 30 sites at least partially on BLM land (Roseburg and Medford Districts) and one site on NFS land (Umpqua National Forest). Three sites are partially located on private, state, or other lands. Most of the local sites are on land designated as Other (Matrix). Four sites are on reserve lands, including three sites in LSRs and one site in a Known Owl Activity Center. The sites located on reserve lands represent 13 percent of the BLM- and Forest Service-managed sites in the local area. Sites in reserved lands are in the Elk Creek-South Umpqua, Little Butte Creek, Olalla Creek-Lookingglass Creek, and Upper Cow Creek watersheds (Table HEMA-5).

TABLE HEMA-5

Distribution of *Helvella maculata*in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	2	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	1	-
Elk Creek-South Umpqua (785)	1*	1
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	23	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	2	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	2	2
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	1*	1

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
*Note: Site counts are not additive because one site occurs in the Elk Creek-South Umpqua and Upper Cow Creek watersheds.



Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number and distribution of sites in the local and nearby regional areas and the extent of forests that may provide suitable habitat (see Figures HEMA-2 and HEMA-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *H. maculata*. This site is on Forest Service-managed lands (Umpqua National Forest). It is on land designated as LSR and is partially located in the Elk Creek-South Umpqua watershed and partially in the Upper Cow Creek watershed. This site is somewhat isolated from other sites in nearby areas of the Klamath Mountains and western Cascade Range; however, several sites are located within 20 miles around the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in one observation of the species in the project area during 2010 (Siskiyou BioSurvey LLC 2012a). This observation is located at MP 105 and comprises the single site in the project area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 97 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 110 total sites on all lands in the NSO range). Table HEMA-6 presents an overview of the features of the PCGP Project that would affect the *H. maculata* site. The construction corridor would affect approximately 0.7 acre within the site (about 25 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *H. maculata* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.7 acre of vegetation and soil within the site and could result in the removal of *H. maculata* populations or individuals. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and woody debris and disturbance to soil could negatively affect *H. maculata* in adjacent areas by removing its habitat, disturbing soil or understory components around trees or roots of trees, and affecting its potential association with the trees or woody debris, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE HEMA-6

Impacts to *Helvella maculata* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.7 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *H. maculata*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, 30 sites of *H. maculata* would remain on BLM land in the local area, including three in reserves, and 96 sites, including 26 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 26 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 27 percent of the remaining *H. maculata* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *H. maculata* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *H. maculata* has a wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (97 on BLM and NFS lands). The species appears to be well distributed in its range in Oregon. The currently known number of sites on BLM and NFS lands is an increase of nine sites on BLM and NFS lands since 2007, with one site documented during the PCGP Project surveys.

  - An estimated 25 percent of the sites (27 sites) are in reserves, which is an increase of about 11 sites in reserves since 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widespread across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and sites are fairly common in the mountain range. A subcomponent of these forests likely provides habitat for *H. maculata*.
- The PCGP Project would affect one of 97 BLM- and Forest Service-managed sites of *H. maculata*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (96) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (30 sites) would remain in the local vicinity of the analysis area; these sites would be distributed across five 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in an LSR, but the percentage of sites in reserves would be about the same (27 percent). Of the remaining sites, 24 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are at least partially in Congressionally Reserved areas where management activities that may adversely affect *H. maculata* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of coniferous and mixed hardwood-coniferous forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *H. maculata*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.26.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *H. maculata* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 96 sites would remain on BLM and NFS lands across the region, and 30 sites would remain on BLM land in the local area. Although the PCGP Project would affect site persistence of *H. maculata* at one site, the site is located in the Klamath Mountains in southern Oregon where the species is well distributed. The

species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *H. maculata* would persist in the region without considering the single site as part of the population.

- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55 percent) of coniferous and mixed hardwood-coniferous forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *H. maculata* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the single *H. maculata* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *H. maculata* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.27 HYDNUM UMBILICATUM

Hydnum umbilicatum is a tooth fungus in the Hydnaceae family. It is commonly known as hedgehog or sweet tooth.

2.27.1 Regulatory Status and Ranking

The 2001 ROD identifies *H. umbilicatum* as a Category B (rare) species. The ORBIC did not evaluate *H. umbilicatum* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. The species is not currently on the ORBIC Lists. *H. umbilicatum* is not a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.27.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are

presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

H. umbilicatum is a saprophyte that is present throughout the year and is most easily detected in October through April (Castellano et al. 2003). In California, fruiting occurs from mid-winter to early spring (The Fungi of California 2010). Little specific information is known about the reproductive biology of *H. umbilicatum*, but as with other tooth fungi, the species is presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997).

Range

H. umbilicatum is found in North America and Europe and may be known from Asia and Australia (Grebenc et al. 2009). In Europe the species is only confirmed from Finland (Grebenc et al. 2009). In the Pacific Northwest, it has a wide distribution throughout Washington, Oregon, and California (Castellano et al. 2003). The currently known range of the species within the NSO range based on 2014 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across North America and Europe and possibly Asia and Australia. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

H. umbilicatum is known from many dozen locations within the NSO range (Castellano et al. 2003). *H. umbilicatum* was documented at 17 sites by 1994 and at 41 new sites between 1994–2000 (USDA and USDI 2000). The species was found in 32 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 144 new sites of *H. umbilicatum* in the NSO range between 1998–2006, and 191 total sites were documented by 2006, including 87 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 153 sites on federal lands and 187 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2011 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species and resulted in six new observations of populations of *H. umbilicatum*. Based on the increased number of sites since 1998 with increased surveys (4-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2014 data are presented below under the Species Distribution discussion.

Habitat

H. umbilicatum occurs as solitary or gregarious sporocarps on the ground in duff of coniferous, mixed hardwood-coniferous, and hardwood forests (Castellano et al. 2003, The Fungi of California 2010). In California, it is often found under tanoak and Pacific madrone, sometimes with Douglas-fir present (The Fungi of California 2010). *H. umbilicatum* typically occurs in late-successional conifer and mixed coastal hardwoods stands. The species has been found in older late-successional forests and younger second growth forests (Holthausen et al. 1994). *H. umbilicatum* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *H. umbilicatum* are presumably similar to threats to other saprophytic fungi. Threats include actions that disrupt stand conditions necessary for its survival, such as damage to host trees or disturbance of large woody debris, litter, and duff (Castellano and O'Dell 1997). Typical threats to fungi species in coniferous and other forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). Activities that cause mortality of individuals or groups of individuals can threaten the species' genetic diversity in localized areas (USDA and USDI 2000). Specific threats to *H. umbilicatum* are not currently known.

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *H. umbilicatum* because it was removed from the S&M list after 2001.

2.27.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *H. umbilicatum* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table HYUM-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 249 observations from BLM and Forest Service geodatabases were converted into 170 sites in the NSO range (region). Table HYUM-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table HYUM-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across

the regional, local, and analysis areas. Figure HYUM-1 displays the regional distribution of the species across BLM and NFS lands, and Figure HYUM-2 displays the species' regional distribution with the extent of coniferous, mixed hardwood-coniferous, and hardwood forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE HYUM-1

Number of *Hydnum umbilicatum* Sites (2014)

Location*	Number of Sites
Regional Area	170
Local Area	45
Analysis Area (Project Area)	5 (5)

Data Source: Processed BLM and Forest Service GIS data, April 7, 2014
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE HYUM-2

Distribution of *Hydnum umbilicatum* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	96	41	2
Forest Service	55	4	3
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	28	8	2

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE HYUM-3

Distribution of *Hydnum umbilicatum* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	6	-	-
Adaptive Management Reserves (AMR)	1	-	-
Administratively Withdrawn (AW)	6	-	-
Congressionally Reserved (CR)	**12**	**-**	**-**
Late Successional Reserve (LSR)	**57**	**16**	**-**
Marbled Murrelet Area (LSR3)	**5**	**1**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	9	-	-
Other (Matrix, Riparian Reserve, Other)	61	28	5
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

H. umbilicatum has a wide distribution across 10 physiographic provinces in Washington (Western Cascades, Western Lowlands, and Olympic Peninsula), Oregon (Coast Range, Willamette Valley, Cascades West and East, and Klamath Mountains), and California (Coast and Klamath). Most sites are found along the Cascade Range, Klamath Mountains, and Coast Range in Oregon, where the sites tend to be clustered or relatively close to one another in groups. Several large groups of clustered sites occur in the Coast Range in California. Sites tend to be more scattered throughout its range in Washington. *H. umbilicatum* appears to be well distributed in Oregon, based on the proximity of sites to one another, which provides opportunities for dispersal, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.



Figure HYUM-1. Regional Distribution of *Hydnum umbilicatum*



Figure HYUM-2.
Forests That May Provide Habitat For *Hydnum umbilicatum*

Of the 170 sites in the region, 28 sites are located on private, state, or other lands (at least partially); three sites are on NPS lands (Mt. Rainier and Olympic National Parks); and 151 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 47 sites in the Roseburg District, nine sites in the Medford District, and nine sites in the Coos Bay District. Sites managed by the National Forests that encompass the project area include 18 sites on the Umpqua National Forest and one site on the Rogue River National Forest. The remaining 67 sites on BLM and NFS lands are in the Salem and Eugene Districts and on the Olympic, Deschutes, Mt. Baker-Snoqualmie, Mt. Hood, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 73 sites are located on reserve lands managed by BLM and the Forest Service, including 57 in LSRs (at least partially), 12 in Congressionally Reserved areas, and five in Marbled Murrelet Areas. This represents 48 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

H. umbilicatum is more commonly found in LSOG forests based on available data (144 of 170 total sites are in LSOG), but it is also found in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in all forest types below about 6,000 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *H. umbilicatum* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 10.4 million acres in reserve land allocations (54 percent of the forests; Table HYUM-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure HYUM-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although all forests below 6,000 feet msl are widespread across the NSO range, LSOG forests are less common and primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE HYUM-4

Extent of Forests that Could Provide Habitat for *Hydnum umbilicatum* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	19,194,850	10,381,240	6,092,570	3,750,320
Local Area	611,850	199,720	185,170	80,260
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *H. umbilicatum* is found in nine 5th field watersheds that overlap the project area (see Table HYUM-5 and Figure HYUM-3). The sites are clustered or relatively close to one another in groups throughout the nine watersheds and are most abundant in the

Coast Range and Klamath Mountains. Many regional sites are located in the immediate vicinity of the local area, along the western Cascade Range, the Klamath Mountains, and the Coast Range (see Regional Distribution discussion above). Throughout the local area, multiple avenues of connectivity appear to be available between sites based on the extent of forests that may provide suitable habitat, and opportunities for dispersal exist between the watersheds and to nearby regional areas.

All 45 sites in the local area are at least partially on BLM and NFS lands, with eight sites partially on private, state, or other lands. Most of the local sites are on land designated as Other (Matrix); 17 sites are in LSRs, representing 37 percent of the BLM- and Forest Service-managed sites. Sites on reserve lands are located in the Middle Fork Coquille River watershed, the Olalla Creek-Lookingglass Creek watershed, and the South Umpqua River watershed (Table HYUM-5).

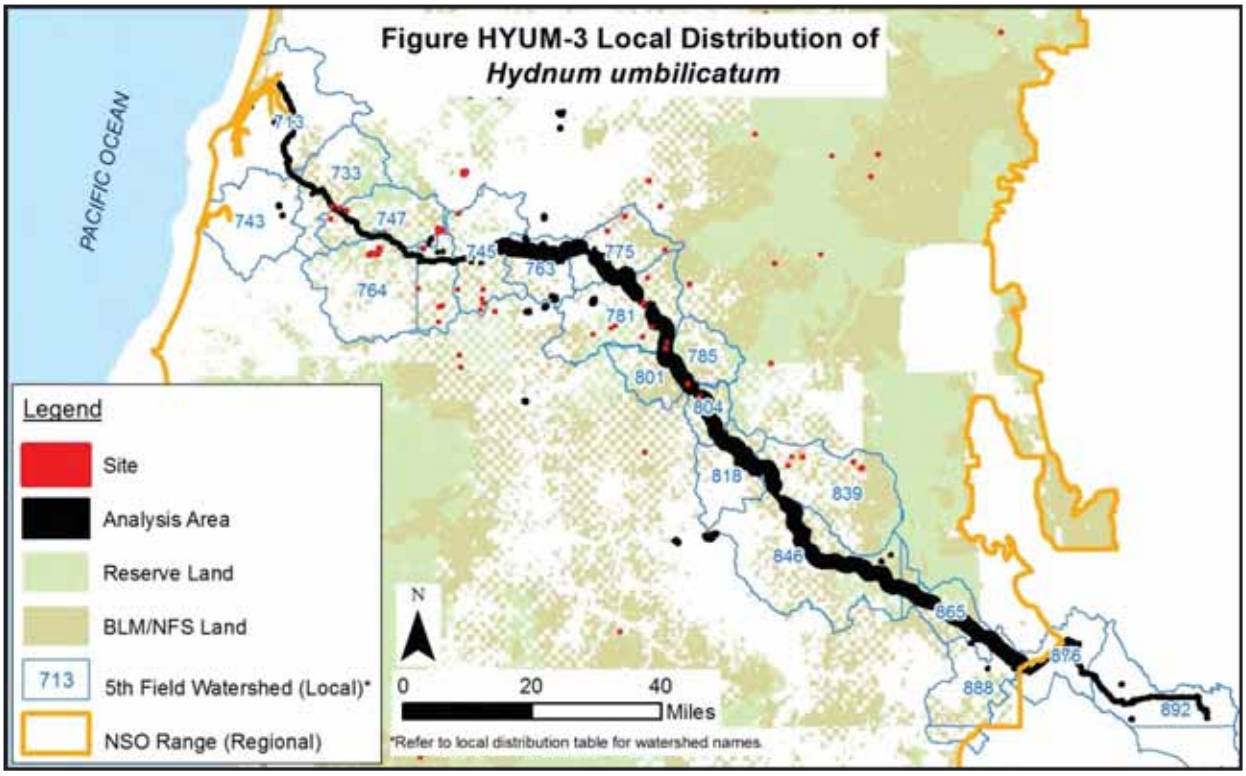
Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 611,850 acres on BLM and NFS lands in the local area, including 199,720 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 185,170 acres are LSOG, including 80,260 acres in reserve land allocations (43 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures HYUM-2 and HYUM-3).

TABLE HYUM-5

Distribution of *Hydnum umbilicatum* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	6	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	10	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	9	5
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	3	-
North Fork Coquille River (733)	1	-
Olalla Creek-Lookingglass Creek (745)	6	6
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	9	6
Spencer Creek (865)	-	-
Trail Creek (804)	1	-
Upper Cow Creek (801)	1	-

Data Sources: Processed BLM and Forest Service GIS data, April 7, 2014; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain five sites of *H. umbilicatum*. These sites are distributed across four 5th field watersheds in the Roseburg and Coos Bay Districts and on the Umpqua National Forest. The sites are located in the central portion of the analysis area. Many local sites are located in the immediate vicinity of the analysis area sites (see Local Distribution discussion above).

All of the sites in the analysis area are at least partially on BLM or NFS lands designated as Other (Matrix), including three on NFS lands and two on BLM lands. Two of the sites are partially on private lands.

Surveys for the PCGP Project resulted in 24 total observations of the species in six locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). An estimated 23 of these recorded observations comprise the five sites in the analysis area; the other observation is in a site outside the analysis area. The sites are located between MPs 27.3 and 23.5 and between MPs 91.2 and 112.9.

Project Impacts

Analysis

The PCGP Project would affect five sites out of the 151 sites on BLM- and Forest Service-managed lands in the region, representing approximately 3 percent of the sites (or five out of 170 total sites on all lands in the NSO range). Table HYUM-6 presents an overview of the features of the PCGP Project that would affect the *H. umbilicatum* sites. The construction corridor and associated work and storage areas would affect approximately 14 acres within the five sites

(about 39 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *H. umbilicatum* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 8.6 acres of vegetation and soil within five sites and could result in the removal of *H. umbilicatum* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 2.9 acres within three sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and disturbance to soil could negatively affect *H. umbilicatum* in adjacent areas by removing its habitat, disturbing soil or decaying material, and affecting its ability to survive, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 2.7 acres of understory habitat in two sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE HYUM-6

Impacts to *Hydnum umbilicatum* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	5	8.6 ac
Temporary Extra Work Area (TEWA)	3	2.9 ac
Uncleared Storage Area (UCSA)	2	2.7 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *H. umbilicatum*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the five sites as a result of the PCGP Project, 40 sites of *H. umbilicatum* would remain on BLM and NFS lands in the local area, including 17

in reserves, and 146 sites, including 73 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 73 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 50 percent of the remaining *H. umbilicatum* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *H. umbilicatum* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *H. umbilicatum* has a wide distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (151 on BLM and NFS lands). The species appears to be well distributed in Oregon. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites documented since 2007, but is still moderate-high. Several sites were documented during PCGP Project surveys.
    - An estimated 48 percent of the sites (73 sites) are in reserves, which is an increase in the proportion of sites in reserves since 2006 per Molina (2008).
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 54 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain the forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *H. umbilicatum*.
- The PCGP Project would affect five of the 151 BLM- and Forest Service-managed sites of *H. umbilicatum*, representing approximately 3 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (146) would continue to be documented on BLM and NFS

lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (40) would remain in the local vicinity of the analysis area; these sites would be distributed across six 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 62 sites are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 12 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *H. umbilicatum* are unlikely.
- The PCGP Project would result in the permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *H. umbilicatum*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.27.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *H. umbilicatum* at five sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 146 sites would remain on BLM and NFS lands across the region, and 40 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *H. umbilicatum* at five sites, the sites are a part of the many sites in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *H. umbilicatum* would persist in the region without considering the five sites as part of the population.
- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable

future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *H. umbilicatum* sites in the analysis area, although some individuals within the sites may persist following project implementation. Based on the above conclusions, avoidance of the five *H. umbilicatum* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *H. umbilicatum* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.28 HYGROPHORUS CAERULEUS

Hygrophorus caeruleus is a gilled mushroom species in the Hygrophoraceae family and does not have a common name.

2.28.1 Regulatory Status and Ranking

The 2001 ROD identifies *H. caeruleus* as a Category B (rare) species. The ORBIC evaluated *H. caeruleus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010), and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2010, the species was considered to be between imperiled because of rarity or other factors that make it vulnerable to extinction and rare, uncommon, or threatened, but not immediately imperiled, within its global range (G2G3) and was imperiled because of rarity or other factors that make it vulnerable to extinction in Oregon (S2). In 2013, the species was considered to be too common and was removed from the ORBIC Lists. It is not considered a BLM Sensitive or Strategic species in Oregon; it is a Forest Service Sensitive species in Oregon.

2.28.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *H. caeruleus*. It grows in small groups or solitary (The Fungi of California 2010) and is likely mycorrhizal with conifer trees (ORBIC 2004). Individuals are found in conifer duff (The Fungi of California 2010) and are associated with moist soil conditions, particularly near melting snowbanks or where snow has melted, but the ground remains moist (ORBIC 2004). It grows into the soil matrix and forms symbiotic associations with the fine root systems of plants (Cushman and Huff 2007). Fruiting

has been documented in the spring, from May through July, and occasionally into fall (Castellano et al. 1999, Cushman and Huff 2007). As with other gilled mushrooms, *H. caeruleus* is presumed to be dependent on wind for dispersal of spores (Castellano and O'Dell 1997).

Range

H. caeruleus is known only from western North America where it occurs in mountainous regions around the northern part of the Great Basin (ORBIC 2004). It has been found from the Sierra Nevada in California north into Washington and east to Idaho (ORBIC 2004, Trappe, pers. comm. 2013). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, Holthausen et al. (1994) indicated that the species' range may be more restricted than historically. This restriction may be a result of habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *H. caeruleus* from about nine element occurrences in the Pacific Northwest in 2004. Most of these occurrences were in Oregon (5), with fewer in Washington (2), California (1), and Idaho (1) (ORBIC 2004). The ORBIC estimated that three of the element occurrences were in protected areas in the NSO range in 2004. This species was believed to be endemic to Washington and Oregon prior to 1999 (Castellano et al. 1999), but occurrences have more recently been reported in Idaho and California (ORBIC 2004). In 2004, *H. caeruleus* had a narrow range and limited distribution within its range (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented five new sites of *H. caeruleus* in the NSO range between 1998–2006, and seven total sites were documented by 2006, including four in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported six sites on federal lands and seven total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *H. caeruleus*, and resulted in five new observations of individuals or populations of *H. caeruleus*. Additional persistence surveys for *H. caeruleus* in LSRs in nearby areas resulted in five additional observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by more than 2-fold. Based on the increased number of sites since 1998 with increased surveys, more survey effort may locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

H. caeruleus is found at mid-elevations in montane coniferous forests, typically in conifer duff (Castellano and O'Dell 1997, The Fungi of California 2010). It occurs in soil in association with roots of conifer trees in family Pinaceae near melting snowbanks (Castellano et al. 1999) and

may be restricted to firs (*Abies* spp.) (Castellano and O'Dell 1997). Many of the known populations have been found where wildfires are frequent on a historical basis (ORBIC 2004). *H. caeruleus* may prefer specific microclimate conditions of LSOG forests, although it is also found in younger open forests (Trappe, pers. comm. 2013), and it may not be as restricted to LSOG conditions.

Threats

Threats to *H. caeruleus* include logging, development, mining, fires, road and trail construction, and recreational activities (Castellano and O'Dell 1997, ORBIC 2004). These activities can remove host trees and disturb soil. Drastic changes to its habitat from logging and development are major threats to the species (ORBIC 2004). This species has been found in open forests, which suggests that populations may not be sensitive to edge effects (Trappe, pers. comm. 2013).

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *H. caeruleus* with one other species (Group 11 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites by retaining old-growth forest structure and soil conditions, including coarse woody debris, and avoid disturbance at or around known sites, such as from removal of host trees or modification of canopy. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *H. caeruleus*:

- As a mycorrhizal species, *H. caeruleus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.28.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *H. caeruleus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table HYCA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 63

observations from BLM and Forest Service geodatabases were converted into 45 sites in the NSO range (region). Table HYCA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table HYCA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure HYCA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure HYCA-2 displays the species' regional distribution with the extent of coniferous and LSOG coniferous forests between 2,000–7,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE HYCA-1

Number of *Hygrophorus caeruleus* Sites (2013)

Location*	Number of Sites
Regional Area	45
Local Area	12
Analysis Area (Project Area)	6 (3)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE HYCA-2

Distribution of *Hygrophorus caeruleus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	1	-	-
Forest Service	43	12	6
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	4	2	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE HYCA-3

Distribution of *Hygrophorus caeruleus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	-	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	9	-	-
Congressionally Reserved (CR)	**3**	**-**	**-**
Late Successional Reserve (LSR)	**9**	**4**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	22	8	5
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure HYCA-1. Regional Distribution of *Hygrophorus caeruleus*

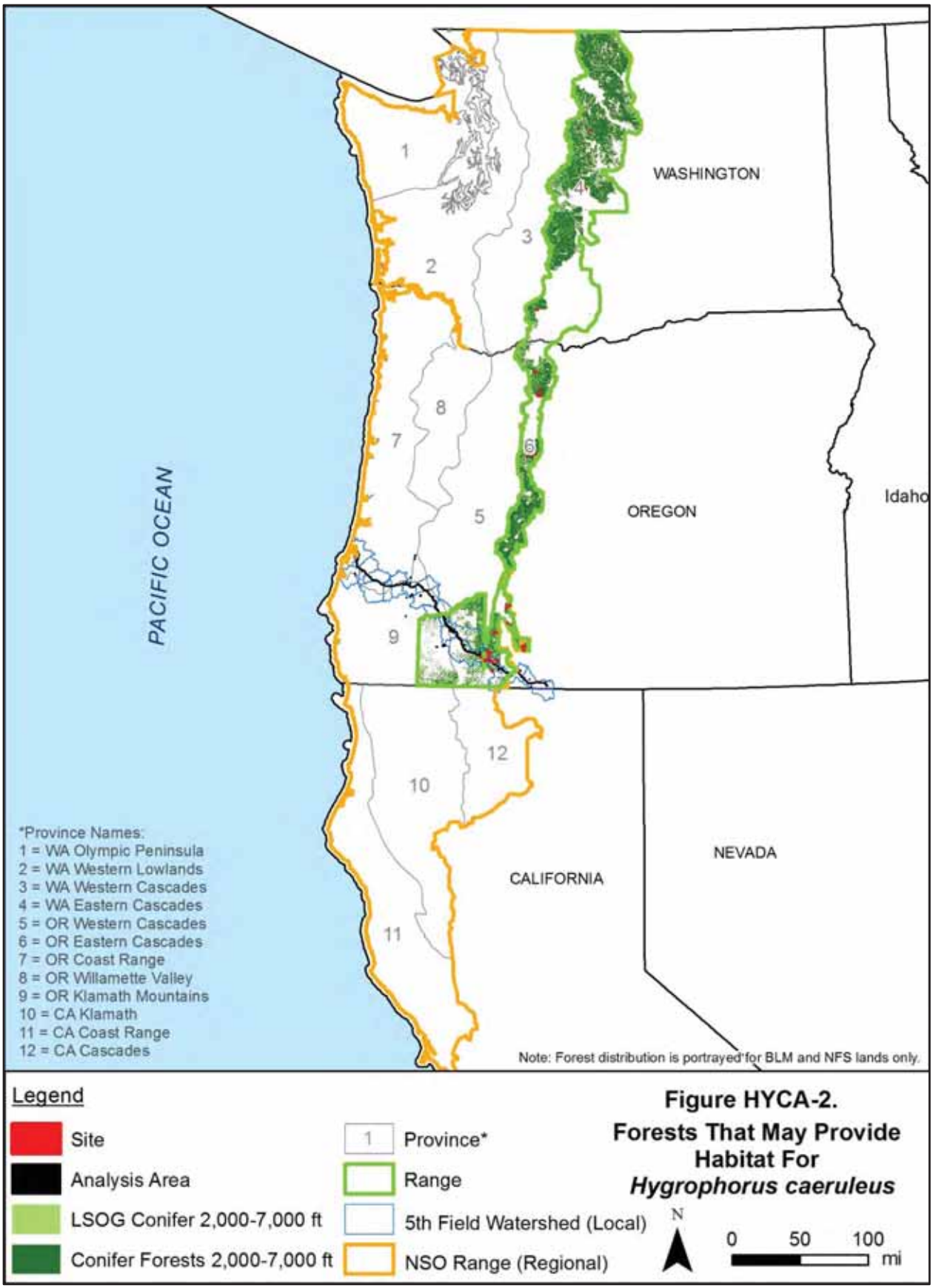


Figure HYCA-2.
Forests That May Provide Habitat For *Hygrophorus caeruleus*

Regional Distribution

H. caeruleus has a somewhat limited distribution across three physiographic provinces in Washington (Eastern Cascades) and Oregon (Cascades East and West). All sites are found along the Cascade Range, with most sites on the eastern side. Clusters of sites are located in the Oregon Cascade Range, where the species appears to be locally abundant; however, sites in Washington appear to be scattered and somewhat isolated from the other sites in the region. The species is not found outside the Cascade Range and appears to have a scattered distribution across the mountain range. *H. caeruleus* does not appear to be well distributed within its range in the NSO range.

Four of 45 sites are located on private or state lands (at least partially), and 44 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Klamath Falls Resource Area of the Lakeview District. Sites managed by the National Forests that encompass the project area include two sites on the Rogue River National Forest and 31 sites on the Winema National Forest. Sites on other National Forests include three sites on the Deschutes, one site on the Gifford Pinchot, five sites on the Mt. Hood, and one site on the Wenatchee National Forest.

Across the NSO range, 13 sites are located on reserve lands managed by the Forest Service, including 10 sites in LSRs and three sites in Congressionally Reserved areas. This represents 30 percent of the total Forest Service-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

H. caeruleus is more commonly found in LSOG forests (31 of 45 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and has been found in younger coniferous forests. Based on current site locations, the species has been found in coniferous forests between about 2,000–7,000 feet msl and has only been documented in parts of Oregon and Washington. Coniferous forests, including the LSOG component of these forests, between 2,000–7,000 feet msl in the eastern Cascade Range of Oregon and Washington and in Jackson County, Oregon could provide habitat for *H. caeruleus* and support additional sites. These forests encompass an estimated 4.7 million acres on BLM and NFS lands in the species' range, including an estimated 2.7 million acres in reserve land allocations (57 percent of the forests; Table HYCA-4). Of this acreage, an estimated 667,610 acres are LSOG (see Figure HYCA-2), including 357,930 acres in reserve land allocations (54 percent of the forests). Although coniferous forests are widespread across the mountain ranges in the species' range, LSOG coniferous forests are less common.

TABLE HYCA-4

Extent of Forests that Could Provide Habitat for *Hygrophorus caeruleus* on BLM and NFS Lands*

Location	Coniferous Forests between 2,000-7,000 feet		LSOG Conifer between 2,000-7,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	4,666,380	2,672,320	667,610	357,930
Local Area	219,830	65,600	58,490	22,200
Project Area	510	220	150	70

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *H. caeruleus* is found in two 5th field watersheds (Little Butte Creek and Spencer Creek) that overlap the project area (see Table HYCA-5 and Figure HYCA-3). The sites are clustered and near one another in the Cascade Range in the eastern portion of the local area. Within the Cascade Range, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests and abundance of sites in the mountain range, and opportunities for dispersal exist within the local area and to nearby regional areas. Several regional sites are located within 20 miles to the north in the Cascade Range.

All of the 12 sites in the local area are on NFS lands (Rogue River and Winema National Forests), with two sites partially on private lands. Four sites are in LSRs, and eight sites are on lands designated as Other (Matrix). The four sites in LSRs represent 33 percent of the sites on NFS lands in the local area. All of the sites in the Little Butte Creek watershed and two sites in the Spencer Creek watershed are in reserves.

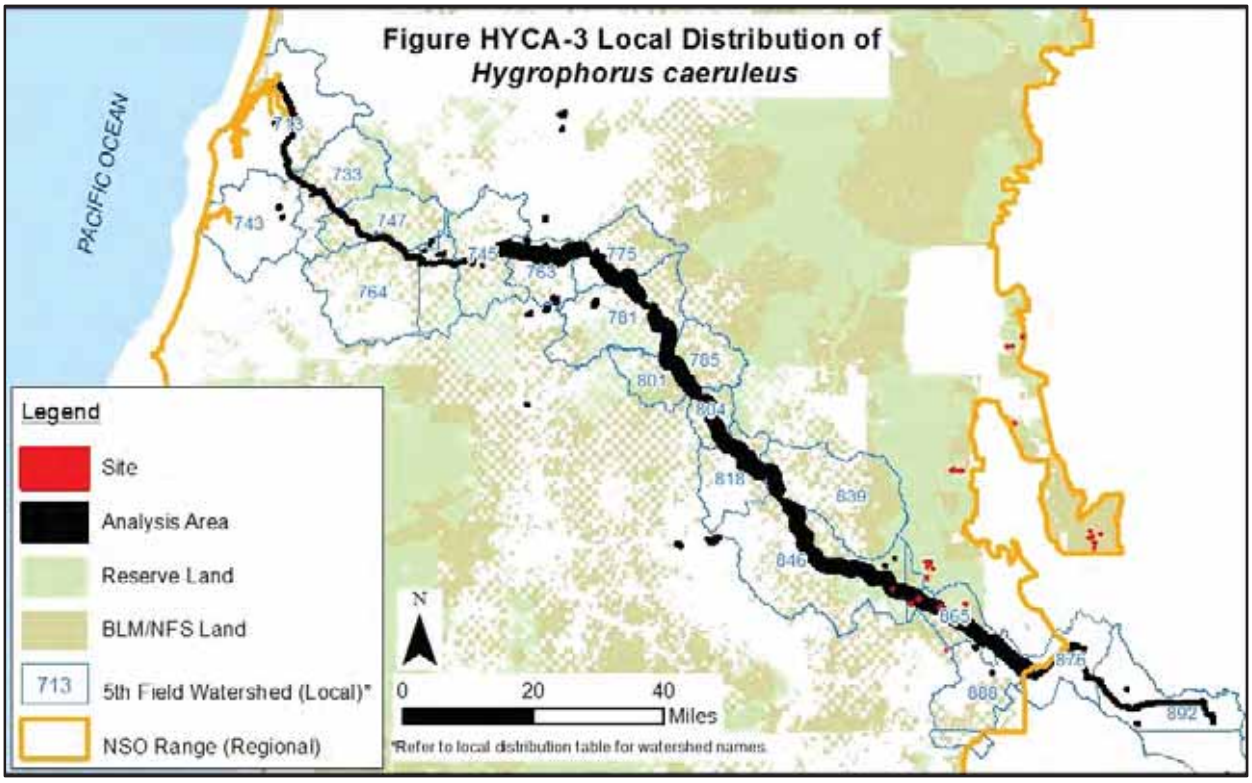
Coniferous forests between 2,000–7,000 feet msl encompass approximately 219,830 acres on BLM and NFS lands in the local area, with 65,600 acres in reserve land allocations (30 percent of the forests). Of this acreage, an estimated 58,490 acres are LSOG, including 22,200 acres in reserve land allocations (38 percent of the forests). Other sites may be located in the Cascade Range in areas that have not been previously surveyed based on the number of sites and extent of forests that may provide suitable habitat in the mountain range.

TABLE HYCA-5

Distribution of *Hygrophorus caeruleus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	2	2
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	10	2
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis area contains six sites of *H. caeruleus*, and the project area contains three sites. All of the analysis area sites are on Forest Service-managed lands (Rogue River and Winema National Forests). Five sites are on land designated as Other (Matrix), and one site is in an LSR. The analysis area sites are found in two 5th field watersheds (Little Butte Creek and Spencer Creek). The sites are restricted to a small portion of the eastern side of the analysis area and are clustered near each other. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 21 total observations of the species in 10 locations in or near the project area during 2010 and 2012 (Siskiyou BioSurvey LLC 2012a). Fifteen of these recorded observations comprise the six sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, one site is between MPs 164.2 and 164.3, one site is near MP 168.8, and one site is near MP 172.5.

Project Impacts

Analysis

The PCGP Project would affect six sites out of the 44 sites on BLM and Forest Service-managed lands in the region, representing approximately 14 percent of the sites (or six out of 45 total sites on all lands in the NSO range). Table HYCA-6 presents an overview of the features of the PCGP Project that would affect the *H. caeruleus* sites. The construction corridor and associated work and storage areas would affect approximately 2.1 acres (7 percent) of the sites (the sites encompass approximately 29.5 acres), with some sites experiencing greater impacts than others (see Figures HYCA-4 and HYCA-5). Measures outlined in Chapter 1 would be implemented to

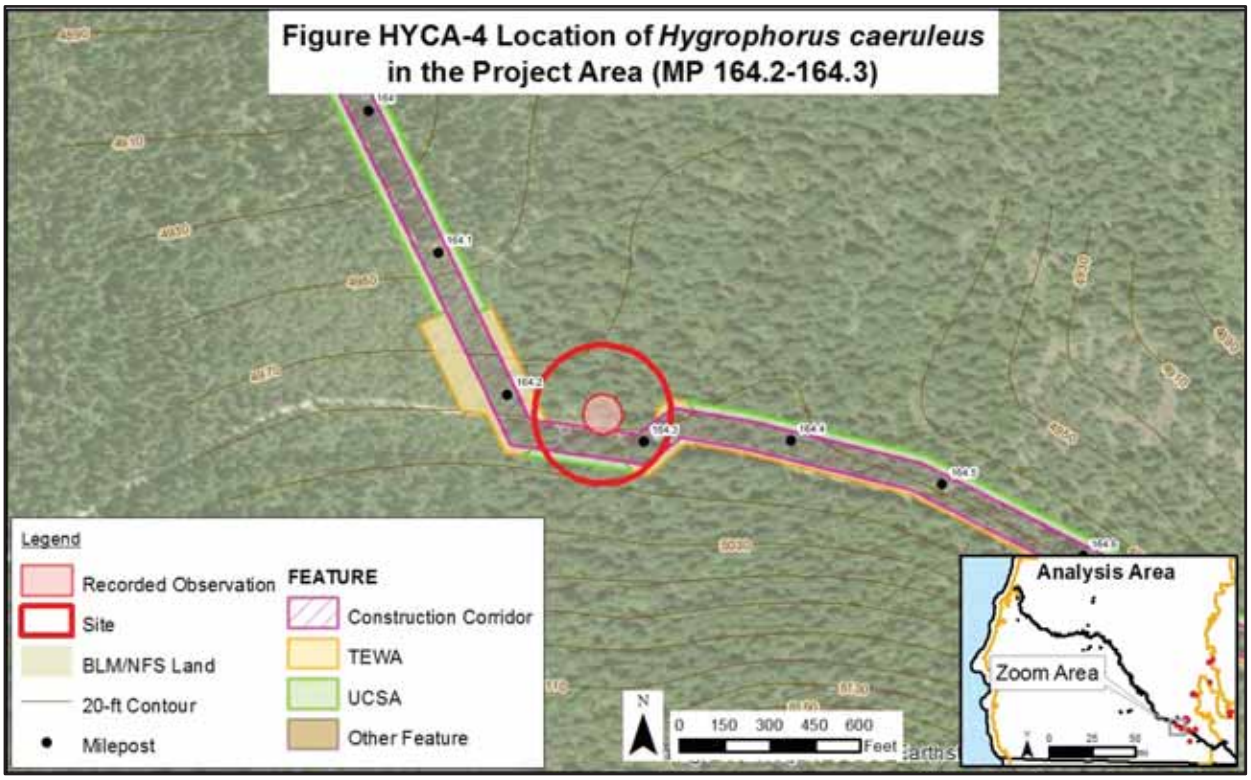
minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *H. caeruleus* in and near the project area. Due to the somewhat limited distribution of the species and proportion of sites affected, the effects on six sites could potentially alter the distribution of the species in the NSO range. This discussion presents a detailed analysis of the features of the PCGP Project that could affect site persistence.

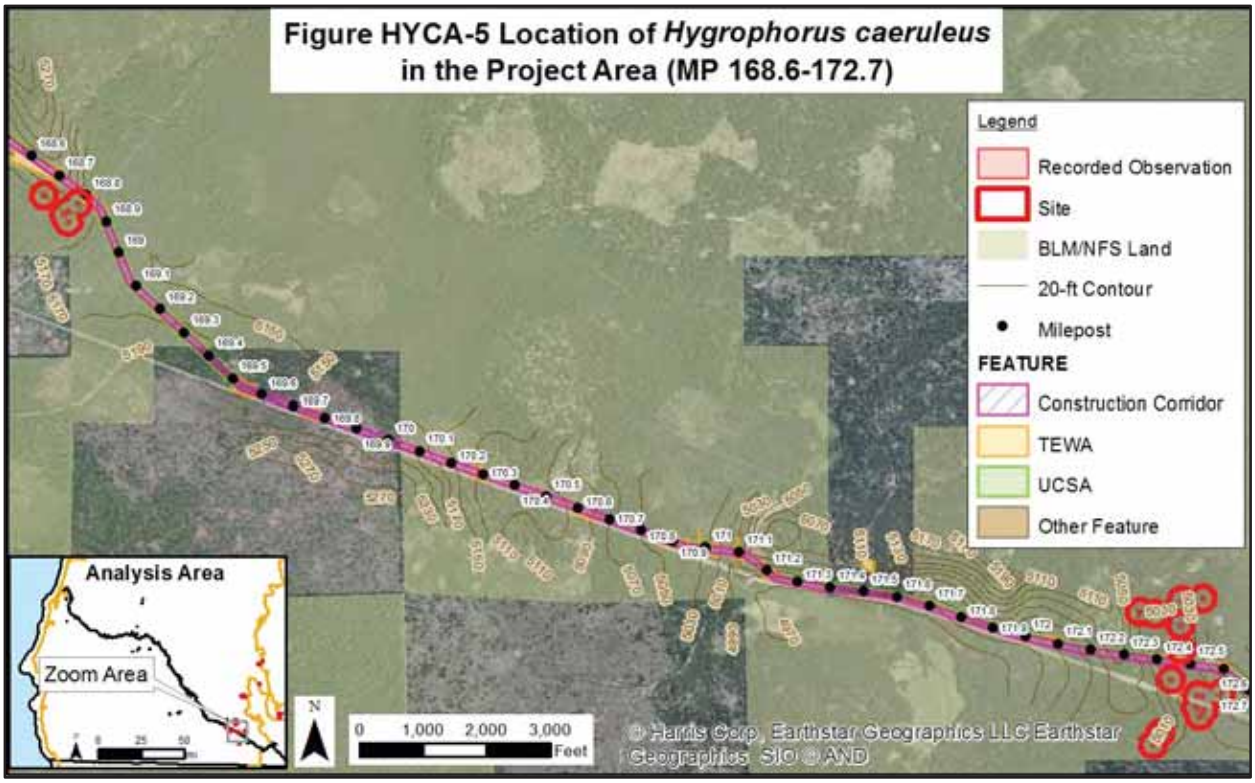
TABLE HYCA-6

Impacts to *Hygrophorus caeruleus* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	3	1.4 ac
Temporary Extra Work Area (TEWA)	3	0.4 ac
Uncleared Storage Area (UCSA)	3	0.3 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.





The PCGP Project would result in ground disturbance and vegetation removal in three sites in the analysis area (Table HYCA-7). The site at MP 164.2-164.3 has a recorded observation of the species within the project area, which would likely be removed during activities within the corridor (see Figures HYCA-4 and HYCA-5). Observations within the other two sites at MP 168.8 and 172.4-172.5 are not within the corridor or TEWAs and would not likely be removed. For all of the sites, including the three sites outside the project area, individuals outside the corridor and TEWAs may also be subject to indirect effects associated with the PCGP Project based on the proximity of project activities to the sites, as discussed below. No direct impacts are anticipated in the three sites outside the project area.

TABLE HYCA-7

Site-Specific Overview of Impacts to *Hygrophorus caeruleus* Sites

Site Location	Source of Impacts	Area of Disturbance	Individuals Likely to Persist?
MP 164.2-164.3	Corridor	1.0 ac	No
	TEWA	1.9 ac	
	UCSA	0.2 ac	
MP 168.8	Corridor	0.3 ac	Yes
	TEWA	0.2 ac	
	UCSA	0.1 ac	
MP 172.4-172.5	Corridor	0.07 ac	Yes
	TEWA	0.2 ac	
	UCSA	0.01 ac	

Notes: MP = milepost; ac = acres

Establishment of the construction corridor and TEWAs would likely remove individuals of *H. caeruleus* and modify microclimate conditions around individuals that are not removed. The removal of forests and host trees and disturbance to soil could negatively affect *H. caeruleus* in adjacent areas by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence. Restored portions of

the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. *H. caeruleus* is not likely to persist at one of the sites because of the extent of impacts and the proximity of the recorded observation to the corridor.

H. caeruleus is likely to persist at both of the other sites (MP 168.8 and MP 172.4-172.5) because the observations within the sites are more than 90 feet from the corridor, where direct effects are not anticipated and indirect effects are unlikely. The site at MP 168.8 is in a forested area on an east-facing slope, with a paved road through the southeast part of the site. Four observations are more than 90 feet southwest of the corridor and are not likely to be directly or indirectly affected by the PCGP Project based on the distance from the corridor, extent of forests surrounding the observations, and proximity to an existing open corridor (the road), indicating the species is likely resilient to edge-related effects at the site. The site at MP 172.4-172.5 is also in a forested area on an east-facing slope. Two observations are north of the project area and are not likely to be directly or indirectly affected by the PCGP Project because of their proximity to the proposed corridor.

Indirect effects on individuals within the three other sites (south of MP 172.5, MP 172.6, and MP 168.7) are unlikely because of the distance of the proposed corridor to the observations (more than 350 feet) and the species' likely resilience to edge-related effects at some of the sites with existing open corridors associated with roads. The species is expected to persist at these three sites.

Based on this analysis, *H. caeruleus* is not likely to persist at one of the six sites in the analysis area following project implementation. Several sites are located in the vicinity of the analysis area, and the five sites that are expected to persist are part of a small group of sites in the Cascade Range in southern Oregon. The species would continue to be found in the southern Cascade Range in Oregon, and other sites may exist in previously unsurveyed areas based on the recent trends of increased observations. One of the affected sites is in an LSR (the one at MP 164.2-164.3), and the others are on lands designated as Other (Matrix).

Across the project area, the PCGP Project would remove an estimated 420 acres of coniferous forests between 2,000–7,000 feet msl, including 110 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *H. caeruleus*. Within this impact area, about 300 acres (71 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 90 acres of coniferous forests between 2,000–7,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests between 2,000–7,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at one of the six sites as a result of the PCGP Project, 11 sites of *H. caeruleus* would remain on NFS lands in the local area, including three in

reserves, and 43 sites, including 12 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 12 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 28 percent of the remaining *H. caeruleus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *H. caeruleus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *H. caeruleus* has a somewhat limited distribution across three provinces and two states in the region and a moderate-high number of overall sites (44 on BLM and NFS lands). The species' distribution is limited to the Cascade Range, and sites are locally abundant in southern Oregon. The currently known number of sites on BLM and NFS lands is an increase of 38 sites since 2007, with most sites documented during the PCGP Project surveys.
    - An estimated 30 percent of the sites (13 sites) are in reserves, which is an increase of about nine sites in reserves since 2006 per Molina (2008).
- Coniferous forests between 2,000–7,000 feet msl (general habitat for the species) are widespread across the Cascade Range in Oregon and Washington, where all sites are documented, and encompass approximately 4.7 million acres on BLM and NFS lands with an estimated 57 percent in reserves. A subcomponent of these forests likely provides habitat for *H. caeruleus*.
- The PCGP Project would affect six of 44 BLM- and Forest Service-managed sites of *H. caeruleus*, representing approximately 14 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at one of the six sites, a moderate-high number of sites (43) would continue to be documented on BLM and NFS lands in the region with a somewhat limited distribution across Washington and Oregon in the Cascade Range. Several sites (11 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across two 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would affect site persistence at one site in an LSR, but the percentage of sites in reserves would be about the same (28 percent). Of the remaining sites, nine are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are in Congressionally Reserved areas where management activities that may adversely affect *H. caeruleus* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 90 acres of coniferous forests between 2,000–7,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 2.7 million acres (57 percent) of coniferous forests and 357,930 acres (54 percent) of LSOG coniferous forests between 2,000–7,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *H. caeruleus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO, particularly in the Cascade Range, that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.28.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *H. caeruleus* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 43 sites would remain on BLM and NFS lands across the region, and 11 sites would remain on NFS lands in the local area. Although the PCGP Project would affect site persistence of *H. caeruleus* at one site, the site is part of a group sites in the Cascade Range where the species is locally abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *H. caeruleus* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 420 acres of coniferous forests and 110 acres of LSOG coniferous forests between 2,000–7,000 feet msl (a negligible amount of the forests). An estimated 71 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 2.7 million acres (57 percent) of coniferous forests and 357,930 acres (54 percent) of LSOG coniferous forests between 2,000–7,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Oregon Cascade Range, several sites are scattered across the rest of the Cascade Range and are less likely to be affected by a single event.

The PCGP Project would not be able to avoid impacts to all *H. caeruleus* sites in the analysis area, although some individuals or populations within the sites and some sites are expected to persist following project implementation. Based on the above conclusions, avoidance of the six *H. caeruleus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *H. caeruleus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.29 LEUCOGASTER CITRINUS

Leucogaster citrinus is a sequestrate mushroom species and false truffle in the Leucogastraceae family and is commonly known as yellow false truffle.

2.29.1 Regulatory Status and Ranking

The 2001 ROD identifies *L. citrinus* as a Category B (rare) species. The ORBIC evaluated *L. citrinus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010), and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2010, the species was considered to be between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G3G4, S3S4, respectively). In 2013, the species was considered to be too common and was removed from the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.29.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *L. citrinus*. It is a sequestrate hypogeous fungus and is presumed to be ectomycorrhizal, forming symbiotic associations with the roots of conifer trees for translocation of minerals, water, and nutrients (Castellano and O'Dell 1997). It is typically associated with Douglas-fir (Holthausen et al. 1994), but has also been found in association with higher elevation firs (*Abies* spp.), pines (*Pinus* spp.), and hemlocks (*Tsuga* spp.) (Trappe, pers. comm. 2013). Fruiting has been documented from August through November (Castellano et al. 1999) and tends to occur during the dry part of the season, atypical of most fungi (USDA and USDI 2007). Fruiting bodies are found beneath the soil surface, which may protect the species from drying winds or temperatures that often prevent

other macrofungi from fruiting, and the cryptic nature of the fruiting body makes detection difficult. As with other sequestrate fungi, *L. citrinus* is presumed to be dependent on mycophagy for spore dispersal (Castellano and O'Dell 1997).

Range

L. citrinus is endemic to the Pacific Northwest, where it has been found from northern California to Washington and east to Idaho (Castellano and O'Dell 1997, Trappe, pers. comm. 2013). Based on data available in 2004, it was commonly found in the Coast Range and foothills of the Cascade Range in Oregon (ORBIC 2004). It was recently found on the Umpqua National Forest during surveys for the PCGP Project in 2010–2011 (Siskiyou BioSurvey LLC 2012a) and on the Fremont-Winema National Forest, where it had not been previously documented, during surveys in 2009–2010 (Fremont-Winema National Forest 2010). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, may have reduced available habitat and further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *L. citrinus* from more than 20 element occurrences in the Pacific Northwest in 2004. Most of these occurrences were in Oregon and Washington, but only one was reported in California (ORBIC 2004). The species was found in 33 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). These observations from the Random Multi-Species surveys were primarily in LSOG forests on reserve lands, and they indicate that the species is more common and better distributed than previously known. Molina (2008) documented 38 new sites of *L. citrinus* in the NSO range between 1998–2006, and 46 total sites were documented by 2006, including 32 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 10 sites on federal lands and 24 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *L. citrinus*, and resulted in one new observation of the species. Based on the increased number of sites since 1998 with increased surveys (5-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

L. citrinus has been found in LSOG coniferous forests at low to high elevations, ranging from about 250–6,500 feet msl (Castellano and O'Dell 1997, Castellano et al. 1999, Cushman and

Huff 2007, Holthausen et al. 1994). It grows in association with roots of white fir, subalpine fir (*A. lasiocarpa*), lodgepole pine, western white pine (*P. monticola*), Douglas-fir, and hemlocks (*Tsuga* spp.). Based on data available in 2004, it appeared to be more abundant in lower elevation forests dominated by Douglas-fir (ORBIC 2004), but it has also been found in a variety of forest types (Trappe, pers. comm. 2013). Recorded observations prior to 1994 tended to be in stands with an abundance of large, coarse woody debris (Holthausen et al. 1994). *L. citrinus* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to specific microclimate conditions of LSOG forests.

Threats

Threats to *L. citrinus* are those that disturb its host tree or the soil or duff around the host tree, such as logging; road, trail, or campground construction; and hot ground fires (Castellano and O'Dell 1997). The mushroom is not routinely harvested for food, so harvesting is not a threat to its populations. Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *L. citrinus* with several other species (Group 12 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat and microclimatic conditions at all known sites; minimize soil disturbance at or around known sites; and prevent damage to or removal of host trees. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *L. citrinus*:

- As a mycorrhizal species, *L. citrinus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.29.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *L. citrinus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table LECI-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 127

observations from BLM and Forest Service geodatabases were converted into 73 sites in the NSO range (region). Table LECI-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table LECI-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure LECI-1 displays the regional distribution of the species across BLM and NFS lands, and Figure LECI-2 displays the species' regional distribution with the extent of all forests and LSOG forests below 6,500 feet msl on BLM and NFS lands.

TABLE LECI-1

Number of *Leucogaster citrinus* Sites (2013)

Location*	Number of Sites
Regional Area	73
Local Area	2
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE LECI-2

Distribution of *Leucogaster citrinus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	14	1	-
Forest Service	53	1	1
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	10	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE LECI-3

Distribution of *Leucogaster citrinus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	3	-	-
Adaptive Management Reserves (AMR)	1	-	-
Administratively Withdrawn (AW)	5	-	-
Congressionally Reserved (CR)	**9**	**-**	**-**
Late Successional Reserve (LSR)	**29**	**1**	**-**
Marbled Murrelet Area (LSR3)	**1**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	20	1	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure LECI-1. Regional Distribution of *Leucogaster citrinus*

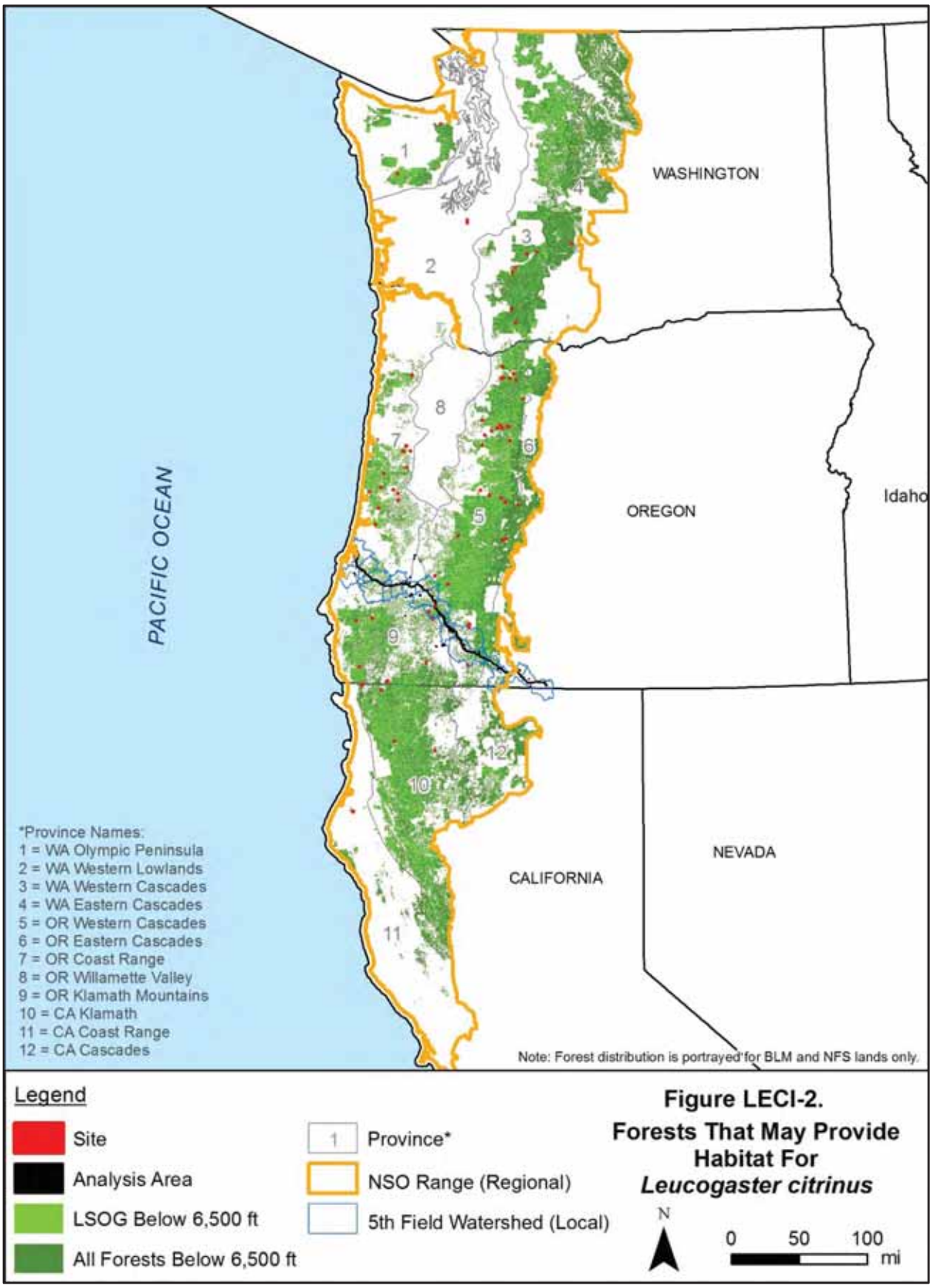


Figure LECI-2.
Forests That May Provide Habitat For *Leucogaster citrinus*

Regional Distribution

L. citrinus is widely distributed across 10 physiographic provinces in Washington (Western Lowlands, Olympic Peninsula, and Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Coast and Klamath) (see Figure LECI-1). The sites are scattered across the region, with most sites found along the Coast Range, western Cascade Range, and Klamath Mountains. Some groups of sites and few clusters of sites are located in these mountain ranges in Oregon where the species is most abundant, but sites are more scattered in Washington and California. *L. citrinus* appears to be well distributed in Oregon based on the relative abundance of sites, proximity of the sites to one another, and distribution of sites across forests that may provide suitable habitat.

Ten of the 73 sites are located on private, state, or other lands (at least partially), and 67 sites are on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include five sites in the Medford District and one site in the Roseburg District. Sites managed by the National Forests that encompass the project area include four sites on the Rogue River National Forest and three sites on the Umpqua National Forest. The remaining 60 sites on BLM and NFS lands are in the Arcata, Eugene, and Salem Districts and on the Deschutes, Gifford Pinchot, Klamath, Mt. Hood, Olympic, Siskiyou, Siuslaw, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 40 sites are located on reserve lands managed by BLM and the Forest Service, including 29 in LSRs, one in a Marbled Murrelet Area, one in a Known Owl Activity Center, and nine in Congressionally Reserved areas. This represents 60 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

L. citrinus is more common in LSOG forests based on available data (59 of 73 total sites are in LSOG), but it is found in a variety of forest types and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous, mixed hardwood-coniferous, and hardwood forests below about 5,300 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests, including the LSOG component of these forests, below 6,500 feet msl could provide habitat for *L. citrinus* and support additional sites. These forests encompass an estimated 19.9 million acres on BLM and NFS lands in the region, including an estimated 10.9 million acres in reserve land allocations (55 percent of the forests; Table LECI-4). Of this acreage, an estimated 6.2 million acres are LSOG (see Figure LECI-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although all forests below 6,500 feet msl are widespread across the NSO range, LSOG forests are less common and primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE LECI-4

Extent of Forests that Could Provide Habitat for *Leucogaster citrinus* on BLM and NFS Lands*

Location	All Forests below 6,500 feet		LSOG Forests below 6,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	19,897,450	10,875,040	6,189,600	3,816,800
Local Area	617,090	204,040	186,650	81,430
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *L. citrinus* is found in three 5th field watersheds that overlap the project area (see Table LECI-4 and Figure LECI-3). The two sites in the local area are about 5 miles from each other and are somewhat distant from others in the region. Several scattered sites are located to the north, east, and south more than 5 miles away (see Figure LECI-3). Other opportunities for dispersal within the local area may also exist via animal vectors based on the extent of forests that may provide suitable habitat.

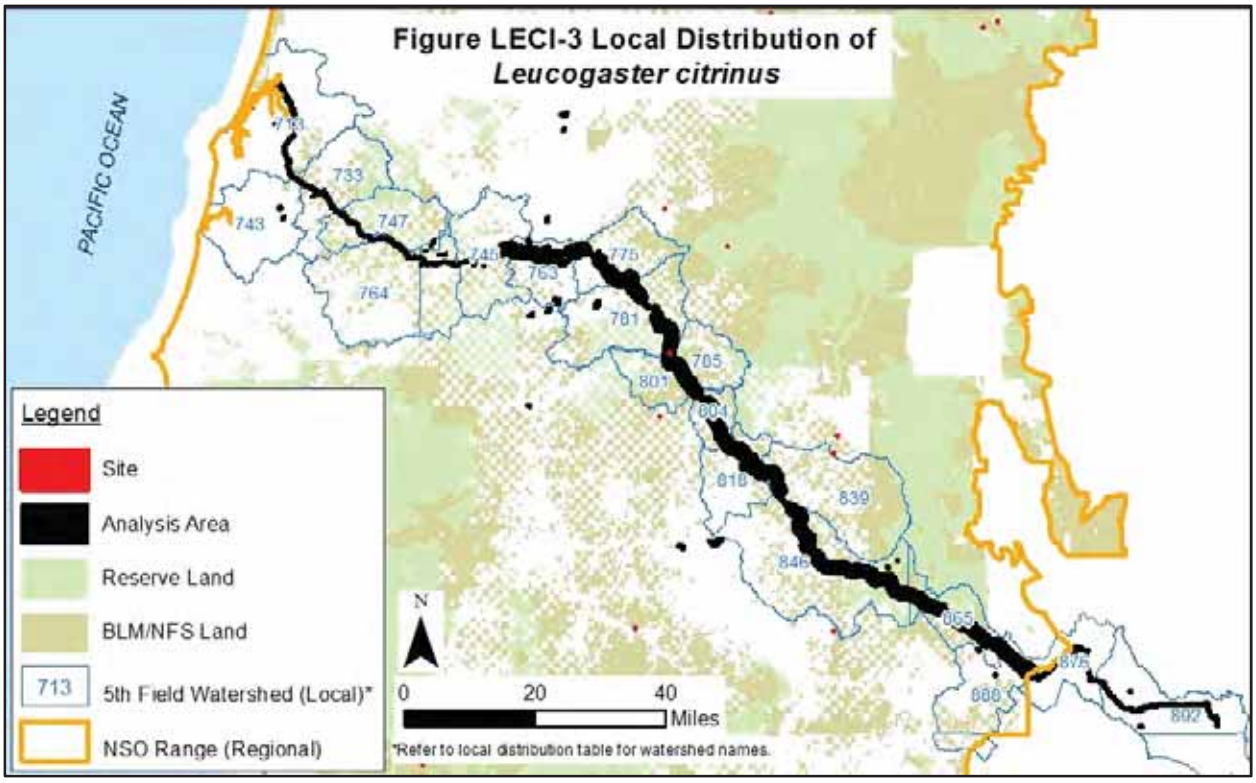
One site in the local area is on NFS land managed by the Umpqua National Forest on land designated as Other (Matrix). The other site is on BLM land managed by the Medford District and is at least partially in an LSR. The single site in an LSR represents 50 percent of the local area sites on BLM and NFS lands.

TABLE LECI-5

Distribution of *Leucogaster citrinus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	1*	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1*	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	1	1

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
*Note: Site counts are not additive because one site occurs in the Elk Creek-South Umpqua and South Umpqua River watersheds.



Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl encompass approximately 617,090 acres on BLM and NFS lands in the local area, including 204,040 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 186,650 acres are LSOG, including 81,430 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the proximity and distribution of sites in the nearby region and the extent of forests that may provide suitable habitat (see Figures LECI-2 and LECI-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *L. citrinus*. This site is in both the Elk Creek-South Umpqua and South Umpqua River 5th field watersheds on land managed by the Umpqua National Forest, as discussed under Local Distribution above.

Surveys for the PCGP Project resulted in one observation of the species near MP 101.8 (Siskiyou BioSurvey LLC 2012a). This recorded observation comprises the one site in the analysis area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 67 sites on BLM- and Forest Service-managed lands in the region, representing 2 percent of the sites (or one out of 73 total sites on all lands in the NSO range). Table LECI-6 presents an overview of the features of the PCGP Project that would affect the *L. citrinus* site. The construction corridor and associated work and storage areas would affect approximately 1.5 acres within the site (about 65 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the

project area and restore areas following construction, which could minimize adverse impacts on *L. citrinus* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.6 acre of vegetation and soils within the site and could remove individuals of *L. citrinus*. Disturbance in the TEWAs would result in similar impacts on about 0.3 acre within the site. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and host trees and disturbance to soil could negatively affect *L. citrinus* individuals outside the corridor by removing its habitat and disturbing the roots of host trees and other understory components. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.7 acre of understory habitat in the site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species, and could disturb individuals.

TABLE LECI-6

Impacts to *Leucogaster citrinus* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.6 ac
Temporary Extra Work Area (TEWA)	1	0.3 ac
Uncleared Storage Area (UCSA)	1	0.7 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *L. citrinus*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,500 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, one site of *L. citrinus* would remain in a reserve on BLM land in the local area, and 66 sites, including 40 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be

subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 40 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 61 percent of the remaining *L. citrinus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *L. citrinus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *L. citrinus* has a wide distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (67 on BLM and NFS lands). The species is fairly abundant in Oregon and appears to be well distributed there. The currently known number of sites on BLM and NFS lands is an increase of 57 sites since 2007, with one site documented during the PCGP Project surveys.
    - An estimated 60 percent of the sites (40 sites) are in reserves, which is an increase of about eight sites in reserves since 2006 per Molina (2008).
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.9 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented, and the Klamath Mountains, where fewer sites are documented. The Coast Range and other areas also contain coniferous, mixed, and hardwood forests, and several sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *L. citrinus*.
- The PCGP Project would affect one of 67 BLM- and Forest Service-managed sites of *L. citrinus*, representing approximately 2 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (66) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. One site would remain in the local vicinity of the analysis area, but several other sites would remain in the nearby region. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would not affect any sites in a reserve, and the percentage of sites in reserves would be about the same (61 percent). Of the remaining sites, 31 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and nine are at least partially in Congressionally Reserved areas where management activities that may adversely affect *L. citrinus* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl (less than 1 percent of the total regional acreage). An estimated 10.9 million acres (55 percent) of all forests and 3.8 million acres (62 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *L. citrinus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.29.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *L. citrinus* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 66 sites would remain on BLM and NFS lands across the region, and one site would remain on BLM land in the local area. Although the PCGP Project would affect site persistence of *L. citrinus* at one site, this site is part of the many sites in the Cascade Range and Klamath Mountains in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *L. citrinus* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests below 6,500 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.9 million acres (55 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *L. citrinus* site in the analysis area, although some individuals within the site may persist following project implementation. Based

on the above conclusions, avoidance of the *L. citrinus* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *L. citrinus* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.30 MYCENA OVERHOLTSII

Mycena overholtsii is a gilled mushroom species in the Mycenaceae family (formerly in Tricholomataceae) and is commonly known as fuzzy foot.

2.30.1 Regulatory Status and Ranking

The 2001 ROD identifies *M. overholtsii* as a Category B (rare) species. The ORBIC evaluated *M. overholtsii* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between imperiled because of rarity or other factors that make it vulnerable to extirpation and not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G2G4, S2S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.30.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

M. overholtsii is a wood decomposer found fruiting in clusters on logs without bark (decorticated) (Cripps 2009). As snow melts, the mushroom matures in the moist snow chamber. Fruiting is from March through July (Castellano et al. 1999). Like other members of genus *Mycena*, it is presumed to be dependent on wind (and possibly arthropods) for dispersal of spores (Castellano and O'Dell 1997).

Range

M. overholtsii is found in western North America, from the Pacific Northwest to Wyoming and Colorado (ORBIC 2004, Trappe, pers. comm. 2013). Its range in the Pacific Northwest extends from northern California to Mount Rainier in Washington (Castellano and O'Dell 1997). *M. overholtsii* was originally described from an occurrence in the Medicine Bow Mountains of Wyoming. The species has also been recently reported from Japan (Cha et al. 2010), although its

distribution in Japan is not confirmed. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed in western North America and possibly parts of Asia. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *M. overholtsii* from more than 20 element occurrences in North America in 2004, but the number of occurrences in the NSO range was not known. In 2004, *M. overholtsii* populations were presumed to be relatively stable (ORBIC 2004). The species was found in two locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 143 new sites of *M. overholtsii* in the NSO range between 1998–2006, and 151 total sites were documented by 2006, including 73 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 136 sites on federal lands and 142 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). *M. overholtsii* was a Category D species at the time and was not specifically targeted during surveys, although incidental sightings of Category D species were recorded and resulted in one new observation of *M. overholtsii*. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (more than 18-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

Based on data available in 1999, *M. overholtsii* was found in higher elevation coniferous forests above 3,000 feet msl, primarily near fir trees (*Abies* spp.) (Castellano et al. 1999). It has been found in gregarious caespitose clusters on decayed wood (stumps, downed wood) near snow banks or where snow has recently melted (Castellano et al. 1999, The Fungi of California 2010), as well as on decorticated logs buried beneath the snow (Cripps 2009). Within the range of the NSO, *M. overholtsii* has been found primarily within LSOG forests, but is occasionally found in younger forests adjacent to LSOG stands (Hibler et al. 2001d). *M. overholtsii* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

A serious threat to *M. overholtsii* is fire, and other activities that disrupt stand conditions or remove woody debris, such as road, trail, and campground construction, also threaten the species

(Castellano and O'Dell 1997). Logging has threatened the species through removal of overstory trees, which modify microclimates. Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *M. overholtsii* with several other species (Group 16 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites by minimizing soil disturbance at or around known sites and preventing removal of host trees. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *M. overholtsii*:

- As a wood saprobe, *M. overholtsii* probably does not extend beyond the available substrate (log, stump etc). Retention of habitat patches across a landscape could provide possible areas of refugia and potential areas for colonization**.** To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.30.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *M. overholtsii* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table MYOV-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 194 observations from BLM and Forest Service geodatabases were converted into 175 sites in the NSO range (region). Table MYOV-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table MYOV-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure MYOV-1 displays the regional distribution of the species across BLM and NFS lands, and Figure MYOV-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests above 2,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE MYOV-1

Number of *Mycena overholtsii* Sites (2013)

Location*	Number of Sites
Regional Area	175
Local Area	10
Analysis Area (Project Area)	2 (2)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE MYOV-2

Distribution of *Mycena overholtsii* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	3	-	-
Forest Service	171	10	2
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	2	1	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE MYOV-3

Distribution of *Mycena overholtsii* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	21	-	-
Congressionally Reserved (CR)	**25**	**1**	**-**
Late Successional Reserve (LSR)	**62**	**1**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	78	9	2
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

M. overholtsii is somewhat widely distributed across six physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Cascades East and West and Klamath Mountain), and California (Klamath). Most sites are found along the eastern Cascade Range, where the sites are found in two general groups in southern Oregon and northern Washington. Scattered sites are located in the Klamath Mountains of Oregon and California, where the species is less abundant and sites are more than 25 miles from other sites in the Cascade Range. *M. overholtsii* appears to be well distributed in the eastern Cascade Range in Oregon and Washington where sites are more abundant and clustered in two large groups.

Two of 175 sites are partially located on private land; one site is on NPS land (Mount Rainier National Park); and 174 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the National Forests that encompass the project area include three sites on the Rogue River National Forest, seven sites on the Umpqua National Forest, and 69 sites on the Winema National Forest. The remaining 95 sites on BLM and NFS lands are in the Salem District and on the Deschutes, Gifford Pinchot, Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Shasta-Trinity, Six Rivers, Wenatchee, and Willamette National Forests.



Figure MYOV-1. Regional Distribution of *Mycena overholtsii*

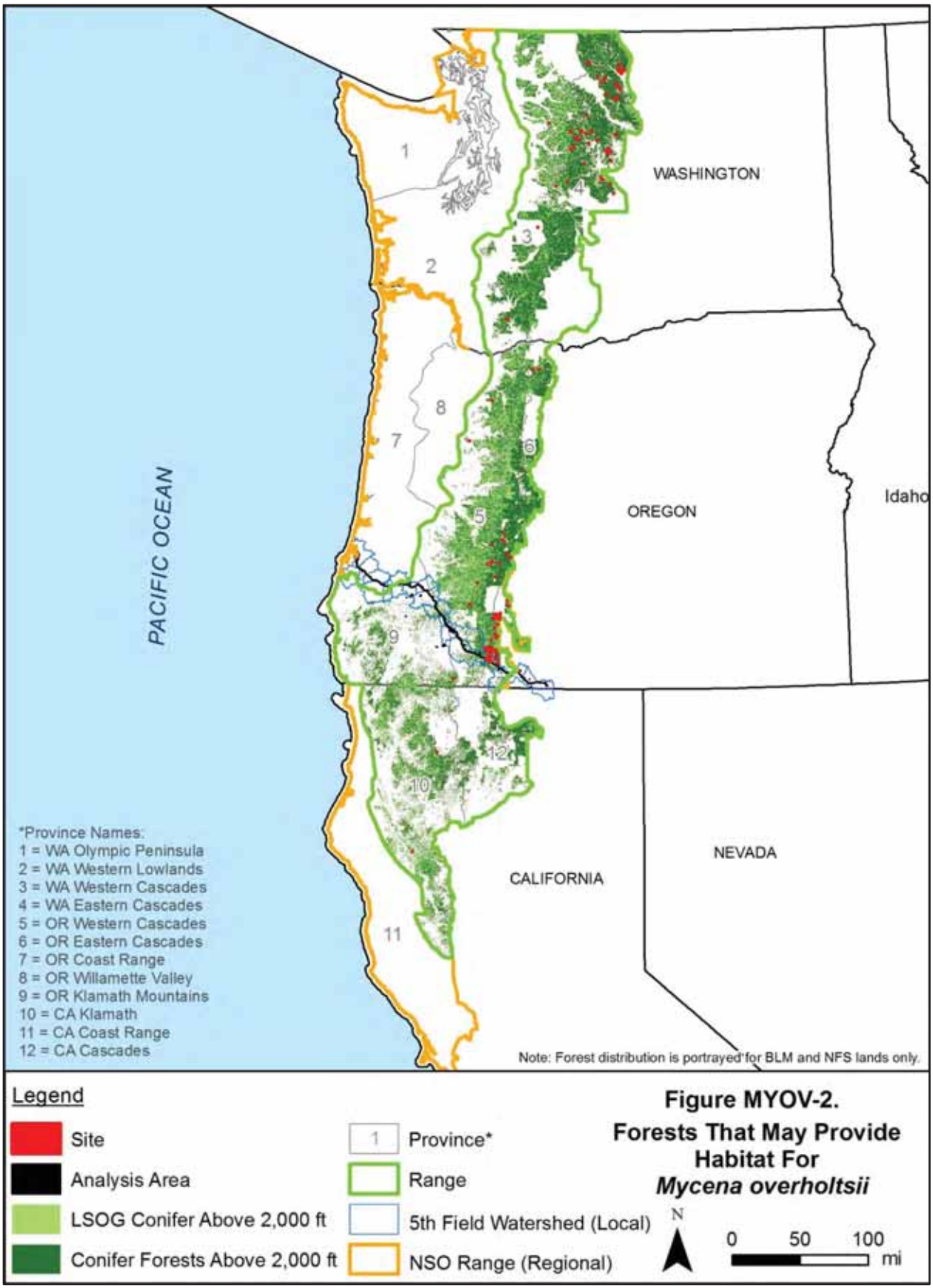


Figure MYOV-2.
Forests That May Provide Habitat For *Mycena overholtsii*

Across the NSO range, 84 sites are located on reserve lands managed by BLM and the Forest Service, including 62 in LSRs (at least partially) and 25 in Congressionally Reserved areas (at least partially). This represents 48 percent of the BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

M. overholtsii is more commonly found in LSOG forests based on available data (98 of 175 total sites are in LSOG), but is also relatively common in non-LSOG forests and has been found in younger forests adjacent to LSOG stands. Based on current site locations, the species has been found in coniferous forests above about 2,500 feet msl and has only been documented in the eastern part of the NSO range. Coniferous forests, including the LSOG component of these forests, within this range could provide habitat for *M. overholtsii* and support additional sites. These forests encompass an estimated 13.6 million acres on BLM and NFS lands in the eastern part of the NSO range, including an estimated 7.8 million acres in reserve land allocations (57 percent of the forests; Table MYOV-4). Of this acreage, an estimated 3.9 million acres are LSOG (see Figure MYOV-2), including 2.0 million acres in reserve land allocations (51 percent of the forests). Coniferous forests, including LSOG coniferous forests, above 2,000 feet msl are somewhat widespread across the species' range and are primarily found along the Cascade Range and the Klamath Mountains.

TABLE MYOV-4

Extent of Forests that Could Provide Habitat for *Mycena overholtsii* on BLM and NFS Lands*

Location	Coniferous Forests above 2,000 feet		LSOG Coniferous Forests above 2,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	13,621,680	7,780,840	3,886,500	1,963,450
Local Area	305,250	100,750	98,820	38,450
Project Area	730	360	220	130

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *M. overholtsii* is found in two 5th field watersheds (Little Butte Creek and Spencer Creek) that overlap the project area (see Table MYOV-5 and Figure MYOV-3). The sites are near one another in the Cascade Range in the eastern portion of the local area. Within the Cascade Range, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 10 miles to the north in the Cascade Range.

All of the 10 sites in the local area are on NFS lands (Rogue River and Winema National Forests), and one site is partially on private land. Most of the local sites are on land designated as Other (Matrix). Two sites are in reserves (CR and LSR), representing 20 percent of the total sites in the local area.

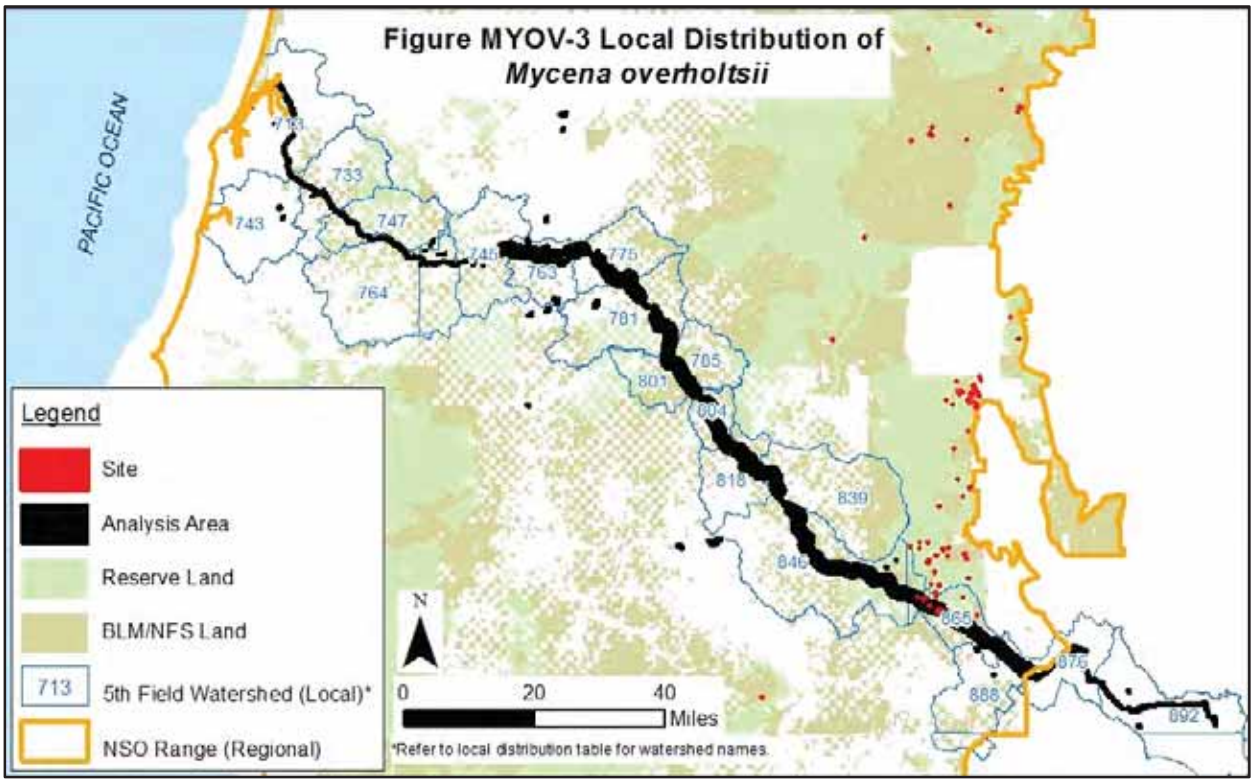
Coniferous forests above 2,000 feet msl encompass approximately 305,250 acres on BLM and NFS lands in the local area, with 100,750 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 98,820 acres are LSOG, including 38,450 acres in reserves (39 percent of the forests). Other sites may also exist in the local area, particularly in the Cascade Range, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures MYOV-2 and MYOV-3).

TABLE MYOV-5

Distribution of *Mycena overholtsii* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	1	1*
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	10	2*
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
*Note: Site counts are not additive because one site occurs in both watersheds and the counts overlap.



Analysis/Project Area Distribution

The analysis and project areas contain two sites of *M. overholtsii*. These sites are on Forest Service-managed lands (Rogue River and Winema National Forests) on lands designated as Other (Matrix), with one site partially in an LSR on both National Forests. The sites are restricted to a small portion of the eastern side of the analysis area and are near each other. Several sites are located within the immediate vicinity (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in one observation of the species near the project area during summer 2011 (Siskiyou BioSurvey LLC 2012a). This recorded observation in combination with agency records comprises the two sites in the analysis area. Within the project area, the sites are at MP 167.9 and MP 171.9.

Project Impacts

Analysis

The PCGP Project would affect two sites out of the 174 sites on BLM and NFS lands in the region, representing approximately 1 percent of the sites (or two out of 175 total sites on all lands in the NSO range). Table MYOV-6 presents an overview of the features of the PCGP Project that would affect the *M. overholtsii* sites. The construction corridor and associated storage areas would affect approximately 1.3 acres within the sites (about 25 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *M. overholtsii* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.9 acre of vegetation and soils within two sites and could result in the removal of *M. overholtsii* populations or individuals on logs or understory components that are removed. Disturbance in a TEWA would result in similar impacts on less than 0.1 acre within one site. The establishment of the corridor and TEWAs could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and woody debris could negatively affect *M. overholtsii* in adjacent areas by removing its habitat, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.4 acre of understory habitat in two sites, which could remove logs or woody debris, potentially making the habitat unsuitable for the species or removing individuals.

TABLE MYOV-6

Impacts to *Mycena overholtsii* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	2	0.9 ac
Temporary Extra Work Area (TEWA)	1	0.08 ac
Uncleared Storage Area (UCSA)	2	0.4 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the two sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 580 acres of coniferous forests above 2,000 feet msl, including 170 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *M. overholtsii*. Within this impact area, about 420 acres (about 72 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 130 acres of coniferous forests above 2,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests above 2,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the two sites as a result of the PCGP Project, eight sites of *M. overholtsii* would remain on NFS lands in the local area, including one in a reserve, and 173 sites, including 83 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 83 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 48 percent of the remaining *M. overholtsii* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *M. overholtsii* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *M. overholtsii* has a somewhat wide distribution across six physiographic provinces and three states in the region and a moderate-high number of overall

sites (174 on BLM and NFS lands). The species appears to be well distributed in the eastern Cascade Range in Oregon and Washington, but has a scattered distribution outside the mountain range. The currently known number of sites on BLM and NFS lands is an increase of 38 sites since 2007, with one site documented during the PCGP Project surveys.

  - An estimated 48 percent of the sites (84 sites) are in reserves, which is an increase of about 11 sites in reserves since 2006 per Molina (2008).

- Coniferous forests above 2,000 feet msl (general habitat for the species) are somewhat widespread across the eastern part of the NSO range and encompass approximately 13.6 million acres on BLM and NFS lands with an estimated 57 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. A subcomponent of these forests likely provides habitat for *M. overholtsii*.
- The PCGP Project would affect two of 174 BLM- and Forest Service-managed sites of *M. overholtsii*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the two sites, a moderate-high number of sites (173) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Washington, Oregon, and California. Some sites (eight sites) would remain in the local vicinity of the analysis area; these sites would be found in the Cascade Range in one 5th field watershed. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in an LSR, but would not change the percentage of sites in reserves (48 percent). Of the remaining sites, 60 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 25 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *M. overholtsii* are unlikely.
- The PCGP Project would result in the permanent loss of an estimated 130 acres of coniferous forests above 2,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 7.8 million acres (57 percent) of coniferous forests and 2.0 million acres (51 percent) of LSOG coniferous forests above 2,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *M. overholtsii*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.30.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *M. overholtsii* at two sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 173 sites would remain on BLM and NFS lands across the region, and eight sites would remain on NFS lands in the local area. Although the PCGP Project would affect site persistence of *M. overholtsii* at two sites, these sites are part of a large group of sites in the Cascade Range in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *M. overholtsii* would persist in the region without considering those sites as part of the population.
- The PCGP Project would remove approximately 580 acres of coniferous forests and 170 acres of LSOG coniferous forests above 2,000 feet msl (a negligible amount of the forests). An estimated 72 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 7.8 million acres (57 percent) of coniferous forests and 2.0 million acres (51 percent) of LSOG coniferous forests above 2,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in one of the two groups of sites in the Cascade Range, several sites are scattered across the region and are less likely to be collectively affected by a single event.

The PCGP Project would not be able to avoid impacts to all *M. overholtsii* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the two *M. overholtsii* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *M. overholtsii* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.31 NEOURNULA POUCHETII

Neournula pouchetii, synonymous with *Urnula pouchetii* and *Neournula normandensis*, is a cup fungus in the Chorioactidaceae family. It is commonly known as rose goblet.

2.31.1 Regulatory Status and Ranking

The 2001 ROD identifies *N. pouchetii* as a Category B (rare) species. The ORBIC did not evaluate *N. pouchetii* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state

rankings are unknown. The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.31.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

N. pouchetii is a saprophyte that is most easily detected in spring and early summer, fruiting March through July (Castellano et al. 1999). Little specific information is known about the reproductive biology of *N. pouchetii*, but as with other cup fungi, the species is presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997)

Range

N. pouchetii is found in France, northern Africa, and North America, including British Columbia, Washington, northern Idaho, Oregon, and eastern Canada (Castellano and O'Dell 1997, Holthausen et al. 1994). The currently known range of the species within the NSO range based on 2014 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across parts of Europe, Africa, and North America, including the Pacific Northwest. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

N. pouchetii was documented at eight sites by 1994 and at 18 new sites between 1994–2000 (USDA and USDI 2000). The species was found in 16 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 54 new sites of *N. Pouchetii* in the NSO range between 1998–2006, and 75 total sites were documented by 2006, including 22 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 56 sites on federal lands and 75 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2011 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *N. pouchetii*, and resulted in 11 new observations of populations of the species. Based on the increased number of sites since 1998 with increased

surveys (more than 3-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range in Washington and Oregon. The current estimated number of sites and distribution of the species based on 2014 data are presented below under the Species Distribution discussion.

Habitat

N. pouchetii occurs as scattered to gregarious sporocarp cups in young to older coniferous or mixed hardwood-coniferous forest stands (35 to 200 years old) (Castellano et al. 1999). Sporocarps develop on soil under duff, litter, and mosses and become exposed to atmosphere as they mature. *N. pouchetii* is commonly associated with Douglas-fir, western redcedar, and mountain hemlock (Castellano and O'Dell 1997). *N. pouchetii* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *N. pouchetii* are not well understood. Because it grows in young and older stands, disruptions to stand conditions, including fire and timber harvest, may not adversely affect the species (Castellano and O'Dell 1997). Although not documented for *N. pouchetii*, other similar fungi are harmed by air pollution, acid deposition, and deposition of nitrogen (NO_x) and sulfur (SO_x) compounds. *N. pouchetii* is not routinely harvested for food.

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations have not been developed for *N. pouchetii*, although it was discussed in *Survey and Manage Management Recommendations for Fungi* (Group 26 of Castellano and O'Dell 1997).

2.31.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *N. pouchetii* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table NEPO-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 108 observations from BLM and Forest Service geodatabases were converted into 81 sites in the NSO range (region). Table NEPO-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table NEPO-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the

regional, local, and analysis areas. Figure NEPO-1 displays the regional distribution of the species across BLM and NFS lands, and Figure NEPO-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE NEPO-1

Number of *Neournula pouchetii* Sites (2014)

Location*	Number of Sites
Regional Area	81
Local Area	13
Analysis Area (Project Area)	9 (9)

Data Source: Processed BLM and Forest Service GIS data, April 7, 2014
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE NEPO-2

Distribution of *Neournula pouchetii* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	25	7	3
Forest Service	51	7	7
NPS	2	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	14	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE NEPO-3

Distribution of *Neournula pouchetii* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	9	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	1	-	-
Congressionally Reserved (CR)	**3**	**-**	**-**
Late Successional Reserve (LSR)	**28**	**10**	**7**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	37	3	2
Riparian Reserve**	**1**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).



Figure NEPO-1.
Regional Distribution of
Neournula pouchetii



Figure NEPO-2.
Forests That May Provide Habitat For *Neournula pouchetii*

Regional Distribution

N. pouchetii is widely distributed across nine physiographic provinces in Washington (Olympic Peninsula, Western Lowlands, Western and Eastern Cascades), Oregon (Coast Range, Willamette Valley, Cascades West, and Klamath Mountain), and California (Klamath). The sites are clustered or relatively close to one another in groups in Oregon. *N. pouchetii* is less abundant in California, with a single site located in the Klamath Mountains. Sites are scattered in Washington. The species appears to be well distributed in its range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the state.

Fourteen of 81 sites are located on private, state, or other lands (at least partially); two sites are on NPS lands (Olympic and Mt. Rainier National Parks); and 74 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 10 sites in the Roseburg District, four sites in the Medford District, and three sites in the Coos Bay District. Sites managed by the National Forests that encompass the project area include 15 sites on the Umpqua National Forest and six sites on the Rogue River National Forest. The remaining 38 sites on BLM and NFS lands are in the Salem District and on the Gifford-Pinchot, Mt. Baker, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 33 sites are located on reserve lands managed by BLM and the Forest Service, including 28 in LSRs, three in Congressionally Reserved areas, two in Known Owl Activity Centers, and one in a Riparian Reserve. Three sites overlap more than one type of reserve. The number of sites in reserves represents 45 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The two NPS sites, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

N. pouchetii is more commonly found in LSOG forests based on available data (69 of 81 total sites are in LSOG), but it is also found in non-LSOG forests. It may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *N. pouchetii* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the NSO range, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table NEPO-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure NEPO-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE NEPO-4

Extent of Forests that Could Provide Habitat for *Neournula pouchetii* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

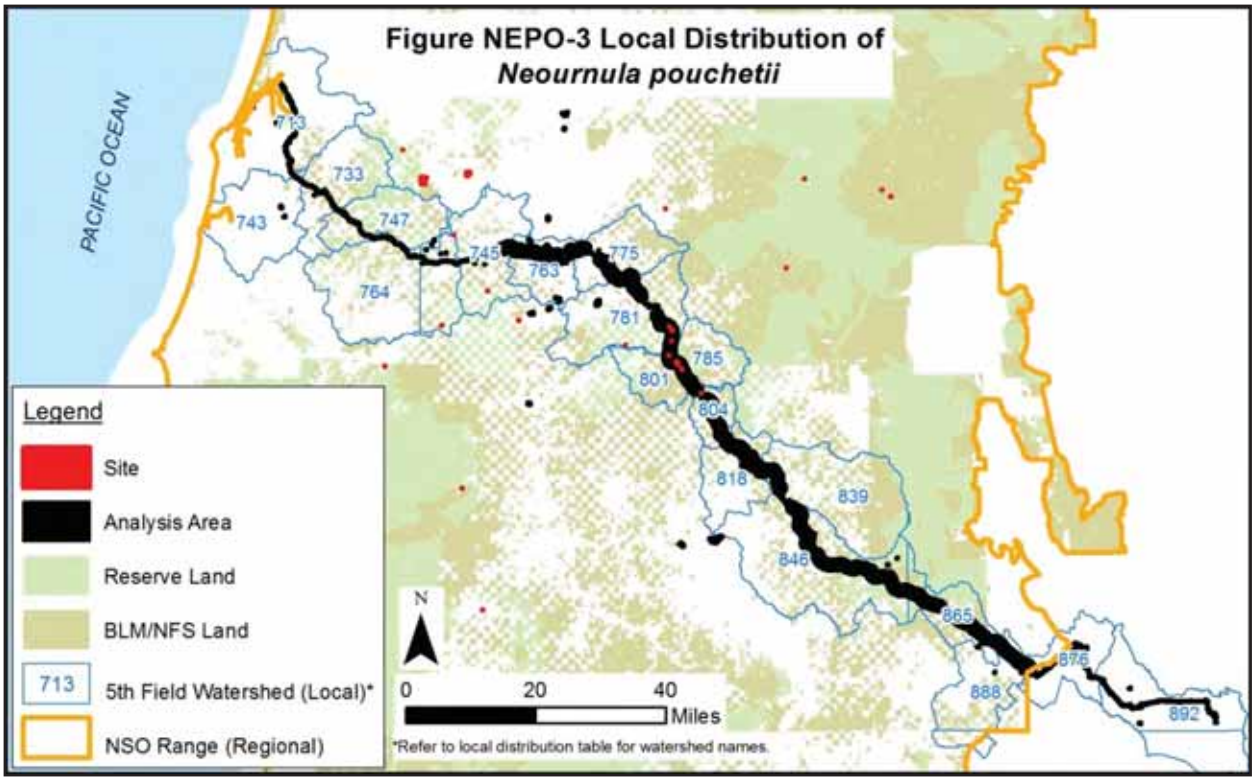
Within the local area, *N. pouchetii* is found in six 5th field watersheds that overlap the project area (see Table NEPO-5 and Figure NEPO-3). All but one of the local area sites are located in the Klamath Mountains, where the sites are clustered and near each other. A single site is located in the Coast Range, with several regional sites located to the north within the same mountain range. Throughout the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests and opportunities for dispersal exist within the local area and to nearby regional areas. Several regional sites are located to the north in the Coast Range and to the south and west in the Klamath Mountains, within 10 miles of the western-most sites in the local area. Several sites are also located to the north in the western Cascade Range, approximately 20 miles from the eastern-most sites in the local area.

TABLE NEPO-5

Distribution of *Neournula pouchetii* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	5*	4**
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	1	1
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	2	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	5*	4
Spencer Creek (865)	-	-
Trail Creek (804)	1	-
Upper Cow Creek (801)	4	4**

Data Sources: Processed BLM and Forest Service GIS data, April 7, 2014; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*One site is in the Elk Creek-South Umpqua and South Umpqua River watersheds.
**Four sites in reserves are in the Elk Creek-South Umpqua and Upper Cow Creek watersheds.



All of the 13 sites in the local area are on BLM or NFS lands, including seven sites at least partially on BLM land (Roseburg District) and seven sites at least partially on NFS land (Umpqua National Forest). Ten of the local sites are in LSRs, and three are on land designated as Other (Matrix). The sites located on reserve lands represent 77 percent of the BLM- and Forest Service-managed sites in the local area. The sites in LSRs are distributed across five watersheds (Table NEPO-5).

Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number and distribution of sites in the local and nearby regional areas and the extent of forests that may provide suitable habitat (see Figures NEPO-2 and NEPO-3).

Analysis/Project Area Distribution

The analysis and project areas contain nine sites of *N. pouchetii*, all of which are on BLM or NFS lands. Three sites are at least partially on BLM-managed lands in the Roseburg District, and seven sites are at least partially on Forest Service-managed lands in the Umpqua National Forest. The sites are located on lands designated as Other (Matrix) and LSRs, with seven sites on reserve lands. The analysis area sites are distributed across four 5th field watersheds in the center portion of the analysis area. Many sites are also located relatively close to the analysis area, in the western Cascade Range and the Klamath Mountains (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 17 observations of the species in 11 locations in or near the project area during 2010 (Siskiyou BioSurvey LLC 2012a). The 17 observations comprise the nine sites in the analysis area. The sites are located between MPs 97.5 and 111.8.

Project Impacts

Analysis

The PCGP Project would affect nine sites out of the 74 sites on BLM- and Forest Service-managed lands in the region, representing approximately 12 percent of the sites (or nine out of 81 total sites on all lands in the NSO range). Table NEPO-6 presents an overview of the features of the PCGP Project that would affect the *N. pouchetii* sites. The construction corridor and associated work and storage areas would affect approximately 13.8 acres within the sites (about 38 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *N. pouchetii* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 9.2 acres of vegetation and soil within nine sites and could result in the removal of *N. pouchetii* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1.8 acres within seven sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *N. pouchetii* in adjacent areas by removing its habitat, disturbing soil around roots of conifer trees, and affecting its ability to attach to roots, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 2.7 acres of understory habitat in three sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE NEPO-6

Impacts to *Neournula pouchetii* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	9	9.2 ac
Temporary Extra Work Area (TEWA)	7	1.8 ac
Uncleared Storage Area (UCSA)	3	2.7 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *N.*

pouchetii. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the nine sites as a result of the PCGP Project, four sites of *N. pouchetii* would remain on BLM lands in the local area, including three in reserves, and 65 sites, including 26 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 26 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 40 percent of the remaining *N. pouchetii* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *N. pouchetii* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *N. pouchetii* has a wide distribution across nine physiographic provinces and three states in the region and a moderate-high number of overall sites (74 on BLM and NFS lands). The species appears to be well distributed in its range in Oregon. The currently known number of sites on BLM and NFS lands is an increase of about 18 sites on BLM and NFS lands since 2007, with several sites documented during the PCGP Project surveys.
    - An estimated 45 percent of the sites (33 sites) are in reserves, which is an increase of about 11 sites in reserves since 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widespread across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and sites are fairly common in the mountain range. A subcomponent of these forests likely provides habitat for *N. pouchetii*.
- The PCGP Project would affect nine of 74 BLM- and Forest Service-managed sites of *N. pouchetii*, representing approximately 12 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the sites, a moderate-high number of sites (65) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Few sites (four) would remain in the local vicinity of the analysis area; these sites would be distributed across three 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at seven sites in LSRs, which would reduce the percentage of sites in reserves to 40 percent. Of the remaining sites, 23 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are at least partially in Congressionally Reserved areas where management activities that may adversely affect *N. pouchetii* are unlikely. One other site is in a Riparian Reserve where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of coniferous and mixed hardwood-coniferous forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *N. pouchetii*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.31.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *N. pouchetii* at nine sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 65 sites would remain on BLM and NFS lands across the region, and four sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *N. pouchetii* at nine sites, the sites are located in

in the Klamath Mountains in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *N. pouchetii* would persist in the region without considering the nine sites as part of the population.

- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55 percent) of coniferous and mixed hardwood-coniferous forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *N. pouchetii* sites in the analysis area, although some individuals within the sites may persist following project implementation. Based on the above conclusions, avoidance of the nine *N. pouchetii* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *N. pouchetii* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.32 NIVATOGASTRIUM NUBIGENUM

Nivatogastrium nubigenum is a false truffle in the Strophariaceae family. It is commonly known as bubblegum fungus.

2.32.1 Regulatory Status and Ranking

The 2001 ROD identifies *N. nubigenum* as a Category B (rare) species. The ORBIC evaluated *N. nubigenum* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, both globally and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. *N. nubigenum* is not a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.32.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using

previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little information is known about the autecology or reproductive biology of *N. nubigenum*. It is a saprophytic species, obtaining its nutrients from dead or decaying plant matter (ORBIC 2004). It fruits on the surface of fir logs and is most easily detected May–October during its fruiting season (Castellano et al. 1999). As with other sequestrate species, *N. nubigenum* is presumed to be dependent on mycophagy (consumption of fungi by animals) for dispersal of spores (Castellano and O'Dell 1997).

Range

N. nubigenum is endemic to California and Oregon in North America. The species is primarily found in the Cascade Range, Sierra Nevada, and Siskiyou Mountains (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed from central Oregon to central California. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under the Threats section below.

Population Status

The ORBIC reported *N. nubigenum* from more than 300 element occurrences across the NSO range in 2004. Most of these occurrences were found in California with fewer in Oregon, although specific estimates were not reported (ORBIC 2004). The species was found in one location in the Oregon and Washington survey region during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 161 new sites of *N. nubigenum* in the NSO range between 1998–2006, and 218 total sites were documented by 2006, including 88 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 200 sites on federal lands and 223 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area, and persistence surveys were conducted for some species in nearby LSRs (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *N. nubigenum,* and resulted in no new observations. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (4-fold increase between 1998 and 2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range, specifically in Oregon and California. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

N. nubigenum grows on the surface of decayed fir logs, primarily above 4,000 feet msl (Castellano and O'Dell 1997, Castellano et al. 1999). The species prefers xeric sites in mature to old-growth forests with a large abundance of coarse woody debris (Holthausen 1994). Based on available information, *C. subalbidus* may be restricted to specific microclimate conditions of LSOG forests.

Threats

Threats to *N. nubigenum* are presumably those actions that disrupt stand conditions necessary for its survival, particularly the removal of the saprophytic host (Castellano and O'Dell 1997, ORBIC 2004). Other threats include: logging, road, trail, or campground construction, or any actions that disturbs the soil or coarse woody debris (Castellano and O'Dell 1997).

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *N. nubigenum* with several other species (Group 12 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites, which will maintain viable populations of the species until additional information on the effects of various management activities can be obtained and evaluated. Populations on federal land should be managed to maintain population viability. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized, and damage to or removal of mycorrhizal and saprophytic hosts should be prevented. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *N. nubigenum*:

- As a wood saprobe, *N. nubigenum* probably does not extend beyond the available substrate (log, stump, etc.). Retention of habitat patches across a landscape could provide possible areas of refugia and potential areas for colonization. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.32.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *N. nubigenum* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table NINU-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that

encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 241 observations from BLM and Forest Service geodatabases were converted into 180 sites in the NSO range (region). Table NINU-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table NINU-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure NINU-1 displays the regional distribution of the species across BLM and NFS lands, and Figure NINU-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests above 4,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE NINU-1

Number of *Nivatogastrium nubigenum* Sites (2013)

Location*	Number of Sites
Regional Area	180
Local Area	33
Analysis Area (Project Area)	7 (6)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE NINU-2

Distribution of *Nivatogastrium nubigenum* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	8	6	-
Forest Service	166	28	7
NPS	7	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	9	7	2

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE NINU-3

Distribution of *Nivatogastrium nubigenum* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	9	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	32	-	-
Congressionally Reserved (CR)	**16**	**1**	**-**
Late Successional Reserve (LSR)	**46**	**3**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	81	29	7
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure NINU-1.
Regional Distribution of
Nivatogastrium nubigenum

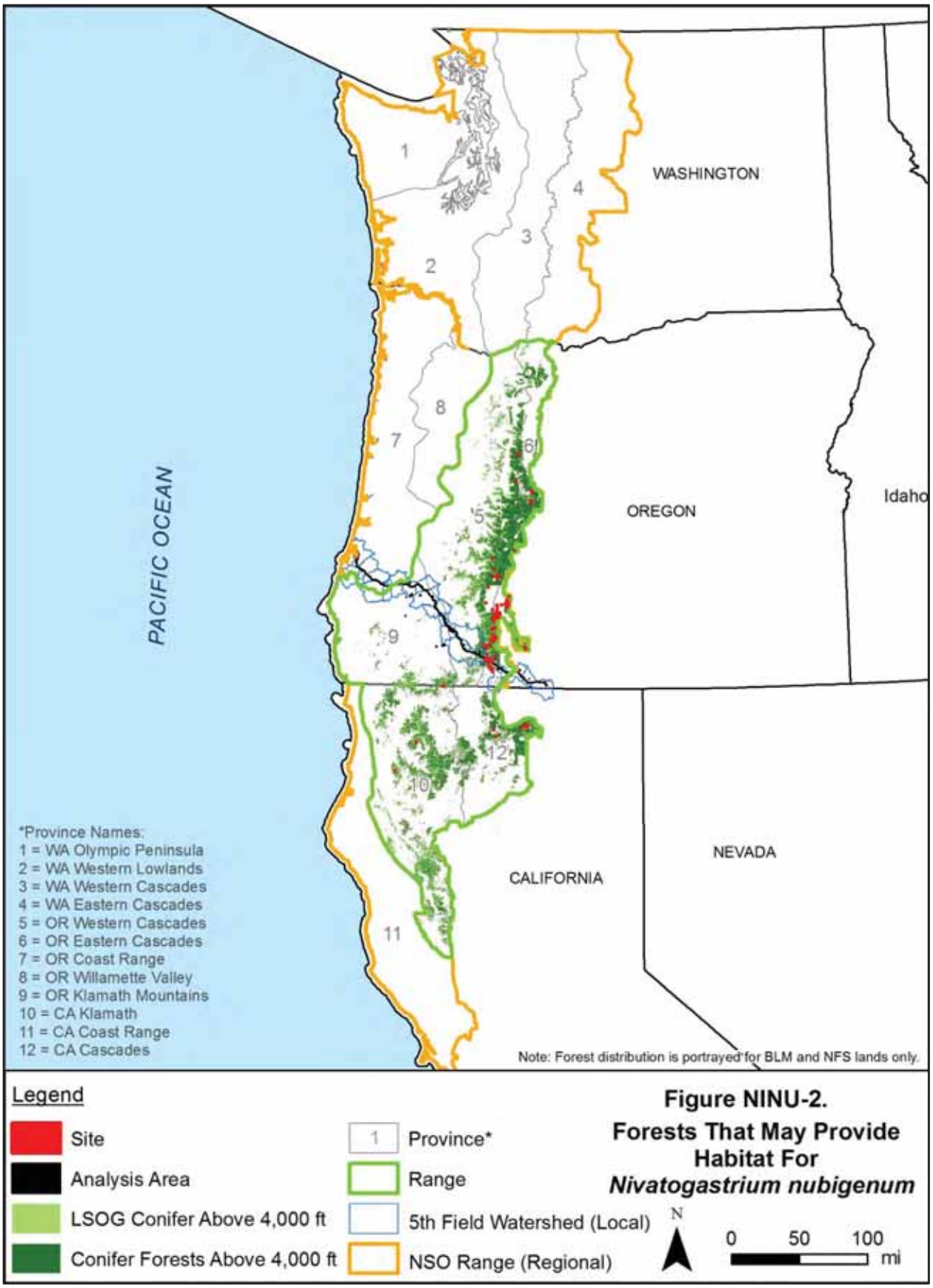


Figure NINU-2.
Forests That May Provide Habitat For *Nivatogastrium nubigenum*

Regional Distribution

N. nubigenum is somewhat widely distributed across five physiographic provinces in Oregon (Cascades East and West, and Klamath Mountains) and California (Klamath and Cascades). Most sites are found along the eastern Cascade Range, where the sites tend to be clustered or relatively close to one another in southern Oregon. Scattered sites are located in the Klamath Mountains and other parts of the Cascade Range. *N. nubigenum* appears to be well distributed in the eastern Cascade Range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Nine of 180 sites are located on private, state, or other lands (at least partially); seven sites are on NPS lands (Crater Lake National Park); and 172 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include eight sites in the Klamath Falls Resource Area of the Lakeview District. Sites managed by the National Forests that encompass the project area include three sites on the Rogue River National Forest, 141 sites on the Winema National Forest, and five sites on the Umpqua National Forest. The remaining 15 sites on NFS lands are on the Deschutes, Klamath, Six Rivers, and Willamette National Forests.

Across the NSO range, 60 sites are located on reserve lands managed by BLM and the Forest Service, including 46 in LSRs and 16 in Congressionally Reserved areas. This represents 35 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The seven NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

N. nubigenum is more common in LSOG forests based on available data (115 of 180 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous forests above about 4,000 feet msl and has been documented in the Cascade Range and Klamath Mountains in Oregon and California. Coniferous forests, including the LSOG component of these forests, within this range could provide habitat for *N. nubigenum* and support additional sites. These forests encompass an estimated 4.7 million acres on BLM and NFS lands in the species' range, including an estimated 2.5 million acres in reserve land allocations (54 percent of the forests; Table NINU-4). Of this acreage, an estimated 1.3 million acres are LSOG (see Figure NINU-2), including 795,940 acres in reserve land allocations (61 percent of the forests). Coniferous forests and LSOG forests are widespread across the species' range.

TABLE NINU-4

Extent of Forests that Could Provide Habitat for *Nivatogastrium nubigenum* on BLM and NFS Lands*

Location	Coniferous Forests above 4,000 feet		LSOG Coniferous Forests above 4,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	4,651,290	2,521,080	1,297,350	795,940
Local Area	147,530	63,030	40,860	20,980
Project Area	420	260	120	80

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *N. nubigenum* is distributed across two 5th field watersheds that overlap the project area (see Table NINU-5 and Figure NINU-3). The sites are clustered and near one another in the Little Butte Creek and Spencer Creek watersheds. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Several regional sites are located to the north in the eastern Cascade Range.

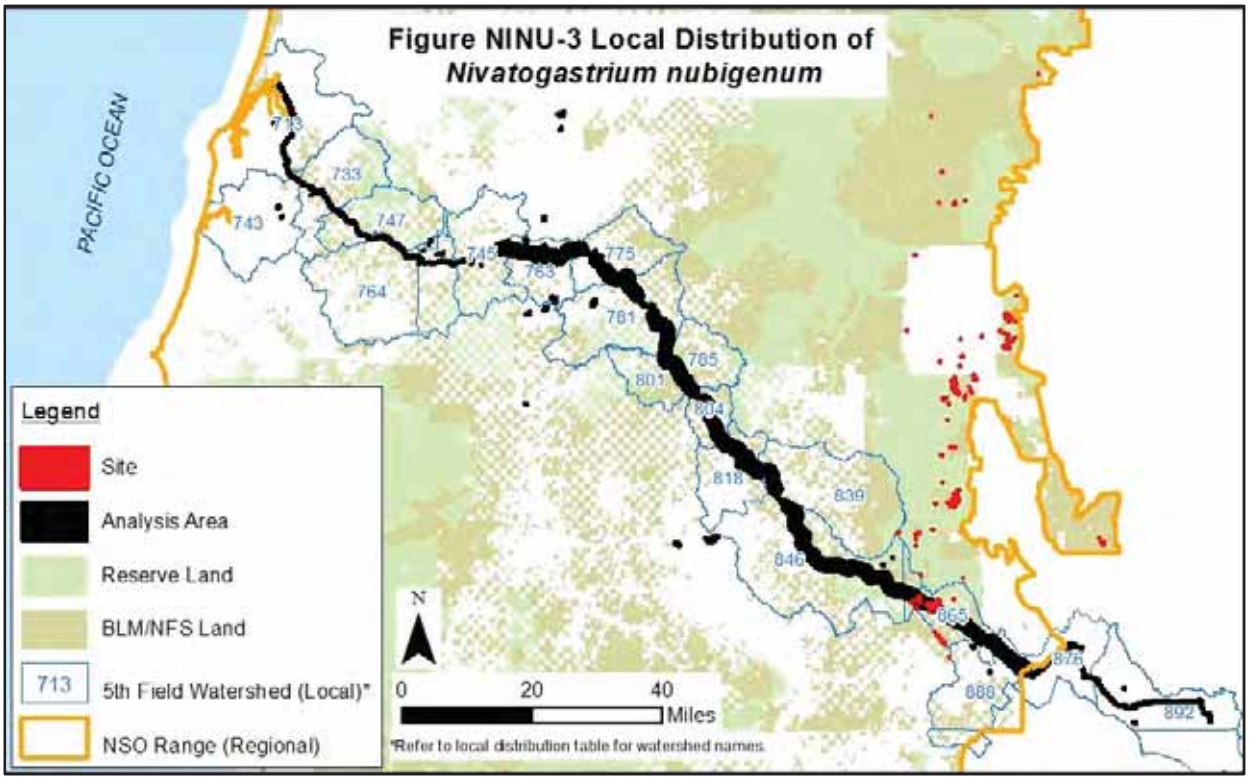
All of the 33 sites in the local area are on BLM and NFS lands. These sites are located on lands designated as Other (Matrix), CR, and LSR. Seven sites are at least partially on private lands. Of the 33 sites in the local area, three sites are on reserve lands (CR and LSRs), representing 9 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table NINU-5 and on Figure NINU-3.

TABLE NINU-5

Distribution of *Nivatogastrium nubigenum* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	2	2
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	31	1
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous forests encompass approximately 147,530 acres on BLM and NFS lands in the local area, including 63,030 acres in reserve land allocations (43 percent of the forests). Of this acreage, an estimated 40,860 acres are LSOG, including 20,980 acres in reserve land allocations (51 percent of the forests). Other sites may also exist in the eastern part of the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures NINU-2 and NINU-3).

Analysis/Project Area Distribution

The analysis area contains seven sites of *N. nubigenum*, and the project area contains six sites. These sites are on Forest Service-managed lands (Winema National Forest) on lands designated as Other (Matrix), and two sites are partially on private lands. The analysis area sites are found in one 5th field watersheds (Spencer Creek). The sites are relatively close to one another. All of the sites are in the eastern portion of the analysis area. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

Surveys for the PCGP Project did not result in any observations of the species (Siskiyou BioSurvey LLC 2012a). Twelve recorded observations of the species in the analysis area are from agency databases and were recorded in 2000. Within the project area, six sites are between MPs 169.1 and 172.2.

Project Impacts

Analysis

The PCGP Project would affect seven sites out of the 172 sites on BLM- and Forest Service-managed lands in the region, representing approximately 4 percent of the sites (or seven out of 180 total sites on all lands in the NSO range). Table NINU-6 presents an overview of the features of the PCGP Project that would affect the *N. nubigenum* sites. The construction corridor and associated work and storage areas would affect approximately 7.6 acres within six sites (about 10 percent of all sites in the analysis area); the seventh site may be indirectly affected by nearby PCGP Project activities. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *N. nubigenum* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

TABLE NINU-6

Impacts to *Nivatogastrium nubigenum* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	6	5.3 ac
Temporary Extra Work Area (TEWA)	4	0.5 ac
Uncleared Storage Area (UCSA)	3	1.8 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Vegetation removal and grading activities in the construction corridor would disturb about 5.3 acres of vegetation and soil within six sites and could result in the removal of *N. nubigenum* populations or individuals on decaying logs. Disturbance in the TEWAs would result in similar impacts on about 0.5 acre within four sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and woody debris could negatively affect *N. nubigenum* in adjacent areas by removing its habitat and affecting its association with the decaying logs or woody debris, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 1.8 acres of understory habitat in three sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

Across the project area, the PCGP Project would remove an estimated 340 acres of coniferous forests, including 100 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *N. nubigenum*. Within this impact area, about 260 acres (about 76 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent

loss of about 90 acres of coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests across the species' range.

Discussion

Assuming site persistence cannot be maintained at the seven sites as a result of the PCGP Project, 26 sites of *N. nubigenum* would remain on BLM and NFS lands in the local area, including three in reserves, and 165 sites, including 60 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 60 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 36 percent of the remaining *N. nubigenum* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *N. nubigenum* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species , as noted below:
    - This species was removed from the S&M Standards and Guidelines in the eastern Cascade Range in Oregon and Cascade Range in California via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M. The species remained on the list as Category B in other areas.
    - *N. nubigenum* has a somewhat wide distribution across five physiographic provinces and two states in the region and a moderate-high number of overall sites (172 on BLM and NFS lands). The species appears to be well distributed in the eastern Cascade Range in Oregon, but has a scattered distribution outside this mountain range. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites since 2007, but is still moderate-high.
    - An estimated 35 percent of the sites (60 sites) are in reserves, which is about the same proportion of sites in reserves as in 2006 per Molina (2008).
- Coniferous forests above 4,000 feet msl (general habitat) are widely distributed across the species' range and encompass approximately 4.7 million acres on BLM and NFS lands with an estimated 54 percent in reserves. The forests are distributed across the Cascade

Range and Klamath Mountains, where all sites are documented. A subcomponent of these forests likely provides habitat for *N. nubigenum*.

- The PCGP Project would affect seven of 172 BLM- and Forest Service-managed sites of *N. nubigenum*, representing approximately 4 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the seven sites, a moderate-high number of sites (165) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Oregon and California. Several sites (26 sites) would remain in the local vicinity of the analysis area; these sites would have a scattered distribution across two 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect site persistence at any sites in reserves, and the percentage of sites in reserves would remain about the same (36 percent). Of the remaining sites, 46 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 16 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *N. nubigenum* are unlikely.
- The PCGP Project would result in a permanent loss of about 90 acres of coniferous forests above 4,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 2.5 million acres (54 percent) of coniferous forests and 795,940 acres (61 percent) of LSOG forests would remain in reserves in the species' range.
- The remaining forests could support additional populations of *N. nubigenum*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

2.32.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *N. nubigenum* at seven sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 165 sites would remain on BLM and NFS lands across the region, and 26 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *N. nubigenum* at seven sites, these sites are part of the many sites in the eastern Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *N. nubigenum* would persist in the region without considering the seven sites as part of the population.
- The PCGP Project would remove approximately 340 acres of coniferous forests and 100 acres of LSOG forests above 4,000 feet msl (a negligible amount of the forests). An estimated 76 percent of the forests would be restored to similar conditions or shrublands,

but a permanent unforested corridor would remain across the project area. An estimated 2.5 million acres (54 percent) of coniferous forests and 795,940 acres (61 percent) of LSOG forests above 4,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *N. nubigenum* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the seven *N. nubigenum* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *N. nubigenum* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species near affected sites and adjacent habitat over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.33 OTIDEA ONOTICA

O. onotica is a cup fungus in the Pyronemataceae family (formerly Otideaceae) and is commonly known as rabbit ears.

2.33.1 Regulatory Status and Ranking

The 2001 ROD identifies *O. onotica* as a Category F (uncommon) species. The ORBIC did not evaluate *O. onotica* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.33.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

O. onotica is a cup fungus that is most easily detected in the late summer through winter (Castellano et al. 1999). Little specific information is known about the autecology or

reproductive biology of *O. onotica*. Cup fungi, including *O. onotica,* are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997). *O. onotica* is either a saprophyte on decaying material or a mycorrhizal species that forms associations with plant roots. It appears to be associated with a restricted group of Pinaceae species (Castellano and O'Dell 1997), especially Douglas-fir dominated forests (Castellano et al. 1999).

Range

O. onotica is distributed across the Pacific Northwest, where it is found in British Columbia, Washington, Oregon, and California (Castellano and O'Dell 1997). *O. onotica* is also found in Europe, where it has been documented in France, Great Britain, Ireland, Italy, and Switzerland (Species Fungorum 2013). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across the Pacific Northwest and Europe. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

O. onotica has been found most often in the Coast Range in Oregon (Castellano et al. 1999). The species was documented at eight sites by 1994 and at 159 new sites between 1994–2000 (USDA and USDI 2000). *O. onotica* was found in nine locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 1,141 new sites of *O. onotica* in the NSO range between 1998–2006, and 1,192 total sites were documented by 2006, including 145 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 88 sites on federal lands and 115 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category F species were recorded during these surveys and resulted in 16 new observations of individuals or populations of *O. onotica*. Based on the increased number of sites since 1998 with increased surveys (more than 23-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. It should also be noted that this species was removed from post-2001 S&M lists because it was considered to be common. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

Little information is known about specific habitat requirements of *O. onotica,* although it has primarily been found in coniferous forests (Castellano and O'Dell 1997). Based on data available in 1994, *O. onotica* grows as sporocarps on duff in moist late-successional coniferous forests (Holthausen et al. 1994). It appears to be associated with Douglas-fir-dominated forests

as well (Castellano et al. 1999). Based on available information, *O. onotica* may prefer specific microclimate conditions of LSOG forests, but it may not be restricted to these conditions.

Threats

Threats to *O. onotica* are presumably those actions that disrupt stand conditions necessary for its survival, particularly damage to overstory trees, host trees, and disturbance to soil, litter, and duff (Castellano and O'Dell 1997). Typical threats to fungi species in coniferous and mixed hardwood-coniferous forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). Little information is known about specific threats to *O. onotica*.

Management Recommendations

As a Category F S&M species, the direction from the 2001 ROD is that management of known sites is not necessary, but a determination needs to be made regarding which S&M category, if any, the species should be assigned to (USDA and USDI 2001). No management recommendations have been developed for *O. onotica* because it was removed from the S&M list after 2001.

2.33.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *O. onotica* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table OTON-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 2,126 observations from BLM and Forest Service geodatabases were converted into 960 sites in the NSO range (region). Table OTON-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table OTON-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure OTON-1 displays the regional distribution of the species across BLM and NFS lands, and Figure OTON-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE OTON-1

Number of *O. onotica* Sites (2013)

Location*	Number of Sites
Regional Area	960
Local Area	114
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE OTON-2

Distribution of *O. onotica* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	715	110	1
Forest Service	231	2	-
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	175	26	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE OTON-3

Distribution of *O. onotica* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	241	-	-
Adaptive Management Reserves (AMR)	10	-	-
Administratively Withdrawn (AW)	4	-	-
Congressionally Reserved (CR)	**5**	**-**	**-**
Late Successional Reserve (LSR)	**100**	**11**	**-**
Marbled Murrelet Area (LSR3)	**13**	**10**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**18**	**2**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	586	96	1
Riparian Reserve**	**1**	**1**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

O. onotica has a wide distribution across 11 physiographic provinces in Washington (Western Lowlands and Western and Eastern Cascades), Oregon (Coast Range, Willamette Valley, Klamath Mountain, and Cascades West and East), and California (Coast, Klamath, and Cascades). Most of the sites are clustered or relatively close to one another in the Cascade Range, Klamath Mountains, and Coast Range throughout Oregon. Sites are more scattered in outlying areas, with few clusters of sites in California and few isolated sites in Washington. The species appears to be well distributed in its range in Oregon, based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

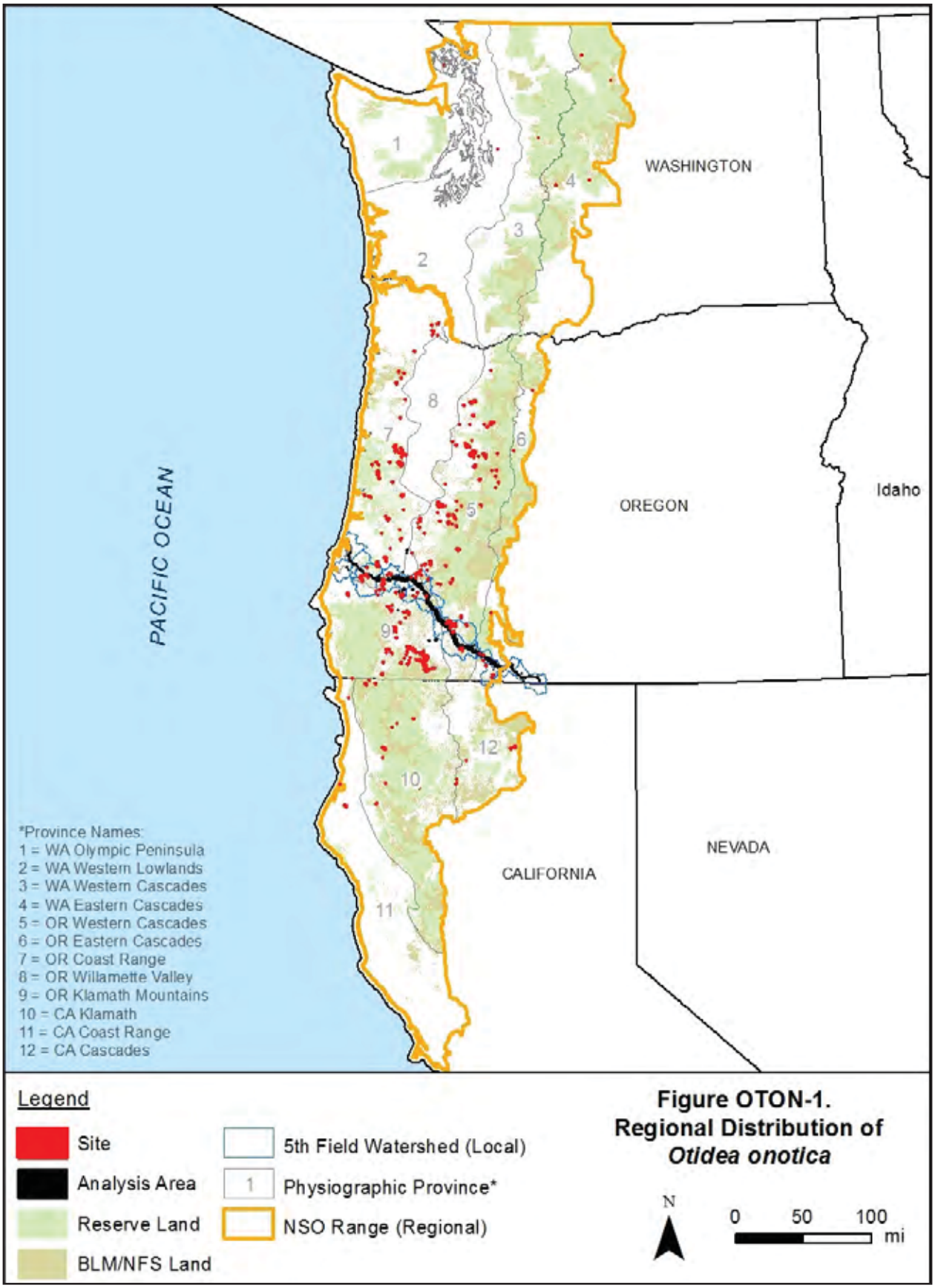


Figure OTON-1. Regional Distribution of *Otidea onotica*

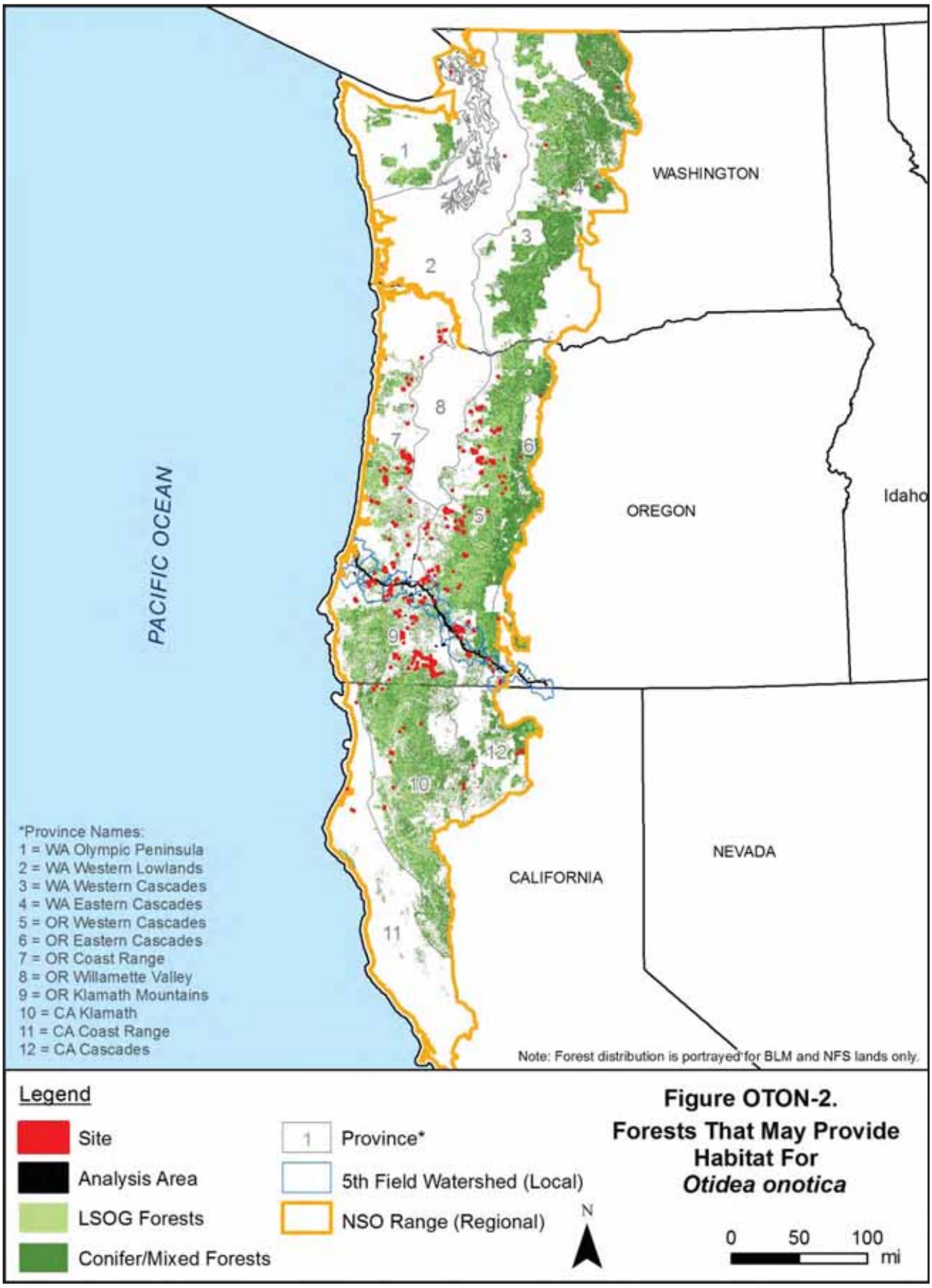


Figure OTON-2.
Forests That May Provide Habitat For *Otidea onotica*

Of the 960 sites in the region, 175 sites are located on private, state, or other lands (at least partially); one site is on NPS lands (Mount Rainier National Park); and 945 sites are on BLM and NFS lands (at least partially). Sites managed by the BLM Districts that encompass the project area include 21 sites in the Coos Bay District, four sites in the Klamath Falls Resource Area of the Lakeview District, 273 sites in the Medford District, and 89 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest, 37 sites on the Umpqua National Forest, and three sites on the Winema National Forest. The remaining 533 sites on BLM and NFS lands are in the Salem, Eugene, and Arcata Districts and on the Deschutes, Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Shasta-Trinity, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 136 sites are located on reserve lands managed by BLM and the Forest Service, including 100 at least partially in LSRs, five in Congressionally Reserved areas, 13 in Marbled Murrelet areas, 18 at least partially in Known Owl Activity Centers, and one in a Riparian Reserve. This represents 14 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

O. onotica is more commonly found in LSOG forests based on available data (766 of 960 total sites are in LSOG), but it is also relatively common in non-LSOG forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *O. onotica* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table OTON-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure OTON-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE OTON-4

Extent of Forests that Could Provide Habitat for *O. onotica* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *O. onotica* is found in nine 5th field watersheds that overlap the project area (see Table OTON-5 and Figure OTON-3). The sites are clustered and relatively close to

one another in the Coast Range, Klamath Mountains, and western Cascade Range and are a part of the many clustered sites in Oregon (see Regional Distribution discussion above). Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites occur to the north in the western Cascade Range and Coast Range and to the south in the Klamath Mountains.

Of the 114 sites in the local area, 112 are at least partially on BLM or NFS lands, including two sites on NFS lands (Winema National Forest) and 110 sites on BLM lands (Coos Bay, Lakeview, Medford, and Roseburg Districts). Twenty-six sites are at least partially on private, state, or other lands. Most of the local sites on BLM and NFS lands are on land designated as Other (Matrix). Of the 112 sites on BLM and NFS lands, 24 sites are in reserves, including 11 sites in LSRs, 10 sites are in Marbled Murrelet areas, two sites in Known Owl Activity Centers, and one site in a Riparian Reserve. The number of sites on reserve lands represents 21 percent of the BLM- and Forest Service-managed sites in the local area. Sites on reserve lands are present in six of the nine watersheds (Table OTON-5).

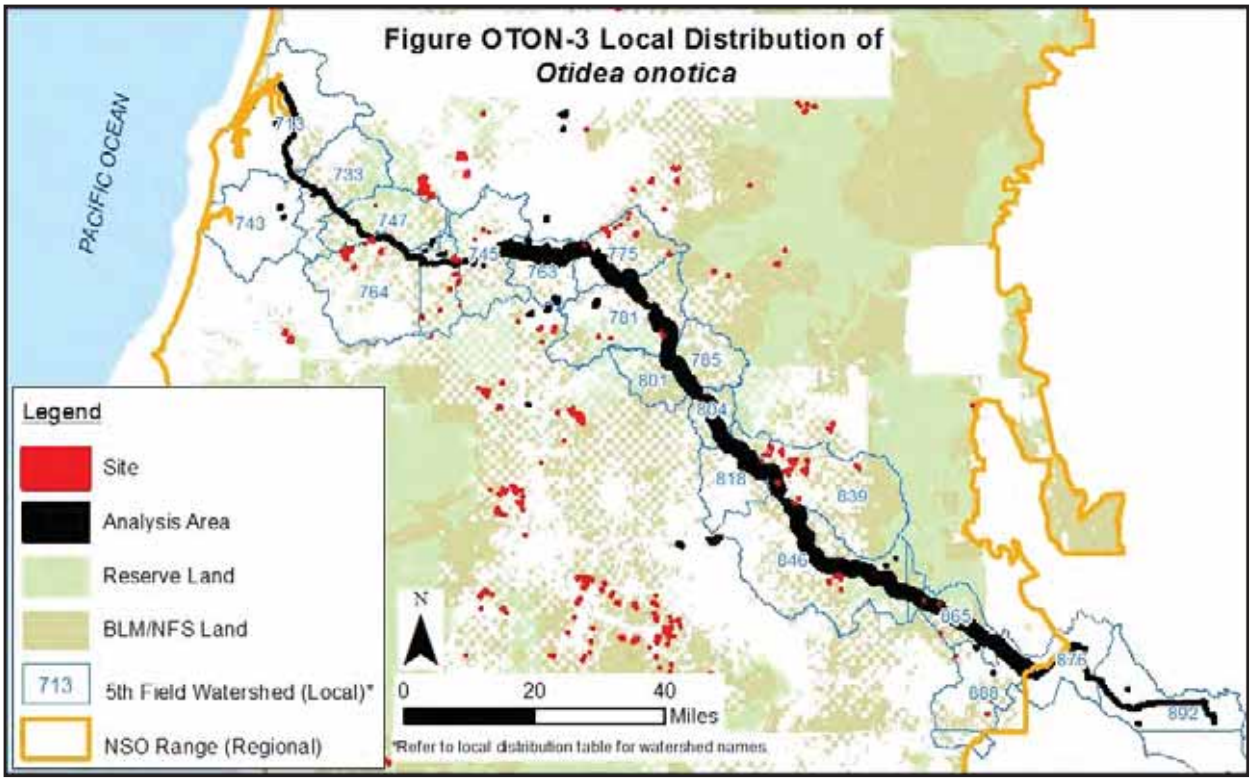
Coniferous and mixed hardwood-coniferous forests encompass approximately 1.3 million acres on BLM and NFS lands in the local area, including 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures OTON-2 and OTON-3).

TABLE OTON-5

Distribution of *O. onotica* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	43	1
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	2	1
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	3	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	8	2
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	27	12
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	16	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	5	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	7	7
Spencer Creek (865)	3	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *O. onotica*. This site is partially on BLM-managed lands (Coos Bay) and partially on private land. It is on land designated as Other (Matrix) in the Middle Fork Coquille River watershed. This site is part of a large group of sites in the Coast Range, and several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 46 total observations of the species in 16 locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). All observations of the species from the PCGP Project surveys are in sites outside the analysis area. The recorded observation of the species in the project area is from agency databases and was recorded in 1999. The site is located at MP 36.1.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 945 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent of the sites (or one out of 960 total sites on all lands in the NSO range). Table OTON-6 presents an overview of the features of the PCGP Project that would affect the *O. onotica* sites. The construction corridor and associated work areas would affect approximately 2.1 acres within the site (about 2 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *O. onotica* in and near the project area. This discussion presents an overview

of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 1.3 acres of vegetation and soil within the site and could result in the removal of *O. onotica* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.8 acre within the site. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and woody debris and disturbance to soil could negatively affect *O. onotica* in adjacent areas by removing its habitat, disturbing soil or understory components around trees or roots of trees, and affecting its potential association with the trees or woody debris, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE OTON-6

Impacts to *Otidea onotica* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	1.3 ac
Temporary Extra Work Area (TEWA)	1	0.8 ac
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *O. onotica*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, 111 sites of *O. onotica* would remain on BLM and NFS lands in the local area, including 24 in reserves, and 944 sites, including 136 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 136 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for

those land allocations. Based on these site counts, approximately 14 percent of the remaining *O. onotica* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *O. onotica* is a Category F (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, information on Category F species is insufficient to determine what level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *O. onotica* has a wide distribution across 11 physiographic provinces and three states in the region and a moderate-high number of overall sites (945 on BLM and NFS lands). The species appears to be well distributed in its range in Oregon. The currently known number of sites on BLM and NFS lands is an increase of 857 sites on BLM and NFS lands since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 14 percent of the sites (136 sites) are in reserves, which is about the same proportion of sites in reserves as in 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range, Klamath Mountains, and Coast Range where most sites are documented. A subcomponent of these forests likely provides habitat for *O. onotica*.
- The PCGP Project would affect one of 945 BLM- and Forest Service-managed sites of *O. onotica*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the single site, a moderate-high number of sites (944) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (111 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across nine 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would not affect any sites in reserves, and the proportion of sites in reserves would be about the same (14 percent). Of the remaining sites, 130 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and five are in Congressionally Reserved areas where management activities that may adversely affect *O. onotica* are unlikely. One other site is in a Riparian Reserve where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *O. onotica*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category F species for which pre-disturbance surveys are not applicable and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.33.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *O. onotica* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 944 sites would remain on BLM and NFS lands across the region, and 111 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *O. onotica* at one site, the site is a part of the many sites in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *O. onotica* would persist in the region without considering the single site as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *O. onotica* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the single *O. onotica* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *O. onotica* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.34 PHAEOCOLLYBIA ATTENUATA

Phaeocollybia attenuata is a gilled mushroom species in the Cortinariaceae family and does not have a common name.

2.34.1 Regulatory Status and Ranking

The 2001 ROD identifies *P. attenuata* as a Category D (uncommon) species. The ORBIC evaluated *P. attenuata* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be rare, uncommon, or threatened, but not immediately imperiled, within its global range and in Oregon (G3, S3, respectively). In 2010, the species was considered to be too common and was removed from the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.34.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *P. attenuata*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). The ORBIC (2004) indicated that the mushroom appears to grow slowly and may be less dependent on spore dispersal (e.g., via wind or animals) than on associations with its mycorrhizal partners. It has been documented fruiting in mid to late fall (Castellano et al. 2003) and produces many scattered fruiting bodies, but it does not fruit annually (ORBIC 2004).

Range

P. attenuata is endemic to western North America, with a range extending from British Columbia, Canada, south to Marin County, California (Castellano et al. 2003). It is primarily

found in the range of the NSO, but its distribution was considered spotty throughout its range based on data available in 2004 (ORBIC 2004). It has also been documented in Idaho (Norvell and Exeter 2008). In 2004, Oregon was the center of the species' range where it was found along the west slope of the Cascade Range to the coast. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *P. attenuata* from an estimated 120 element occurrences across the species' range in 2004. An estimated 90 of these occurrences were in Oregon, with fewer in California (16) and Washington (9) (ORBIC 2004). The ORBIC estimated that 33 of the element occurrences were in protected areas in 2004. In 2004, *P. attenuata* was presumed to be relatively stable with a potential for population declines based on its limited range (ORBIC 2004). The species was found in six locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 98 new sites of *P. attenuata* in the NSO range between 1998–2006, and 151 total sites were documented by 2006, including 57 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 117 sites on federal lands and 146 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area, and persistence surveys were conducted for some species in nearby LSRs (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category D species were recorded during these surveys and resulted in three new observations of individuals or populations of *P. attenuata*. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

P. attenuata has been found in undisturbed, moist coniferous forests and mixed hardwood-coniferous forests (ORBIC 2004, Norvell and Exeter 2008). It is also occasionally found in urban parks and younger forests (Trappe, pers. comm. 2013). *P. attenuata* grows in highly humus soil associated with mosses under conifers, such as Sitka spruce (*Picea sitchensis*), western hemlock, or Pacific silver fir (*Abies amabilis*) (Castellano et al. 2003, ORBIC 2004). It is more prevalent in low-elevation coastal forests, but has been found in montane coniferous forests, where it may be more adapted to colder, drier forests (Holthausen et al. 1994, Trappe, pers. comm. 2013). Based on data available in 2007, recorded observations were found below

about 5,300 feet msl (Cushman and Huff 2007). *P. attenuata* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *P. attenuata* are those that remove host trees or disrupt stand conditions necessary for its survival, such as logging, hot fires, and development (ORBIC 2004). Other specific threats to the species are not currently known. *P. attenuata* has been documented in the soil at project sites that had been subject to varying levels of harvest (Gordon 2012) and may be able to survive in the soil following some levels of ground disturbance or tree removal, presuming environmental conditions remain suitable.

Management Recommendations

As a Category D S&M species, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *P. attenuata*:

- As a mycorrhizal species, *P. attenuata* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.34.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. attenuata* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PHAT-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 439 observations from BLM and Forest Service geodatabases were converted into 204 sites in the NSO range (region). Table PHAT-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PHAT-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PHAT-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PHAT-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE PHAT-1

Number of *Phaeocollybia attenuata* Sites (2013)

Location*	Number of Sites
Regional Area	204
Local Area	57
Analysis Area (Project Area)	3 (3)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PHAT-2

Distribution of *Phaeocollybia attenuata* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	132	56	3
Forest Service	35	-	-
NPS	5	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	59	11	2

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE PHAT-3

Distribution of *Phaeocollybia attenuata* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Project Area Sites
Adaptive Management Area (AMA)	8	-	-
Adaptive Management Reserves (AMR)	15	-	-
Administratively Withdrawn (AW)	2	-	-
Congressionally Reserved (CR)	**2**	**-**	**-**
Late Successional Reserve (LSR)	**60**	**10**	**1**
Marbled Murrelet Area (LSR3)	**8**	**6**	**1**
Northern Spotted Owl Activity Center (LSR4)*	**3**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	80	45	2
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, version 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

P. attenuata is widely distributed across nine physiographic provinces in Washington (Western Lowlands, Olympic Peninsula, and Western Cascades), Oregon (Coast Range, Willamette Valley, Cascades West, and Klamath Mountain), and California (Coast and Klamath). Most sites are found along the Coast Range, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the Klamath Mountains, Cascade Range, and other outlying areas with some clusters of sites in the Oregon Cascade Range and northwestern Washington. *P. attenuata* appears to be well distributed in the Coast Range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.



Figure PHAT-1.
Regional Distribution of *Phaeocollybia attenuata*

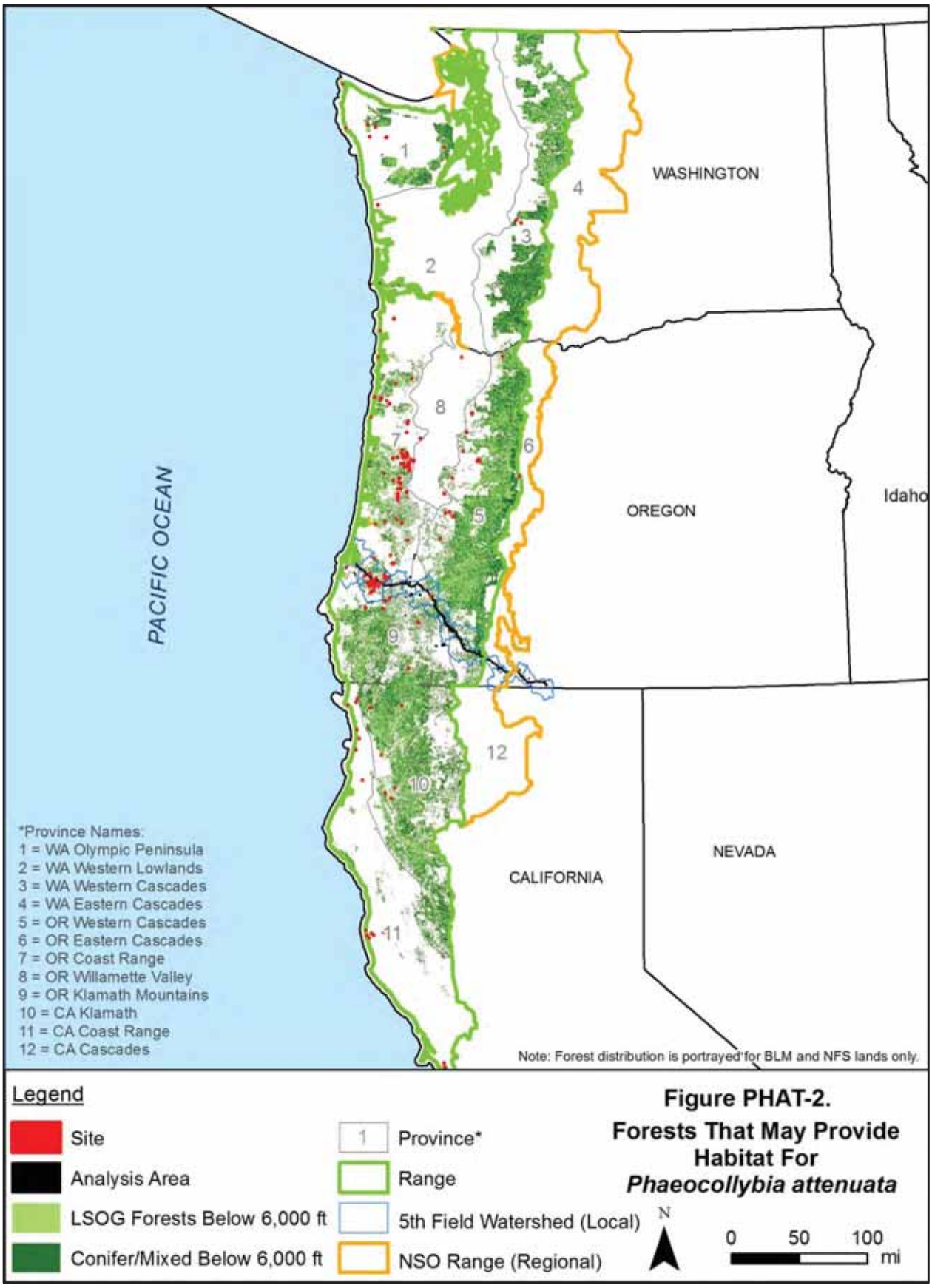


Figure PHAT-2.
Forests That May Provide Habitat For *Phaeocollybia attenuata*

Fifty-nine of 204 sites are located on private, state, or other lands (at least partially); five sites are on NPS land (Mount Rainier, Olympic, and Redwood National Parks); and 167 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 59 sites in the Coos Bay District, eight sites in the Medford District, and three sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include two sites on the Rogue River National Forest. The remaining 95 sites on BLM and NFS lands are in the Eugene and Salem Districts and on the Deschutes, Klamath, Mt. Hood, Olympic, Siskiyou, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 72 sites are located on reserve lands managed by BLM and the Forest Service, including 60 in LSRs (at least partially), eight in Marbled Murrelet Areas (at least partially), three in Known Owl Activity Centers, and two in Congressionally Reserved areas. This represents 43 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The five NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

P. attenuata is more commonly found in LSOG forests based on available data (162 of 204 total sites are in LSOG), but it is somewhat common in non-LSOG forests and has also been found in younger forests and urban parks. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 5,300 feet msl and has been documented in the western part of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, below 6,000 feet msl in most of the NSO range, excluding the eastern Cascade Range in Oregon and Washington and Cascade Range in California, could provide habitat for *P. attenuata* and support additional sites. These forests encompass an estimated 13.7 million acres on BLM and NFS lands in the region, including an estimated 7.6 million acres in reserve land allocations (56 percent of the forests; Table PHAT-4). Of this acreage, an estimated 5.3 million acres are LSOG (see Figure PHAT-2), including 3.3 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the western part of the NSO range, LSOG forests are less common.

TABLE PHAT-4

Extent of Forests that Could Provide Habitat for *Phaeocollybia attenuata* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	13,707,530	7,624,230	5,329,960	3,322,720
Local Area	520,780	179,810	173,050	75,990
Project Area	1,250	490	270	150

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. attenuata* is distributed across four 5th field watersheds that overlap the project area (see Table PHAT-5 and Figure PHAT-3). The sites in the East Fork and Middle

Fork Coquille River watersheds are clustered and near one another, whereas sites in the other two watersheds appear more scattered. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 20 miles to the north and south in the Coast Range.

Of the 57 sites in the local area, 56 are on BLM lands (Coos Bay, Medford, and Roseburg Districts), with 11 sites at least partially on private lands. Most of the local sites are on land designated as Other (Matrix); 15 sites are in LSRs, representing 27 percent of the BLM-managed sites. The sites in LSRs are in the Middle Fork Coquille River and Elk Creek-South Umpqua watersheds (Table PHAT-5).

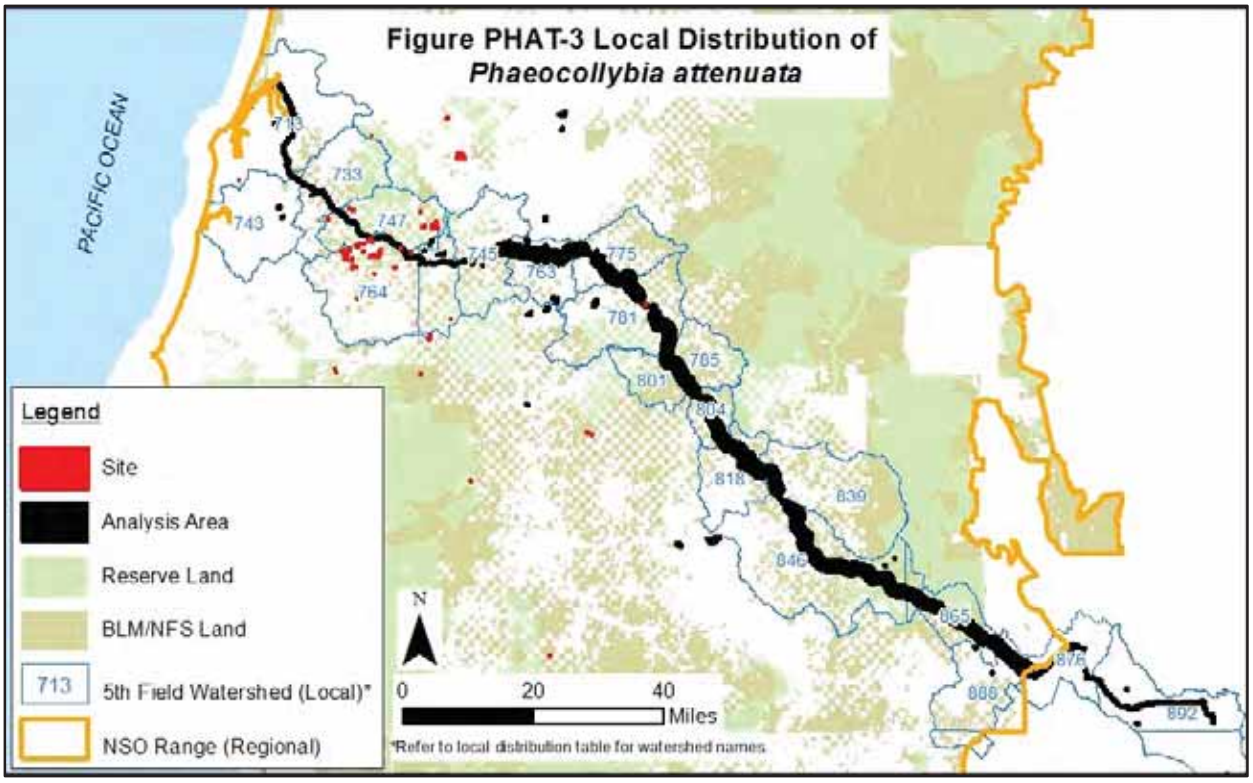
Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 520,780 acres on BLM and NFS lands in the local area, with 179,810 acres in reserve land allocations (35 percent of the forests). Of this acreage, an estimated 173,050 acres are LSOG, including 75,990 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures PHAT-2 and PHAT-3).

TABLE PHAT-5

Distribution of *Phaeocollybia attenuata* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	1	-
East Fork Coquille River (747)	19*	2
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	38*	15
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*Two sites occur in both East Fork Coquille River and Middle Fork Coquille River watersheds.



Analysis/Project Area Distribution

The analysis and project areas contain three sites of *P. attenuata*. These sites are on BLM-managed lands (Coos Bay and Roseburg), with two sites partially on private lands. Two of the sites are on land designated as Other (Matrix), and one site is partially in an LSR and partially in a Marbled Murrelet Area. The analysis area sites are found in three 5th field watersheds (Middle and East Fork Coquille Rivers and South Umpqua River). The sites are restricted to a small portion of the western side of the analysis area and are near each other. Several sites are located within the immediate vicinity of the sites (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in five total observations of the species in three locations in or near the project area (Siskiyou BioSurvey LLC 2012a). These recorded observations in combination with agency records comprise the three sites in the analysis area. Within the project area, one site is at MP 36.1, one site is at MP 41.9, and one site is between MPs 91.1 and 91.4.

Project Impacts

Analysis

The PCGP Project would affect three sites out of the 167 sites on BLM- and Forest Service-managed lands in the region, representing approximately 2 percent of the sites (or three out of 204 total sites on all lands in the NSO range). Table PHAT-6 presents an overview of the features of the PCGP Project that would affect the *P. attenuata* sites. The construction corridor and associated work areas would affect approximately 4.3 acres within the sites (about 4 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. attenuata* in and near the project area. This discussion presents

an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 2.8 acres of vegetation and soil within three sites and could result in the removal of *P. attenuata* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1.5 acres within three sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *P. attenuata* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE PHAT-6

Impacts to *Phaeocollybia attenuata* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	3	2.8 ac
Temporary Extra Work Area (TEWA)	3	1.5 ac
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 980 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 200 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *P. attenuata*. Within this impact area, about 650 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 200 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the three sites as a result of the PCGP Project, 53 sites of *P. attenuata* would remain on BLM lands in the local area, with 14 in reserves, and 164 sites, including 71 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 71 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on

these site counts, approximately 43 percent of the remaining *P. attenuata* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. attenuata* is a Category D (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *P. attenuata* has a wide distribution across nine physiographic provinces and three states in the region and a moderate-high number of overall sites (167 on BLM and NFS lands). The species appears to be well distributed in the Coast Range and is fairly common overall. The currently known number of sites on BLM and NFS lands is an increase of 50 sites since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 43 percent of the sites (72 sites) are in reserves, which is an increase of about 15 sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the species' range and encompass approximately 13.7 million acres on BLM and NFS lands with an estimated 56 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where some sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *P. attenuata*.
- The PCGP Project would affect three of 167 BLM- and Forest Service-managed sites of *P. attenuata*, representing approximately 2 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the sites, a moderate-high number of sites (164) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (53 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Coast Range, and the species would still be well distributed in the Coast Range in Oregon. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in a reserve. Of the remaining sites, 69 are at least partially in LSRs where management actions are restricted to those

activities that benefit LSOG forests, and two are at least partially in Congressionally Reserved areas where management activities that may adversely affect *P. attenuata* are unlikely.

- The PCGP Project would result in a permanent loss of an estimated 200 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 7.6 million acres (56 percent) of coniferous and mixed forests and 3.3 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *P. attenuata*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category D species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.34.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. attenuata* at three sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 164 sites would remain on BLM and NFS lands across the region, and 53 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *P. attenuata* at three sites, these sites are part of the many sites in the Coast Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. attenuata* would persist in the region without considering the three sites as part of the population.
- The PCGP Project would remove approximately 980 acres of coniferous and mixed hardwood-coniferous forests and 200 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 7.6 million acres (56 percent) of coniferous and mixed forests and 3.3 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to *P. attenuata* sites in the analysis area, although some individuals within the sites may persist following project implementation. Based on the above conclusions, avoidance of the three *P. attenuata* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species

persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *P. attenuata* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.35 PHAEOCOLLYBIA FALLAX

Phaeocollybia fallax is a gilled mushroom species in the Cortinariaceae family and does not currently have a common name.

2.35.1 Regulatory Status and Ranking

The 2011 Settlement Agreement identifies *P. fallax* as a Category D (rare) species. The ORBIC evaluated *P. fallax* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.35.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *P. fallax*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004, Cushman and Huff 2007). The ORBIC (2004) indicated that the mushroom appears to grow slowly and may be less dependent on spore dispersal (e.g., via wind or animals) than on associations with its mycorrhizal partners, which are typically conifer trees. The species grows scattered to gregarious in highly humus soil in mixed coniferous forests and is typically associated with hemlock (*Tsuga* spp.), red cedar (*Thuja* spp.), fir (*Abies* spp.), Douglas-fir, redwood (*Sequoia* spp.), and spruce (*Picea* spp.) (Castellano et al. 2003, ORBIC 2004). The mushroom fruits sporadically in fall and early winter (Castellano et al. 2003) and has also been documented fruiting in spring, although not as frequently (Norvell and Exeter 2008).

Range

P. fallax is endemic to western North America (Castellano et al. 2003). The species' range extends from Vancouver Island and mainland British Columbia, south to California, and it has been reported in western Idaho and Mexico (ORBIC 2004, Norvell and Exeter 2008). Like other bryophilous fungi, *P. fallax* exhibits irregular distributions that are directly proportional to the

presence of suitable substrate. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range with populations distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *P. fallax* from an estimated 95 element occurrences across western North America in 2004. An estimated 60 of these occurrences were in Oregon, and fewer were in California (16) and Washington (13) (ORBIC 2004). In 2004, *P. fallax* was considered to be irregularly distributed and presumed to be relatively stable to moderately declining (ORBIC 2004). The species was found in two locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 72 new sites of *P. fallax* in the NSO range between 1998–2006, and 120 total sites were documented by 2006, including 44 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 86 sites on federal lands and 115 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area, and persistence surveys were conducted for some species in nearby LSRs (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category D species were recorded during these surveys and resulted in no new observations of *P. fallax*. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

P. fallax is found in coniferous and mixed hardwood-coniferous forests (Cushman and Huff 2007) and may require cool, moist LSOG forests (ORBIC 2004, Holthausen et al. 1994). It is more prevalent in low-elevation coastal forests, but has been found in montane coniferous forests, where it may be more adapted to colder, drier forests (Holthausen et al. 1994, Trappe, pers. comm. 2013). The species has also been found in plantations (ORBIC 2004). Based on data available in 2007, *P. fallax* has been found below about 4,120 feet msl (Cushman and Huff 2007). *P. fallax* may prefer specific microclimate conditions of LSOG forests, but it is also found in younger forests and may not be as restricted to these conditions.

Threats

Threats to *P. fallax* are those that remove LSOG forests, affect its host tree, and disturb the soil, such as logging and development (ORBIC 2004). Hot fires are the primary threat to the species in montane areas outside of reserves or other areas that can be protected from logging or development. Other specific threats to the species are not currently known. *P. fallax* has been

documented in the soil at project sites that had been subject to varying levels of harvest (Gordon 2012) and may be able to survive in the soil following some levels of ground disturbance or tree removal, presuming environmental conditions remain suitable.

Management Recommendations

As a Category D species, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *P. fallax*:

- As a mycorrhizal species, *P. fallax* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.35.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. fallax* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PHFA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 282 observations from BLM and Forest Service geodatabases were converted into 135 sites in the NSO range (region). Table PHFA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PHFA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PHFA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PHFA-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 4,500 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE PHFA-1

Number of *Phaeocollybia fallax* Sites (2013)

Location*	Number of Sites
Regional Area	135
Local Area	32
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, and project areas are provided in Chapter 1.

TABLE PHFA -2

Distribution of *Phaeocollybia fallax* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	59	30	1
Forest Service	41	-	-
NPS	7	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	43	7	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE PHFA-3

Distribution of *Phaeocollybia fallax* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	11	-	-
Adaptive Management Reserves (AMR)	5	-	-
Administratively Withdrawn (AW)	-	-	-
Congressionally Reserved (CR)	**2**	**-**	**-**
Late Successional Reserve (LSR)	**37**	**6**	**-**
Marbled Murrelet Area (LSR3)	**3**	**2**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	2	-	-
Other (Matrix, Riparian Reserve, Other)	41	23	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

P. fallax is widely distributed across eight physiographic provinces in Washington (Western Cascades, Olympic Peninsula, and Western Lowlands), Oregon (Coast Range, Cascades West, and Klamath Mountains), and California (Coast and Klamath). Most sites are found along the Coast Range, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the western Cascade Range, Klamath Mountains, and other outlying areas. *P. fallax* appears to be well distributed in the Coast Range in Oregon where several clusters of sites are distributed across the mountain range and the species is relatively abundant.

Forty-three of 135 sites are located on private, state, or other lands (at least partially); seven sites are on NPS lands (Mount Rainier, Olympic, and Redwood National Parks); and 100 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 34 sites in the Coos Bay District. Sites managed by the National Forests that encompass the project area include five sites on the Rogue River National Forest and one site on the Umpqua National Forest. The remaining 60 sites on BLM and NFS lands are in the Arcata, Eugene, and Salem Districts and on the Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Siskiyou, Siuslaw, Six Rivers, and Willamette National Forests.



Figure PHFA-1.
Regional Distribution of *Phaeocollybia fallax*

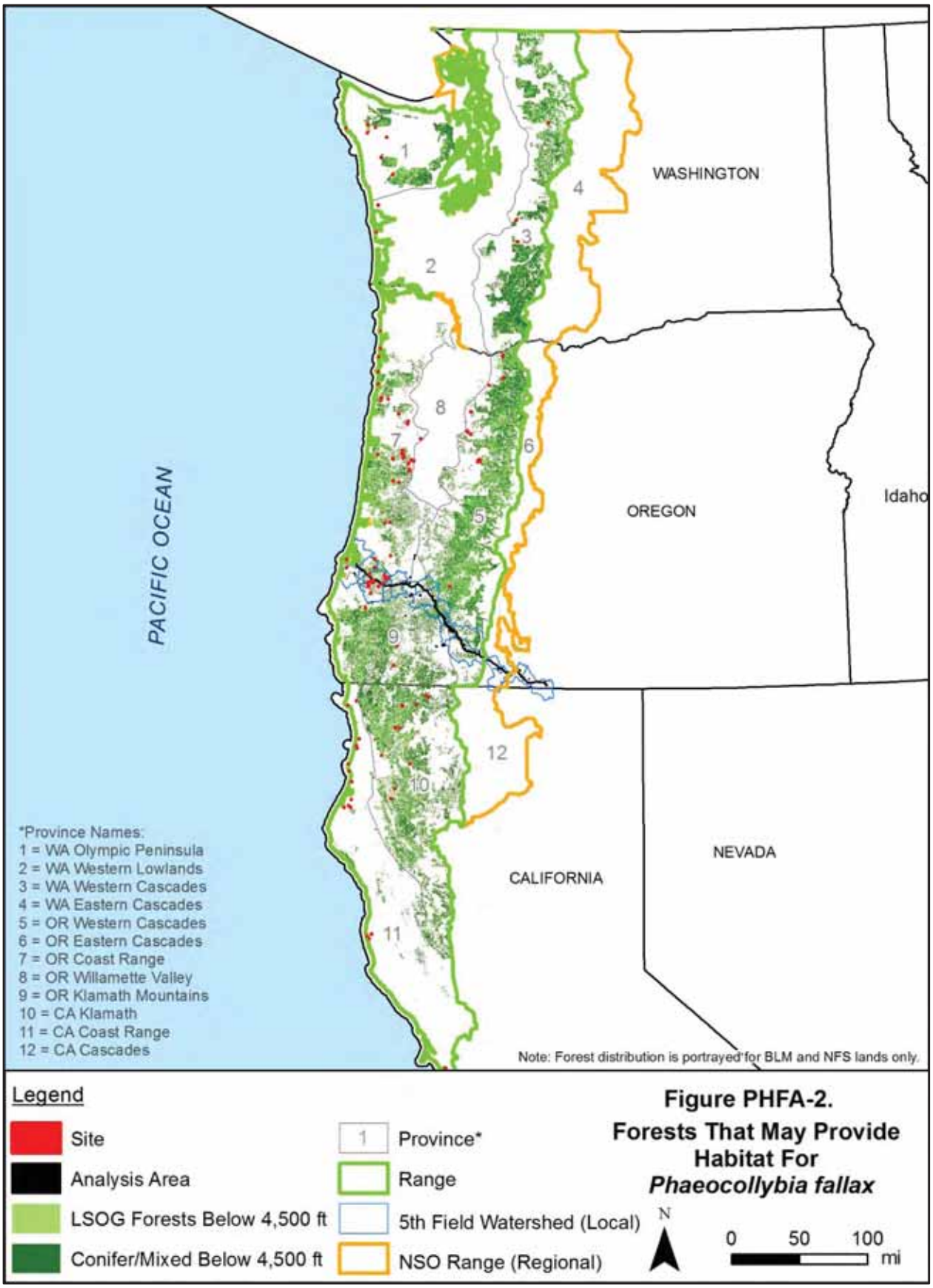


Figure PHFA-2.
Forests That May Provide Habitat For *Phaeocollybia fallax*

Across the NSO range, 42 sites are located on reserve lands managed by BLM and the Forest Service, including 37 in LSRs, three in a Marbled Murrelet Area, and two in Congressionally Reserved areas. This represents 42 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The seven NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

P. fallax is more commonly found in LSOG forests based on available data (112 of 135 total sites are in LSOG), but it is somewhat common in non-LSOG forests and has also been found in younger forests and plantations. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 4,000 feet msl and has only been documented in the western part of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, in most of the NSO range, excluding the eastern Cascade Range in Oregon and Washington and Cascade Range in California, could provide habitat for *P. fallax* and support additional sites. These forests encompass an estimated 11.4 million acres on BLM and NFS lands, including an estimated 6.1 million acres in reserve land allocations (53 percent of the forests; Table PHFA-4). Of this acreage, an estimated 4.6 million acres are LSOG (see Figure PHFA-2), including 1.9 million acres in reserve land allocations (42 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 4,500 feet msl are somewhat widespread across the western part of the NSO range, LSOG forests are less common.

TABLE PHFA-4

Extent of Forests that Could Provide Habitat for *Phaeocollybia fallax* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 4,500 feet		LSOG Forests below 4,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	11,357,450	6,068,910	4,590,940	1,909,320
Local Area	456,860	145,080	151,360	62,690
Project Area	1,040	280	200	80

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. fallax* is distributed across four 5th field watersheds that overlap the project area (see Table PHFA-5 and Figure PHFA-3). The sites are clustered and near one another in the Coast Range and Klamath Mountains in the western portion of the local area. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of forests that may provide suitable habitat, and opportunities for dispersal exist within the local area and to nearby regional areas. A few regional sites are located within about 15 miles to the south in the Klamath Mountains and to the north in the Coast Range, and many other sites are located further north and south in the Coast Range.

Thirty of the 32 sites in the local area are on BLM lands (Coos Bay District), and seven sites are at least partially on private lands. Most of the local sites are on land designated as Other

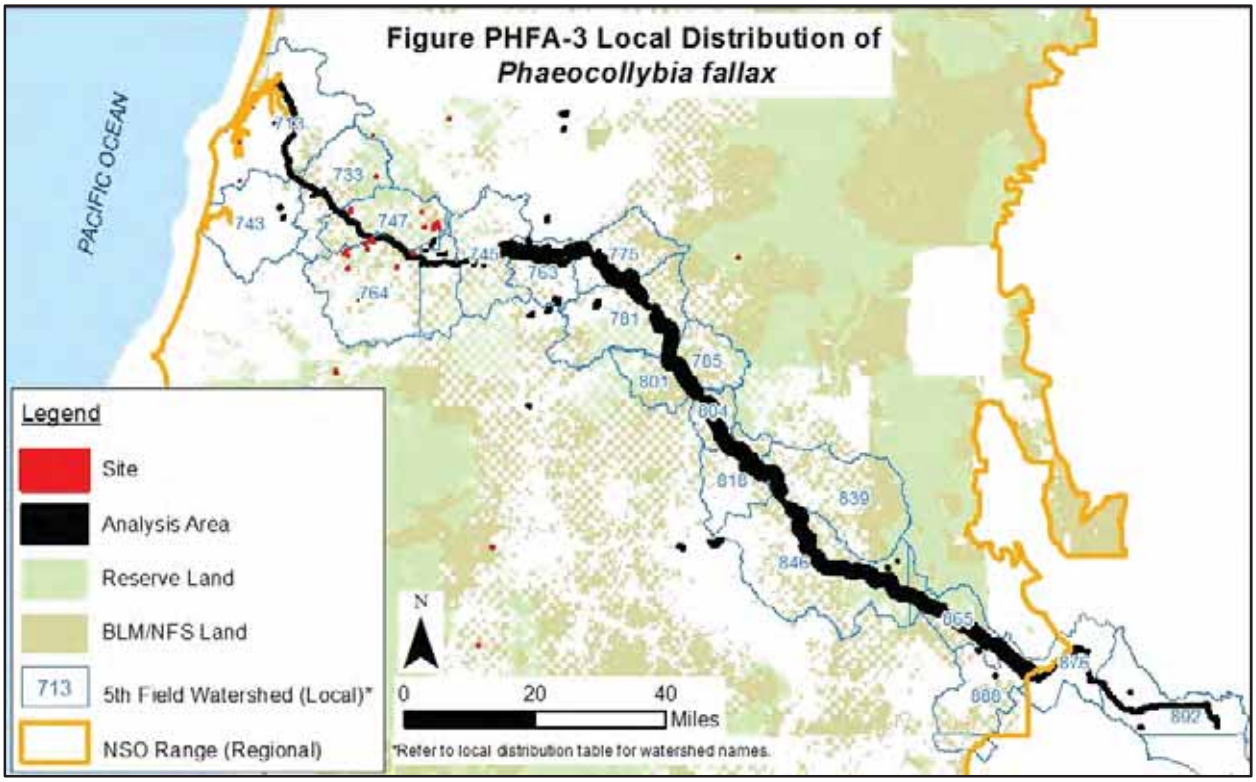
(Matrix); eight sites are at least partially in LSRs, representing 27 percent of the BLM-managed sites. Sites in LSRs are in the Middle Fork and North Fork Coquille River watersheds (Table PHFA-5).

TABLE PHFA-5

Distribution of *Phaeocollybia fallax* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	2	-
East Fork Coquille River (747)	16	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	13	7
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	1	1
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous forests below 4,500 feet msl encompass approximately 456,860 acres on BLM and NFS lands in the local area, including 145,080 acres in reserve land allocations (32 percent of the forests). Of this acreage, an estimated 151,360 acres are LSOG, including 62,690 acres in reserve land allocations (41 percent of the forests).

Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures PHFA-2 and PHFA-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *P. fallax*. This site is partially on BLM-managed lands (Coos Bay) and partially on private land. It is on land designated as Other (Matrix) in the Middle Fork Coquille River watershed. Several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in no observations of the species (Siskiyou BioSurvey LLC 2012a). The recorded observation of the species in the analysis area is from agency databases and was recorded in 1999. Within the project area, the site is located between MPs 36.1 and 36.3, but the site extends further southwest beyond the project area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 100 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 135 total sites on all lands in the NSO range). Table PHFA-6 presents an overview of the features of the PCGP Project that would affect the *P. fallax* site. The construction corridor and associated work areas would affect approximately 2.1 acres within the site (about 2 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. fallax* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 1.3 acres of vegetation and soils within the site and could remove individuals of *P. fallax*. Disturbance in the TEWAs would result in similar impacts on about 0.9 acre within the site. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *P. fallax* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE PHFA -6

Impacts to *Phaeocollybia fallax* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	1.3 ac
Temporary Extra Work Area (TEWA)	1	0.9 ac
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 830 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl, including 140 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *P. fallax*. Within this impact area, about 530 acres (about 64 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 160 acres of coniferous and mixed forests below 4,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 4,500 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, 29 sites of *P. fallax* would remain on BLM lands in the local area, including eight in reserves, and 99 sites, including 42 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 42 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 42 percent of the remaining *P. fallax* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. fallax* is a Category D (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *P. fallax* has a wide, but scattered, distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall

sites (100 on BLM and NFS lands). The species is well distributed in the Coast Range in Oregon, but has a scattered distribution in other areas. The currently known number of sites on BLM and NFS lands is an increase of 14 sites since 2007.

  - An estimated 42 percent of the sites (42 sites) are in reserves, which is an increased proportion of sites in reserves since 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (general habitat for the species) are somewhat widely distributed across the western part of the NSO range and encompass approximately 11.4 million acres on BLM and NFS lands with an estimated 53 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where some sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *P. fallax*.
- The PCGP Project would affect one of 100 BLM- and Forest Service-managed sites of *P. fallax*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (99) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (29 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across four 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 40 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and two are at least partially in Congressionally Reserved areas where management activities that may adversely affect *P. fallax* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 160 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 6.1 million acres (53 percent) of coniferous and mixed forests and 1.9 million acres (42 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the species' range.
- The remaining suitable habitat could support additional populations of *P. fallax*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category D species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

2.35.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. fallax* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 99 sites would remain on BLM and NFS lands across the region, and 29 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *P. fallax* at one site, this site is part of a large group of sites in the Coast Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. fallax* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 830 acres of coniferous and mixed hardwood-coniferous forests and 140 acres of LSOG forests below 4,500 feet msl (a negligible amount of the forests). An estimated 64 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 6.1 million acres (53 percent) of coniferous and mixed forests and 1.9 million acres (42 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *P. fallax* site in the analysis area, although individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *P. fallax* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. fallax* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.36 PHAEOCOLLYBIA KAUFFMANII

Phaeocollybia kauffmanii is a gilled mushroom species in the Cortinariaceae family and does not have a common name.

2.36.1 Regulatory Status and Ranking

The 2011 Settlement Agreement identifies *P. kauffmanii* as a Category D (uncommon) species. The ORBIC evaluated *P. kauffmanii* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.36.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *P. kauffmanii*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (Castellano and O'Dell 1997). The ORBIC (2004) indicated that the mushroom appears to grow slowly and may be less dependent on spore dispersal (e.g., via wind or animals) than on associations with its mycorrhizal partners. It has been documented fruiting from late September through early January (Castellano et al. 1999) and produces many scattered fruiting bodies, but it does not fruit annually (ORBIC 2004).

Range

P. kauffmanii is endemic to the Pacific Northwest, ranging from Vancouver Island and British Columbia along the coast to the Santa Cruz Mountains in California and extending east to Mount Baker and the western slopes of the Cascade Range (ORBIC 2004). In Oregon, it has been found from the Pacific coast to the western slope of the Cascade Range based on data available in 2004. An isolated population was also reported in Idaho in 1992, and the species may have been found in New Hampshire and Vermont, although identification of the specimen was not confirmed (ORBIC 2004, Trappe, pers. comm. 2013). It has also been reported from Mexico and the eastern United States (Norvell and Exeter 2008). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest and possibly other parts of North America. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *P. kauffmanii* from an estimated 150 element occurrences across the species' range in 2004. An estimated 82 of these occurrences were in Oregon, and fewer were in California (46) and Washington (15) (ORBIC 2004). In 2004, *P. kauffmanii* was presumed to be relatively stable (ORBIC 2004). The species was found in five locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 60 new sites of *P. kauffmanii* in the NSO range between 1998–2006, and 146 total sites were documented by 2006, including 65 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 91 sites on federal lands and 110 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area, and persistence surveys were conducted for some species in nearby LSRs (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category D species were recorded during these surveys and resulted in one new observation of a population of *P. kauffmanii*. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (70 percent increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

Based on data available in 2004, *P. kauffmanii* appeared to be restricted to mesic coniferous forests in closed-canopy stands, primarily LSOG forests, and was mostly found in undisturbed forests, although it was also documented in younger plantations about 35 years old (ORBIC 2004) and in urban parks (Trappe, pers. comm. 2013). It is often associated with the roots of Sitka spruce, Douglas-fir, western hemlock, and occasionally Pacific silver fir (Castellano et al. 1999, Cushman and Huff 2007; Trappe, pers. comm. 2013) and may be found in mixed stands with *Sequoia*, *Lithocarpus*, *Tsuga*, *Abies*, and *Pseudotsuga* species (ORBIC 2004). It is more prevalent in low-elevation coastal forests, but has been found in montane coniferous forests, where it may be more adapted to colder, drier forests (Holthausen et al. 1994, Trappe, pers. comm. 2013). *P. kauffmanii* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *P. kauffmanii* are those that affect its host tree and disturb the soil, such as road and trail construction, logging, fire management activities, and recreational activities (Castellano and O'Dell 1997). Hot fires are the primary threat to the species in montane areas outside of reserves or other areas that can be protected from logging or development (ORBIC 2004). Other specific threats to the species are not currently known.

Management Recommendations

As a Category D S&M species, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). Management recommendations were developed for *P. kauffmanii* with several other species (Group 8 of Castellano and O'Dell 1997). The primary directions are to maintain habitat and microclimatic conditions at all known sites by retaining LSOG forest conditions; minimizing soil disturbance at or around known sites; and limiting disruption to host populations, particularly from fire and logging. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *P. kauffmanii*:

- As a mycorrhizal species, *P. kauffmanii* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas

(as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.36.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. kauffmanii* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PHKA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 297 observations from BLM and Forest Service geodatabases were converted into 128 sites in the NSO range (region). Table PHKA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PHKA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PHKA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PHKA-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 4,500 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE PHKA-1

Number of *Phaeocollybia kauffmanii* Sites (2013)

Location*	Number of Sites
Regional Area	128
Local Area	13
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PHKA-2

Distribution of *Phaeocollybia kauffmanii* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	61	13	1
Forest Service	46	-	-
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	27	1	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE PHKA-3

Distribution of *Phaeocollybia kauffmanii* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	7	-	-
Adaptive Management Reserves (AMR)	18	-	-
Administratively Withdrawn (AW)	2	-	-
Congressionally Reserved (CR)	**5**	**-**	**-**
Late Successional Reserve (LSR)	**36**	**3**	**1**
Marbled Murrelet Area (LSR3)	**3**	**3**	**1**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	41	10	-
Riparian Reserve**	**1**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

P. kauffmanii is widely distributed across eight physiographic provinces in Washington (Western Cascades, Olympic Peninsula, and Western Lowlands), Oregon (Coast Range, Cascades West, and Klamath Mountains), and California (Coast and Klamath). Most sites are found along the Coast Range, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the western Cascade Range, Klamath Mountains, and other outlying areas with some clusters of sites in the Oregon Cascade Range and northwestern Washington. *P. kauffmanii* appears to be well distributed in the Coast Range in Oregon where the species is most abundant and sites are distributed in several clusters across the mountain range.

Twenty-seven of 128 sites are located on private, state, or other lands (at least partially); three sites are on NPS lands (Mount Rainier, Olympic, and Redwood National Parks); and 107 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 15 sites in the Coos Bay District, six sites in the Medford District, and one site in the Roseburg District. Sites managed by the National Forests that encompass the project area include two sites on the Rogue River National Forest. The remaining 83 sites on BLM and NFS lands are in the Arcata, Eugene, and Salem Districts and on the Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Siskiyou, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 43 sites are located on reserve lands managed by BLM and the Forest Service, including 36 in LSRs (at least partially), three in Marbled Murrelet Areas (at least partially), one in a Known Owl Activity Center, five in Congressionally Reserved areas (at least partially), and one in a Riparian Reserve. This represents 40 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.



Figure PHKA-1.
Regional Distribution of *Phaeocollybia kauffmanii*

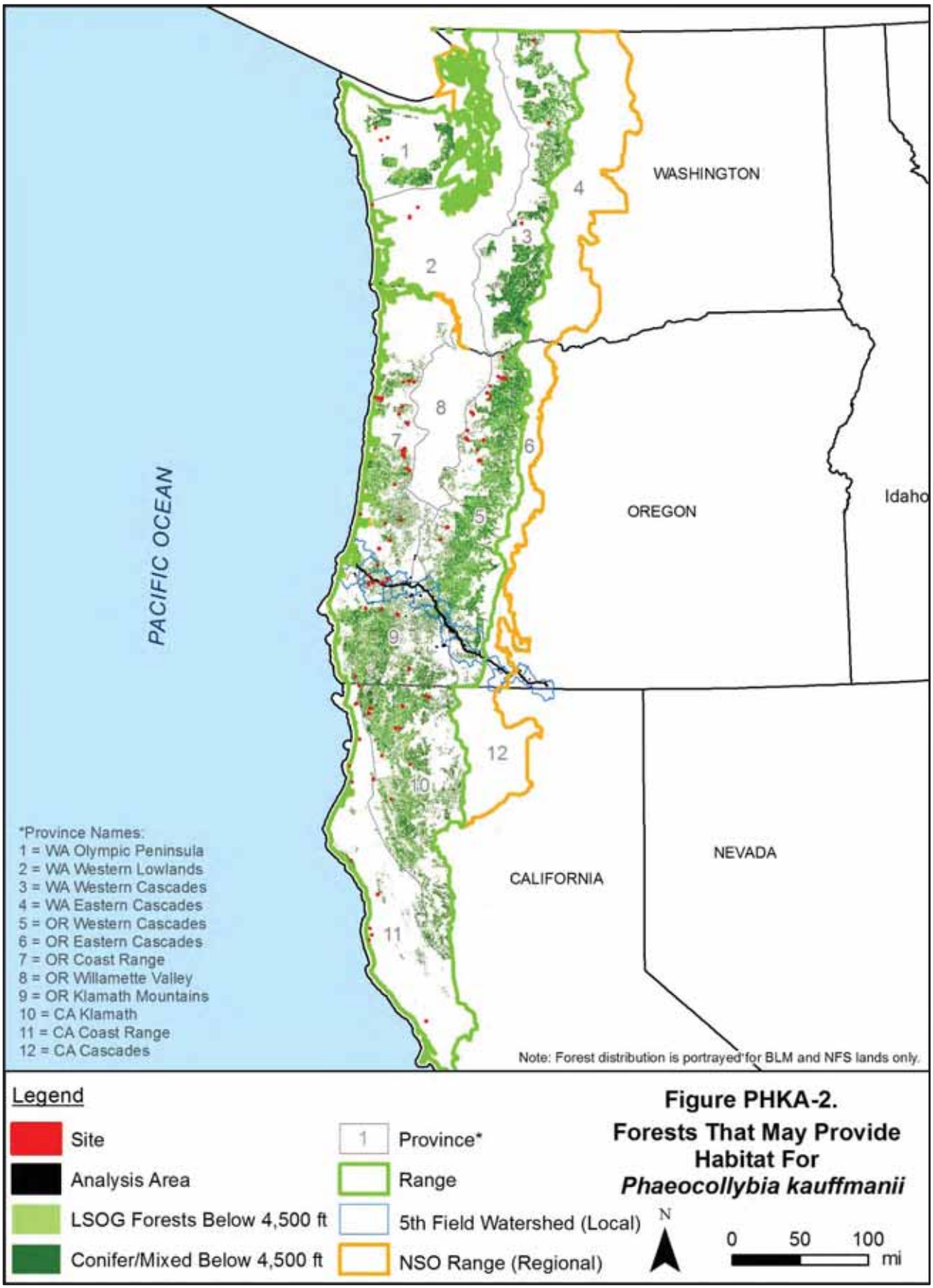


Figure PHKA-2.
Forests That May Provide Habitat For *Phaeocollybia kauffmanii*

P. kauffmanii is more commonly found in LSOG forests based on available data (106 of 128 total sites are in LSOG), but it is somewhat common in non-LSOG forests and has also been found in younger forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 4,300 feet msl and has only been documented in the western part of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, in most of the NSO range, excluding the eastern Cascade Range in Oregon and Washington and Cascade Range in California, could provide habitat for *P. kauffmanii* and support additional sites. These forests encompass an estimated 11.4 million acres on BLM and NFS lands, including an estimated 6.1 million acres in reserve land allocations (53 percent of the forests; Table PHFA-4). Of this acreage, an estimated 4.6 million acres are LSOG (see Figure PHFA-2), including 1.9 million acres in reserve land allocations (42 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 4,500 feet msl are somewhat widespread across the western part of the NSO range, LSOG forests are less common.

TABLE PHKA-4

Extent of Forests that Could Provide Habitat for *Phaeocollybia kauffmanii* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 4,500 feet		LSOG Forests below 4,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	11,357,450	6,068,910	4,590,940	1,909,320
Local Area	456,860	145,080	151,360	62,690
Project Area	1,040	280	200	80

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. kauffmanii* is found in three 5th field watersheds that overlap the project area (see Table PHKA-5 and Figure PHKA-3). The sites are near one another in the Coast Range in the western portion of the local area, and several are clustered in the Middle Fork and East Fork Coquille River watersheds. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Several regional sites are located within 30 miles to the north and south in the Coast Range.

All of the 13 sites in the local area are on BLM lands (Coos Bay District), with one site partially on private land. Most of the local sites are on land designated as Other (Matrix); five sites are in LSRs, representing 39 percent of the BLM-managed sites. The sites in LSRs are distributed across the watersheds (Table PHKA-5).

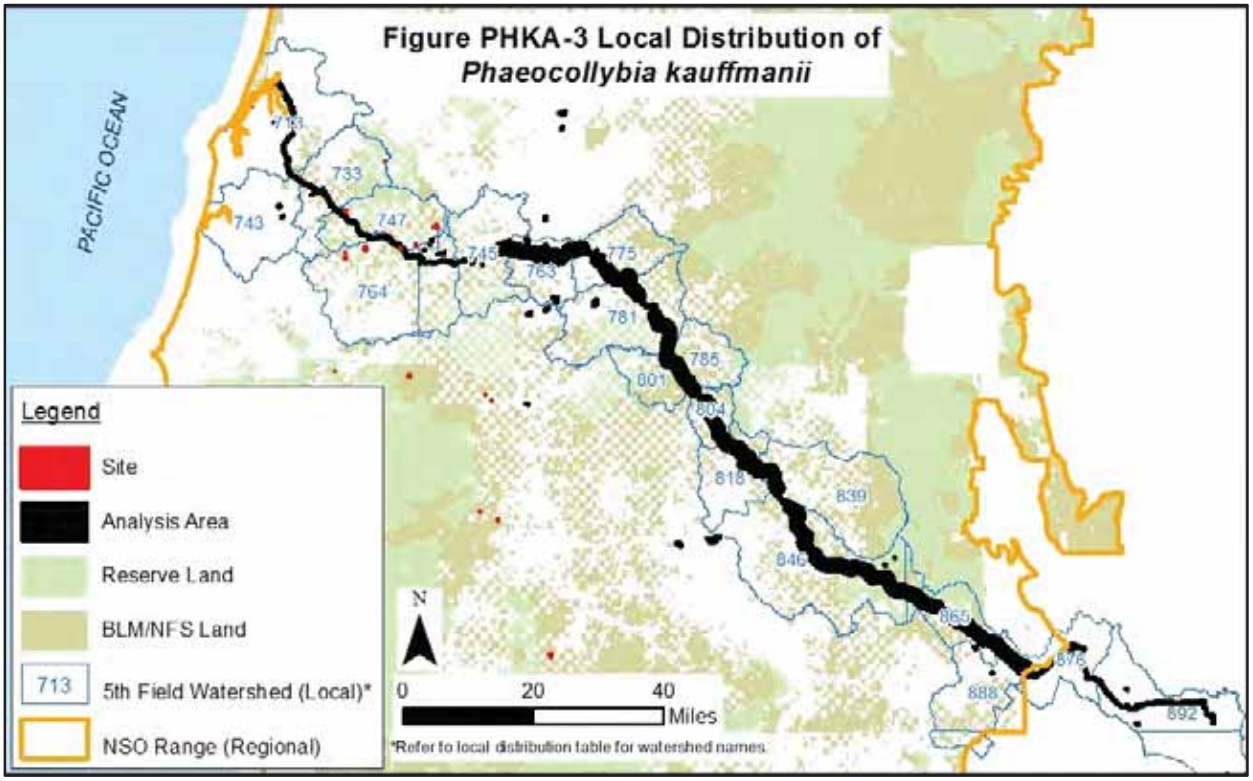
Coniferous and mixed hardwood-coniferous forests below 4,500 feet msl encompass approximately 456,860 acres on BLM and NFS lands in the local area, including 145,080 acres in reserve land allocations (32 percent of the forests). Of this acreage, an estimated 151,360 acres are LSOG, including 62,690 acres in reserve land allocations (41 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures PHKA-2 and PHKA-3).

TABLE PHKA-5

Distribution of *Phaeocollybia kauffmanii* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	9*	2
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	4*	3
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	1	1
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
*Note: Site counts are not additive because one site occurs in both watersheds and the counts overlap.



Analysis/Project Area Distribution

The analysis and project areas contain one site of *P. kauffmanii*. This site is on BLM-managed land (Coos Bay District) and is partially in an LSR and partially in a Marbled Murrelet Area. It is on the border of the Middle Fork and East Fork Coquille River watersheds. Several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in four total observations of the species in one location in and near the project area during 2010 (Siskiyou BioSurvey LLC 2012a). These recorded observations are between MPs 41.8 and 42 and comprise the site in the analysis area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 107 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 128 total sites on all lands in the NSO range). Table PHKA-6 presents an overview of the features of the PCGP Project that would affect the *P. kauffmanii* site. The construction corridor and associated storage areas would affect approximately 1.8 acres within the site (about 31 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. kauffmanii* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 1.5 acres of vegetation and soils within the site and would likely remove individuals of *P. kauffmanii*. Disturbance in a TEWA would result in similar impacts on about 0.3 acre of the site. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and host trees and disturbance to soil could negatively affect *P. kauffmanii* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWA could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE PHKA-6

Impacts to *Phaeocollybia kauffmanii* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	1.5
Temporary Extra Work Area (TEWA)	1	0.3 ac
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 830 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl, including 140 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *P. kauffmanii*. Within this impact area, about 530 acres (about 64 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for

the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 160 acres of coniferous and mixed forests below 4,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 4,500 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, 12 sites of *P. kauffmanii* would remain on BLM land in the local area, with four in reserves, and 106 sites, including 42 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 42 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 40 percent of the remaining *P. kauffmanii* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. kauffmanii* is a Category D (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *P. kauffmanii* has a wide, but scattered, distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (107 on BLM and NFS lands). The species is well distributed in the Coast Range in Oregon, but has a scattered distribution in other areas. The currently known number of sites on BLM and NFS lands is an increase of 16 sites since 2007, with many sites documented during the PCGP Project surveys.
    - An estimated 40 percent of the sites (43 sites) are in reserves, which is about the same proportion of sites in reserves as in 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (general habitat for the species) are somewhat widely distributed across the species' range and encompass approximately 11.4 million acres on BLM and NFS lands with an estimated 53 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where some sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *P. kauffmanii*.

- The PCGP Project would affect one of 107 BLM- and Forest Service-managed sites of *P. kauffmanii*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (106) would continue to be documented on BLM and NFS lands in the region with a wide distribution across the NSO range. Twelve sites would remain in the local vicinity of the analysis area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in a reserve. Of the remaining sites, 39 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and five are at least partially in Congressionally Reserved areas where management activities that may adversely affect *P. kauffmanii* are unlikely. One other site is at least partially in a Riparian Reserve.
- The PCGP Project would result in a permanent loss of an estimated 160 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 6.1 million acres (53 percent) of coniferous and mixed forests and 1.9 million acres (42 percent) would remain in reserves in the species' range.
- The remaining forests could support additional populations of *P. kauffmanii*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category D species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.36.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. kauffmanii* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 106 sites would remain on BLM and NFS lands across the region, and 12 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *P. kauffmanii* at one site, this site is part of a large group of sites in the Coast Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. kauffmanii* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 830 acres of coniferous and mixed hardwood-coniferous forests and 140 acres of LSOG forests below 4,500 feet msl (a negligible amount of the forests). An estimated 64 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 6.1 million acres (53 percent) of coniferous and mixed forests and 1.9 million acres (42 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the species' range. Other sites may be located in

unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *P. kauffmanii* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *P. kauffmanii* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. kauffmanii* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.37 PHAEOCOLLYBIA OLIVACEA

Phaeocollybia olivacea is a gilled mushroom species in the Cortinariaceae family and does not have a common name.

2.37.1 Regulatory Status and Ranking

The 2011 Settlement Agreement identifies *P. olivacea* as a Category B (rare) species. The ORBIC evaluated *P. olivacea* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be imperiled because of rarity or other factors that make it vulnerable to extinction within its global range and in Oregon (G2, S2, respectively). The species is on the ORBIC List 1. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.37.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *P. olivacea*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). It forms symbiotic associations with the roots of trees (mostly hardwood, but occasionally conifer) to obtain minerals, water, and nutrients (Castellano and O'Dell 1997). The ORBIC (2004) indicated that the mushroom appears to grow slowly and may be less dependent on spore

dispersal (e.g., via wind or animals) than on associations with its mycorrhizal partners. It has been documented fruiting in autumn and produces closely gregarious fruiting bodies (ORBIC 2004, Castellano et al. 2003). It is often found growing in arcs under oak and conifer trees (Norvell and Exeter 2008).

Range

P. olivacea is endemic to the western United States, ranging from Washington south to Santa Cruz County, California (Castellano et al. 2003). The specimen observation in Washington has not been confirmed (ORBIC 2004), and the species may actually be restricted to Oregon and California. Populations are found primarily along the Pacific coast, Coast Range, and west slope of the Cascade Range. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *P. olivacea* from an estimated 94 element occurrences across the species' range in 2004. An estimated 53 of these occurrences were in Oregon, and fewer were in California (39) and Washington (1) (ORBIC 2004). The ORBIC estimated that 31 of the element occurrences were in protected areas in 2004. In 2004, *P. olivacea* had a spotty distribution within its range and was considered unusual to uncommon in California and Oregon and rare in Washington (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 82 new sites of *P. olivacea* in the NSO range between 1998–2006, and 114 total sites were documented by 2006, including 31 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 34 sites on federal lands and 47 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *P. olivacea*, and resulted in two new observations of individuals or populations of *P. olivacea*. Incidental sightings of the species were recorded during persistence surveys and resulted in four additional observations of individuals or populations. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (3-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

P. olivacea is primarily found in fairly complex forests with a mix of fagaceous (hardwood trees in the family Fagaceae, particularly *Quercus* or *Lithocarpus* species) and conifer trees and occasionally in pure coniferous stands (ORBIC 2004). It grows scattered or in arcs (Castellano et al. 2003). It is more prevalent in low-elevation coastal forests, but has been found in montane coniferous forests, where it may be more adapted to colder, drier forests (Holthausen et al. 1994, Trappe, pers. comm. 2013). Based on data available in 2007, recorded observations were found below about 3,200 feet msl (Cushman and Huff 2007). *P. olivacea* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *Phaeocollybia* species are those that affect its host tree and disturb the soil, such as road and trail construction, logging, fire management activities, and recreational activities (Castellano and O'Dell 1997). Hot fires are the primary threat to the species in montane areas outside of reserves or other areas that can be protected from logging or development (ORBIC 2004). Sudden oak death (caused by *Phytophthora ramorum*) is also a primary threat to *P. olivacea* in hardwood stands. Populations in unprotected areas may also be threatened by road construction, development, clear-cutting, and heavy thinning. Moderate to light thinning is not considered a threat. Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *P. olivacea*:

- As a mycorrhizal species, *P. olivacea* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.37.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. olivacea* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PHOL-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 384

observations from BLM and Forest Service geodatabases were converted into 177 sites in the NSO range (region). Table PHOL-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PHOL-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PHOL-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PHOL-2 displays the species' regional distribution with the extent of coniferous, mixed hardwood-coniferous, and hardwood forests and LSOG forests below 6,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE PHOL-1

Number of *Phaeocollybia olivacea* Sites (2013)

Location*	Number of Sites
Regional Area	177
Local Area	22
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PHOL-2

Distribution of *Phaeocollybia olivacea* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	117	22	1
Forest Service	40	-	-
NPS	2	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	36	4	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE PHOL-3

Distribution of *Phaeocollybia olivacea* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	10	-	-
Adaptive Management Reserves (AMR)	8	-	-
Administratively Withdrawn (AW)	-	-	-
Congressionally Reserved (CR)	**3**	**-**	**-**
Late Successional Reserve (LSR)	**55**	**2**	**-**
Marbled Murrelet Area (LSR3)	**4**	**3**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**3**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	3	-	-
Other (Matrix, Riparian Reserve, Other)	77	18	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure PHOL-1. Regional Distribution of *Phaeocollybia olivacea*

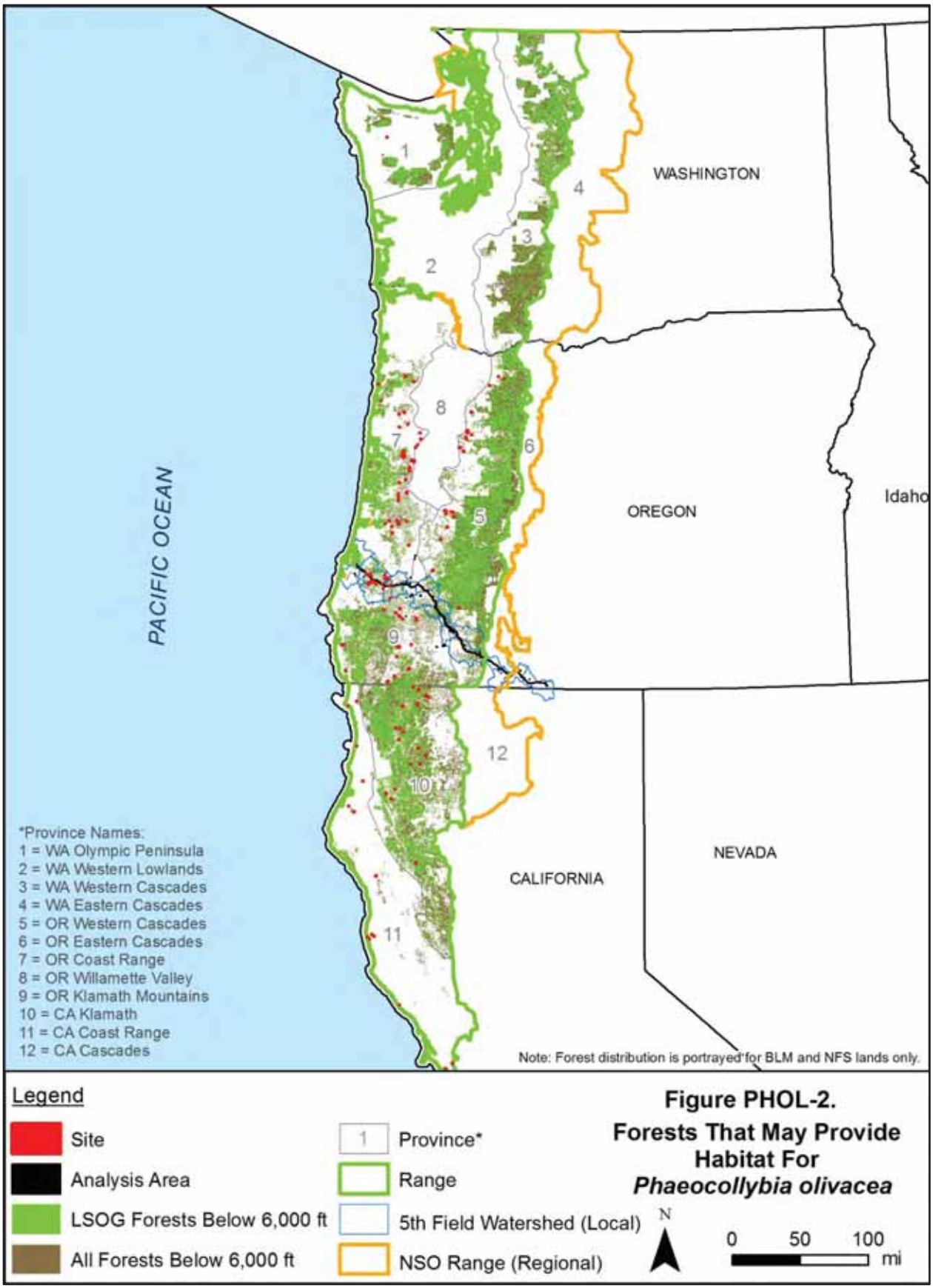


Figure PHOL-2.
Forests That May Provide Habitat For *Phaeocollybia olivacea*

Regional Distribution

P. olivacea is somewhat widely distributed across seven physiographic provinces in Washington (Olympic Peninsula), Oregon (Coast Range, Willamette Valley, Cascades West, and Klamath Mountain), and California (Coast and Klamath). Most sites are found along the Coast Range and in the Klamath Mountains, where many of the sites are clustered or relatively close to one another in groups. Scattered sites are located in the Cascade Range and other outlying areas with some clusters of sites in the Oregon Cascade Range. *P. olivacea* appears to be well distributed in the Oregon Coast Range and in the Klamath Mountains based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Thirty-six of 177 sites are located on private, state, or other lands (at least partially); two sites are on NPS lands (Olympic and Redwood National Parks); and 157 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 30 sites in the Coos Bay District, 18 sites in the Medford District, and eight sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include seven sites on the Rogue River National Forest. The remaining 94 sites on BLM and NFS lands are in the Arcata, Eugene, and Salem Districts and on the Klamath, Mt. Hood, Siskiyou, Siuslaw, and Six Rivers National Forests.

Across the NSO range, 65 sites are located on reserve lands managed by BLM and the Forest Service, including 55 in LSRs, four in Marbled Murrelet Areas, three in Known Owl Activity Centers, and three in Congressionally Reserved areas. This represents 41 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The two NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

P. olivacea is more commonly found in LSOG forests based on available data (145 of 177 total sites are in LSOG), but it is somewhat common in non-LSOG forests and has also been found in younger forests. Based on current site locations, the species is found in coniferous, mixed hardwood-coniferous, and hardwood forests below about 5,000 feet msl and has only been documented in the western part of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests, including the LSOG component of these forests, below 6,000 feet msl in most of the NSO range, excluding the eastern Cascade Range in Oregon and Washington and Cascade Range in California, could provide habitat for *P. olivacea* and support additional sites. These forests encompass an estimated 13.8 million acres on BLM and NFS lands, including an estimated 7.7 million acres in reserve land allocations (56 percent of the forests; Table PHOL-4). Of this acreage, an estimated 5.5 million acres are LSOG (see Figure PHOL-2), including 3.3 million acres in reserve land allocations (60 percent of the forests). Although coniferous, mixed, and hardwood forests below 6,000 feet msl are somewhat widespread across the western part of the NSO range, LSOG coniferous forests are less common.

TABLE PHOL-4

Extent of Forests that Could Provide Habitat for *Phaeocollybia olivacea* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	13,750,350	7,645,190	5,502,710	3,325,820
Local Area	520,780	179,810	176,180	75,990
Project Area	1,250	490	270	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. olivacea* is found in three 5th field watersheds that overlap the project area (see Table PHOL-5 and Figure PHOL-3). The sites are clustered and near one another in the Coast Range and Klamath Mountains in the western portion of the local area. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous, mixed, and hardwood forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 20 miles to the south in the Klamath Mountains and within 40 miles to the north in the Coast Range.

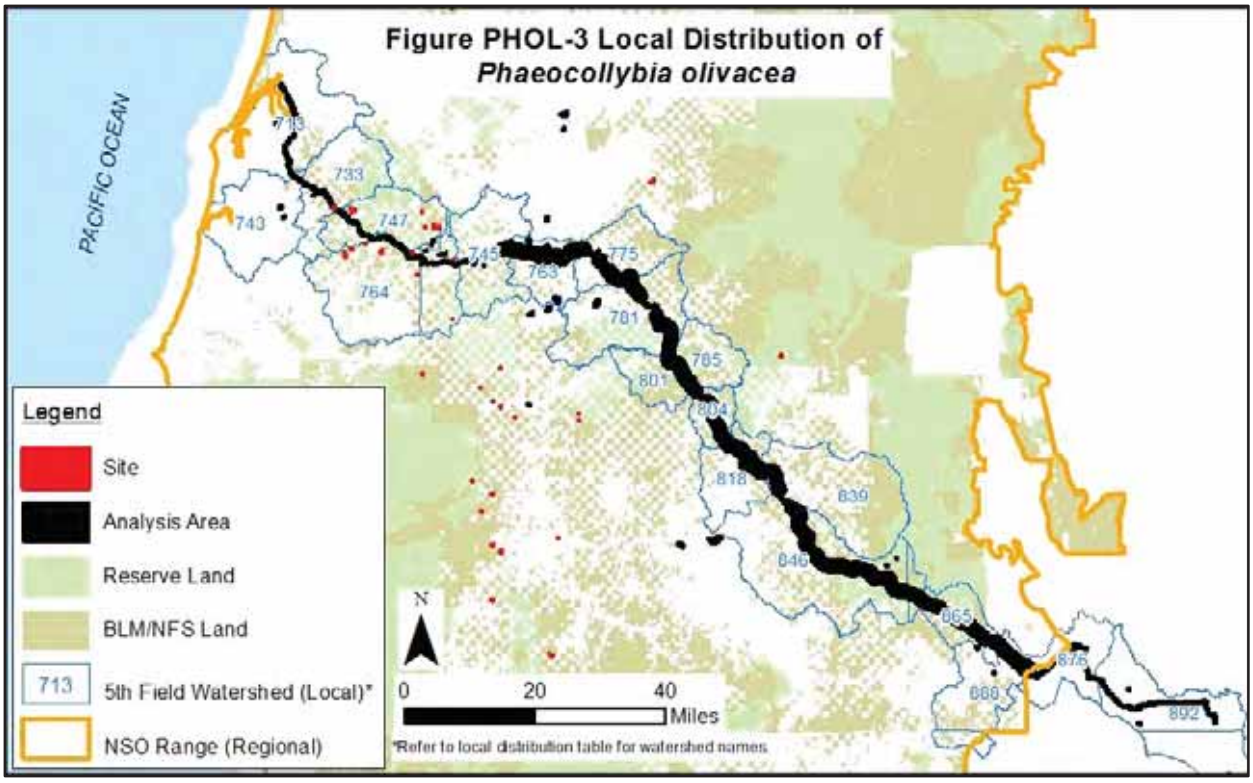
All of the 22 sites in the local area are on BLM lands (Coos Bay and Roseburg Districts), with four sites partially on private lands. Most of the local sites are on land designated as Other (Matrix); five sites are in reserve land allocations, representing 23 percent of the BLM-managed sites. All of the sites in reserves are in the Middle Fork Coquille River watershed (Table PHOL-5).

TABLE PHOL-5

Distribution of *Phaeocollybia olivacea* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	11	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	10	5
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	1	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 520,780 acres on BLM and NFS lands in the local area, including 179,810 acres in reserve land allocations (35 percent of the forests). Of this acreage, an estimated 176,180 acres are LSOG, including 75,990 acres in reserve land allocations (43 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures PHOL-2 and PHOL-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *P. olivacea*. This site is partially on BLM-managed lands (Coos Bay) and partially on private land. It is on land designated as Other (Matrix) in the North Fork Coquille River watershed. Several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in six total observations of the species in or near the project area (Siskiyou BioSurvey LLC 2012a). An estimated four of these recorded observations comprise the site in the analysis area; the other observations are in sites outside the analysis area. Within the project area, the site is located between MPs 27.4 and 27.5.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 157 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent of the sites (or one out of 177 total sites on all lands in the NSO range). Table PHOL-6 presents an overview of the features of the

PCGP Project that would affect the *P. olivacea* site. The construction corridor would affect approximately 1.0 acre within the site (about 19 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. olivacea* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 1.0 acre of vegetation and soils within the site and could remove individuals of *P. olivacea*. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and host trees and disturbance to soil could negatively affect *P. olivacea* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and nearby TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE PHOL-6

Impacts to *Phaeocollybia olivacea* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	1.0 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres

Across the project area, the PCGP Project would remove an estimated 980 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 200 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *P. olivacea*. Within this impact area, about 650 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 200 acres of coniferous, mixed, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, 21 sites of *P. olivacea* would remain on BLM lands in the local area, with five in reserves, and 156 sites, including 65 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations

with regard to agency-related actions. The 65 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 42 percent of the remaining *P. olivacea* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. olivacea* is a Category B (rare) S&M species in Oregon. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *P. olivacea* has a wide distribution across seven physiographic provinces and three states in the region and a moderate-high number of overall sites (157 on BLM and NFS lands). The species appears to be well distributed in the Coast Range in Oregon and in the Klamath Mountains and is fairly common in other areas with suitable habitat. The currently known number of sites on BLM and NFS lands is an increase of 123 sites since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 41 percent of the sites (65 sites) are in reserves, which is an increase of about 34 sites in reserves since 2006 per Molina (2008).
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are somewhat widely distributed across the species' range and encompass approximately 13.8 million acres on BLM and NFS lands with an estimated 56 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where some sites are documented. The Coast Range and other areas also contain forests that may provide suitable habitat, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *P. olivacea*.
- The PCGP Project would affect one of 157 BLM- and Forest Service-managed sites of *P. olivacea*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (156) would continue to be documented on BLM and NFS lands in the region with a wide distribution across the NSO range. Many sites (21) would remain in the local vicinity of the analysis area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 62 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are in Congressionally Reserved areas where management activities that may adversely affect *P. olivacea* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 200 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 7.7 million acres (56 percent) of coniferous, mixed, and hardwood forests below 6,000 feet msl and 3.3 million acres (60 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *P. olivacea*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.37.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. olivacea* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 156 sites would remain on BLM and NFS lands across the region, and 21 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *P. olivacea* at one site, this site is part of a large group of sites in the Coast Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. olivacea* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 980 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 200 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 7.7 million acres (56 percent) of coniferous, mixed, and hardwood forests below 6,000 feet msl and 3.3 million acres (60 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *P. olivacea* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *P. olivacea* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. olivacea* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.38 PHAEOCOLLYBIA PICEAE

Phaeocollybia piceae is a gilled mushroom species in the Cortinariaceae family. It is commonly known as spruce phaeocollybia.

2.38.1 Regulatory Status and Ranking

The 2001 ROD identifies *P. piceae* as a Category B (rare) species. The ORBIC evaluated *P. piceae* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and ranked the species in the 2007 ORBIC publication (ORBIC 2007). The species was not ranked in the most recent updates of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010 and 2013). In 2007, *P. piceae* was considered to be rare, uncommon, or threatened, but not immediately imperiled, both globally and in Oregon (G3?, S3?, respectively), although the rankings were uncertain (USDA and USDI 2007, ORBIC 2007). NatureServe currently considers *P. piceae* to be rare, uncommon, or threatened, but not immediately imperiled globally (G3?), although the ranking is uncertain. The species is not currently on the ORBIC Lists. *P. piceae* is not a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.38.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *P. piceae*. The species is most easily detected in fall, fruiting in October and November (Castellano et al. 1999). It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004, Cushman and Huff 2007). The ORBIC (2004) indicated that the mushroom appears to be long lived and grow slowly and may be less dependent on spore dispersal (e.g., via wind or animals) than on associations with its mycorrhizal partners, which are typically conifer trees.

Range

P. piceae is endemic to the Pacific Northwest of North America, ranging from Lower Carmanah Valley on Vancouver Island, British Colombia to the Olympic Peninsula and from Oswald West State Park in Oregon south to Mendocino County, California and east to the southwest slope of Mt. Hood and south along the Willamette Valley fringe to near Corvallis, Oregon (ORBIC 2004). The currently known range of the species within the NSO range based on 2014 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations limited to the Pacific Northwest. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under the Threats section below.

Population Status

The ORBIC reported *P. piceae* from approximately 36 element occurrences across the NSO range in 2004. In the Pacific Northwest, Oregon had the highest number of occurrences at 25 in 2004. Washington had about seven occurrences, and California had about three occurrences (ORBIC 2004). According to ORBIC (2004), *P. piceae* was considered to be uncommon and rare with a spotty distribution across its range in 2004. Populations of the species were considered to be stable for the long term and secure for the short term throughout most of its range. The species was not detected during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 36 new sites of *P. piceae* in the NSO range between 1998–2006, and 53 total sites were documented by 2006, including 17 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 52 sites on federal lands and 57 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2011 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *P. piceae*; however, the species was not observed during the surveys. Based on the increased number of sites since 1998 with increased surveys (more than a 3-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2014 data are presented below under the Species Distribution discussion.

Habitat

P. piceae grows in sandy to well-drained humus soil in coniferous and mixed hardwood-coniferous forests and is found associated with the roots of western hemlock, Sitka spruce, Pacific silver fir, and Douglas-fir (Cushman and Huff 2007, ORBIC 2004). The species generally occurs at low to medium elevations along the Pacific Coast and approximately 80 miles inland throughout its range. According to ORBIC 2004, *P. piceae* was generally found in mid- to late-successional or old-growth coniferous stands and appears restricted to fairly

complex habitats. *P. piceae* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *Phaeocollybia* species are presumably those actions that disrupt stand conditions necessary for its survival, particularly damage to host trees and disturbance of soil and humus occupied by the fungus and host tree roots (Castellano and O'Dell 1997). Typical threats in coniferous forests include: heavy logging that removes overstory trees and causes disturbance to soils; development; hot fires; heavy thinning for fire management; and construction or maintenance of roads, trails, or campgrounds (ORBIC 2004, Castellano and O'Dell 1997). *Phaeocollybia* species are not routinely harvested for food (Castellano and O'Dell 1997). Other specific threats to the species are not currently known. Harvest of coastal forests has likely eradicated populations of this species in some areas (Holthausen et al. 1994).

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *P. piceae* with several other species (Group 8 of Castellano and O'Dell 1997). The primary directions are to maintain habitat and microclimatic conditions at all known sites by retaining LSOG forest conditions; minimizing soil disturbance at or around known sites; and limiting disruption to host populations, particularly from fire and logging. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *P. piceae*:

- As a mycorrhizal species, *P. piceae* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.38.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. piceae* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PHPI-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 107

observations from BLM and Forest Service geodatabases were converted into 79 sites in the NSO range (region). Table PHPI-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PHPI-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PHPI-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PHPI-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 4,500 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE PHPI-1

Number of *Phaeocollybia piceae* Sites (2014)

Location*	Number of Sites
Regional Area	79
Local Area	24
Analysis Area (Project Area)	1 (0)

Data Source: Processed BLM and Forest Service GIS data, April 7, 2014
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PHPI-2

Distribution of *Phaeocollybia piceae* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	55	24	1
Forest Service	17	-	-
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	13	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE PHPI-3

Distribution of *Phaeocollybia piceae* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	2	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	-	-	-
Congressionally Reserved (CR)	**-**	**-**	**-**
Late Successional Reserve (LSR)	**25**	**1**	**-**
Marbled Murrelet Area (LSR3)	**1**	**1**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	40	23	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure PHPI-1. Regional Distribution of *Phaeocollybia piceae*

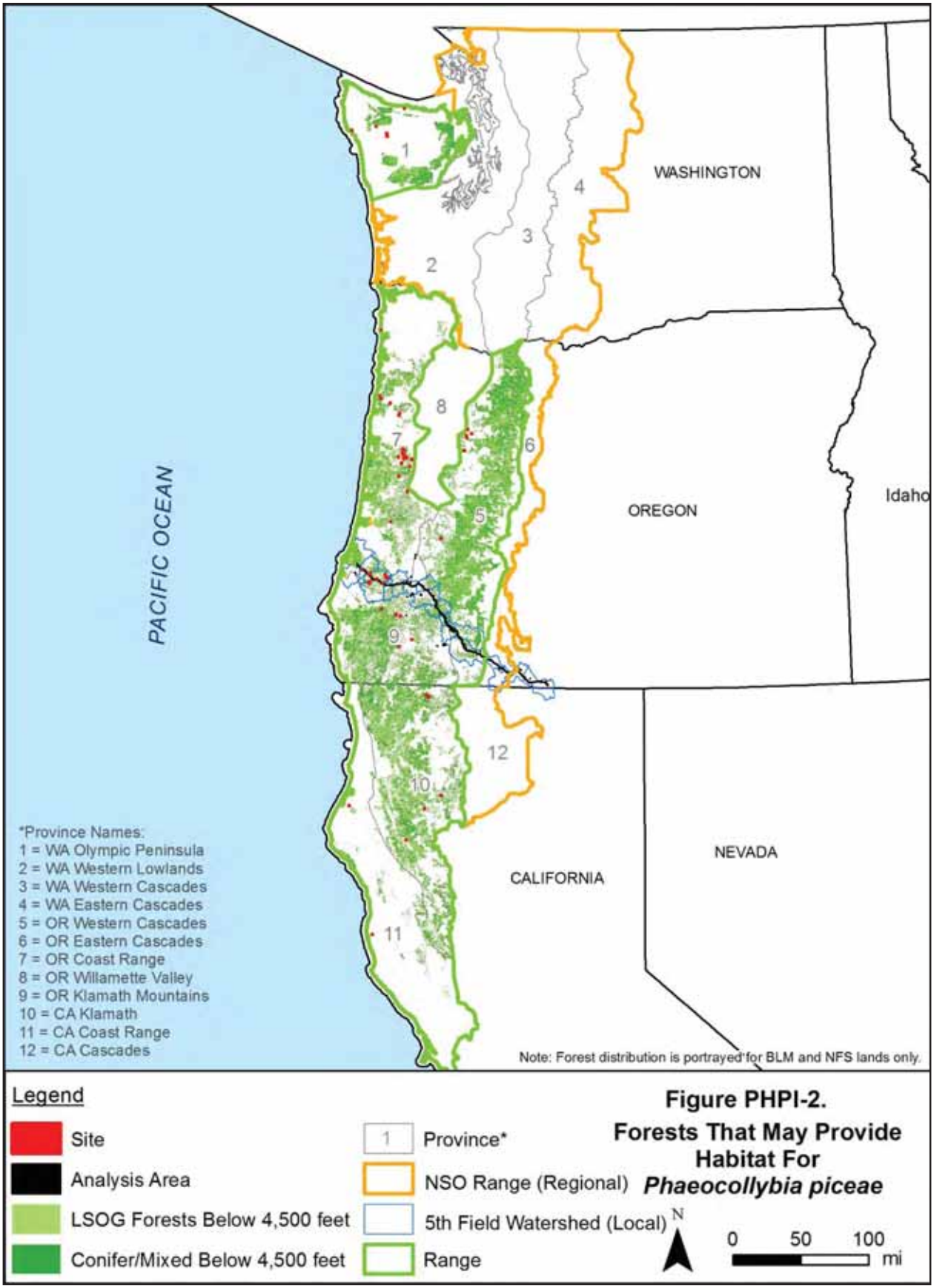


Figure PHPI-2.
Forests That May Provide Habitat For *Phaeocollybia piceae*

Regional Distribution

P. piceae has a somewhat wide distribution across six physiographic provinces in Washington (Olympic Peninsula), Oregon (Coast Range, Klamath Mountains, and Cascades West), and California (Coast and Klamath). Most sites are found along the Coast Range in Oregon, where the sites tend to be clustered or relatively close to one another. Scattered sites are found in other areas outside the Coast Range, with a couple of groups of sites in the Klamath Mountains and western Cascade Range in Oregon. *P. piceae* appears to be well distributed in the Coast Range and Klamath Mountains in Oregon based on the proximity of sites to one another, which provides opportunities for dispersal, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Thirteen of 79 sites are located on private lands (at least partially), three sites are on NPS lands (Olympic National Park), and 69 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 25 sites in the Coos Bay District and eight sites in the Medford District. Sites managed by the National Forests that encompass the project area include two sites on the Rogue River National Forest. The remaining 36 sites on BLM and NFS lands are in the Salem and Eugene Districts and on the Klamath, Shasta-Trinity, and Siuslaw National Forests.

Across the NSO range, 26 sites are located on reserve lands managed by BLM and the Forest Service, including 25 in LSRs and one in a Marbled Murrelet Area. This represents 38 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

P. piceae is primarily found in LSOG forests based on available data (68 of 79 total sites are in LSOG), but it is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 4,500 feet msl and has been documented in part of the NSO range, including the Olympic Peninsula, Coast Range, Klamath Mountains, and western Cascade Range in Oregon. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the this range could provide habitat for *P. piceae* and support additional sites. These forests encompass an estimated 9.2 million acres on BLM and NFS lands in the region, including an estimated 4.7 million acres in reserve land allocations (51 percent of the forests; Table PHPI-4). Of this acreage, an estimated 3.8 million acres are LSOG (see Figure PHPI-2), including 1.4 million acres in reserve land allocations (35 percent of the forests). Although coniferous and mixed forests below 4,500 feet msl are widespread across the species' range, LSOG forests are less common.

TABLE PHPI-4

Extent of Forests that Could Provide Habitat for *Phaeocollybia piceae* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 4,500 feet		LSOG Forests below 4,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	9,194,480	4,717,480	3,821,810	1,353,910
Local Area	456,860	145,080	151,360	62,690
Project Area	1,040	280	200	80

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. piceae* is found in three 5th field watersheds that overlap the project area (see Table PHPI-5 and Figure PHPI-3). The sites are clustered and relatively close to one another in the Coast Range in the western portion of the local area. Several sites are located to the north in the Coast Range and to the south in the Klamath Mountains. Multiple avenues of connectivity appear to be available between sites in the local area based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist between the watersheds and to nearby regional areas.

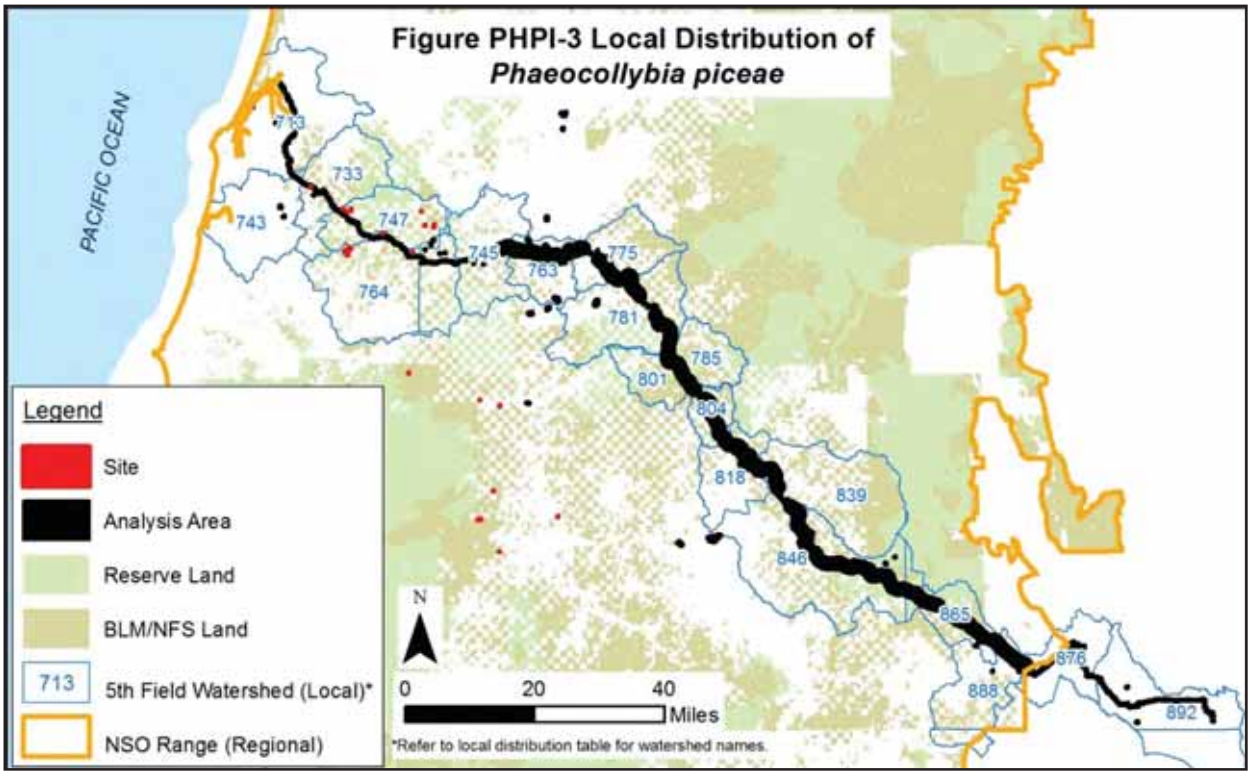
All of the 24 sites in the local area are on BLM lands. Most of the local sites are on land designated as Other (Matrix); two sites are on reserve lands, representing 8 percent of the BLM-managed sites. The two sites on reserve lands are in the Middle Fork Coquille River watershed (Table PHPI-5).

TABLE PHPI-5

Distribution of *Phaeocollybia piceae* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	9	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	14	2
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	1	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, April 7, 2014; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous forests below 4,500 feet msl encompass approximately 456,860 acres on BLM and NFS lands in the local area, with 145,080 acres in reserve land allocations (32 percent of the forests). Of this acreage, an estimated 151,360 acres are LSOG, including 62,690 acres in reserves (41 percent of the forests). Other sites may also exist in the local area, particularly in the Coast Range, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures PHPI-2 and PHPI-3).

Analysis/Project Area Distribution

The analysis area contains one site of *P. piceae*, and no sites are located in the project area. The site is on BLM-managed land (Coos Bay District) and is on land designated as Other (Matrix) in the North Fork Coquille River watershed. This site is part of a group of sites in the Coast Range where the species appears to be well distributed, and several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project did not result in any observations of the species (Siskiyou BioSurvey LLC 2012a). The recorded observation of the species in the analysis area is from agency databases and was recorded in 2012. The site is located near MP 21.5.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 69 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 79 total sites on all lands in the NSO range). The PCGP Project would not result in any direct effects on *P.*

piceae sites, but one site could be indirectly affected by activities related to the construction corridor and associated work areas. Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. piceae* near the project area.

The *P. piceae* site in the analysis area could be indirectly affected by activities within the corridor and TEWAs, but direct effects on the site are not anticipated. The establishment of the corridor could modify microclimate conditions near the site after the corridor is established. The removal of forests could negatively affect *P. piceae* in nearby areas by removing its habitat, reducing the complexity of the habitat, and reducing opportunities for dispersal, potentially affecting site persistence even though the site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

Across the project area, the PCGP Project would remove an estimated 830 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl, including 140 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *P. piceae*. Within this impact area, about 530 acres (about 64 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 160 acres of coniferous and mixed forests below 4,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 4,500 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, 23 sites of *P. piceae* would remain on BLM lands in the local area, including two in reserves, and 68 sites, including 26 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 26 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 38 percent of the remaining *P. piceae* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the

persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. piceae* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *P. piceae* has a somewhat wide distribution across six physiographic provinces and three states in the region and a moderate-high number of overall sites (69 on BLM and NFS lands). The species appears to be well distributed in the Coast Range and Klamath Mountains in Oregon. The currently known number of sites on BLM and NFS lands is an increase of about 22 sites since 2007.
    - An estimated 38 percent of the sites (26 sites) are in reserves, which is an increase of about nine sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (general habitat for the species) are widespread across the species' range and encompass approximately 9.2 million acres on BLM and NFS lands with an estimated 51 percent in reserves. A subcomponent of these forests likely provides habitat for *P. piceae*.
- The PCGP Project would affect one of the 69 BLM- and Forest Service-managed sites of *P. piceae*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (68) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Washington, Oregon, and California. Many sites (23 sites) would remain in the local vicinity of the analysis area; these sites would be distributed across two 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 26 sites are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests.
- The PCGP Project would result in a permanent loss of an estimated 160 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 4.7 million acres (51 percent) of coniferous and mixed forests and 1.4 million acres (35 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *P. piceae*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however,

it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

2.38.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. piceae* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 68 sites would remain on BLM and NFS lands across the region, and 23 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *P. piceae* at one site, the site is part of the many sites in the Coast Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. piceae* would persist in the region without considering the single site as part of the population.
- The PCGP Project would remove approximately 830 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl and 140 acres of LSOG forests (a negligible amount of the forests). An estimated 64 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 4.7 million acres (51 percent) of coniferous and mixed hardwood-coniferous forests and 1.4 million acres (35 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *P. piceae* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *P. piceae* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. piceae* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.39 PHAEOCOLLYBIA SCATESIAE

Phaeocollybia scatesiae is a gilled mushroom species in the Cortinariaceae family and does not have a common name. The species was described in 1972 (Smith & Trappe 1972), erroneously synonymized with *P. californica* in 1977 (Horak 1977), and restored as a legitimate species by Norvell in 1998 (Norvell 1998).

2.39.1 Regulatory Status and Ranking

The 2001 ROD identifies *P. scatesiae* as a Category B (rare) species. The ORBIC evaluated *P. scatesiae* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be rare, uncommon, or threatened, but not immediately imperiled, within its global range and in Oregon (G3, S3, respectively). In 2010, the species was considered to be too common and was removed from the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.39.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *P. scatesiae*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). It forms symbiotic associations with the roots of conifer trees to obtain minerals, water, and nutrients (Castellano and O'Dell 1997). The ORBIC (2004) indicated that the mushroom appears to grow slowly and may be less dependent on spore dispersal (e.g., via wind or animals) than on associations with its mycorrhizal partners. It has been documented fruiting in March, May, October, and November (Castellano et al. 1999), but primarily in late fall (Norvell and Exeter 2008). It does not fruit annually (ORBIC 2004). This species is distinguished from *P. californica* by its densely caespitose growth habit, darker coloration, and smaller stature.

Range

P. scatesiae is endemic to the Pacific Northwest. Based on data available in 2004, its range extended from the Olympic Peninsula in Washington south to Van Damme State Park in California and east to the Cascade Range (ORBIC 2004). Its range in Oregon extended from the Cascade Head Experimental Forest south along the Oregon coast to the Coos Bay area and east to Larch Mountain on the Columbia Gorge and south along the western slope of the Cascade Range to southeast of Salem. Within its range in 2004, *P. scatesiae* had a spotty distribution and appeared to be restricted to fairly complex habitats. The currently known range of the species

within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *P. scatesiae* from an estimated 27 element occurrences across the species' range in 2004, although other occurrences may have been incorrectly reported as *P. californica*. An estimated 21 of these occurrences were in Oregon, and fewer were in California (4) and Washington (2) (ORBIC 2004). In 2004, *P. scatesiae* was presumed to be relatively stable with a potential for population declines due to its limited range (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 17 new sites of *P. scatesiae* in the NSO range between 1998–2006, and 19 total sites were documented by 2006, including 10 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 19 total sites, all on federal lands.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *P. scatesiae*, and resulted in one new observation of a population of *P. scatesiae*. Based on the increased number of sites since 1998 with increased surveys (9-fold increase between 1998–2006 per Molina 2008 records), more survey effort may locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

P. scatesiae has primarily been found in LSOG coniferous forests, including pristine 400-year-old forests, and has been reported between sea level and about 4,500 feet msl (ORBIC 2004, Castellano et al. 1999, Cushman and Huff 2007). It grows in association with true firs (*Abies* spp.), Sitka spruce, and berry shrubs (*Vaccinium* spp.) (Castellano et al. 1999). It has been found in well-decomposed wood or woody humus in densely canopied coniferous forests (ORBIC 2004). It has also been documented in moderately thinned LSOG forests. It is more prevalent in low-elevation coastal forests, but has been found in montane coniferous forests, where it may be more adapted to colder, drier forests (Holthausen et al. 1994, Trappe, pers. comm. 2013). This species seems to prefer specific microclimate conditions of LSOG forests.

Threats

Threats to *P. scatesiae* are those that affect its host tree and disturb the soil, such as road and trail construction, logging, fire management activities, and recreational activities (Castellano and O'Dell 1997). Hot fires are the primary threat to the species in montane areas outside of reserves

or other areas that can be protected from logging or development (ORBIC 2004). Populations in unprotected areas may also be threatened by road construction, development, clear-cutting, and heavy thinning. Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *P. scatesiae* with several other species (Group 8 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat and microclimate conditions at all known sites by retaining LSOG conditions; minimizing soil disturbance at or around known sites; and limiting disruption to host populations, particularly from fire and logging. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *P. scatesiae*:

- As a mycorrhizal species, *P. scatesiae* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.39.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. scatesiae* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PHSC-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 66 observations from BLM and Forest Service geodatabases were converted into 38 sites in the NSO range (region). Table PHSC-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PHSC-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PHSC-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PHSC-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 4,500 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE PHSC-1

Number of *Phaeocollybia scatesiae* Sites (2013)

Location*	Number of Sites
Regional Area	38
Local Area	10
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PHSC-2

Distribution of *Phaeocollybia scatesiae* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	31	10	1
Forest Service	6	-	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	3	1	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE PHSC-3

Distribution of *Phaeocollybia scatesiae* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	-	-	-
Adaptive Management Reserves (AMR)	3	-	-
Administratively Withdrawn (AW)	-	-	-
Congressionally Reserved (CR)	**4**	**-**	**-**
Late Successional Reserve (LSR)	**14**	**3**	**-**
Marbled Murrelet Area (LSR3)	**1**	**1**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	15	6	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

P. scatesiae has a somewhat limited distribution across four physiographic provinces in Oregon (Coast Range, Cascades West, and Klamath Mountain) and California (Coast). The sites are distributed in three groups of clustered sites in the Coast Range and Cascade Range in Oregon with a few scattered sites in the Coast Range in California. *P. scatesiae* is less abundant outside Oregon based on current site locations, but appears to be locally abundant in the Coast Range and northern Cascade Range in Oregon. The species appears to have a limited distribution outside the Oregon Coast and Cascade Ranges based on the lower number of sites and isolated nature of the sites in California. Based on the overall scattered distribution of sites, the species does not appear to be well distributed within its range in the NSO range.



Figure PHSC-1. Regional Distribution of *Phaeocollybia scatesiae*

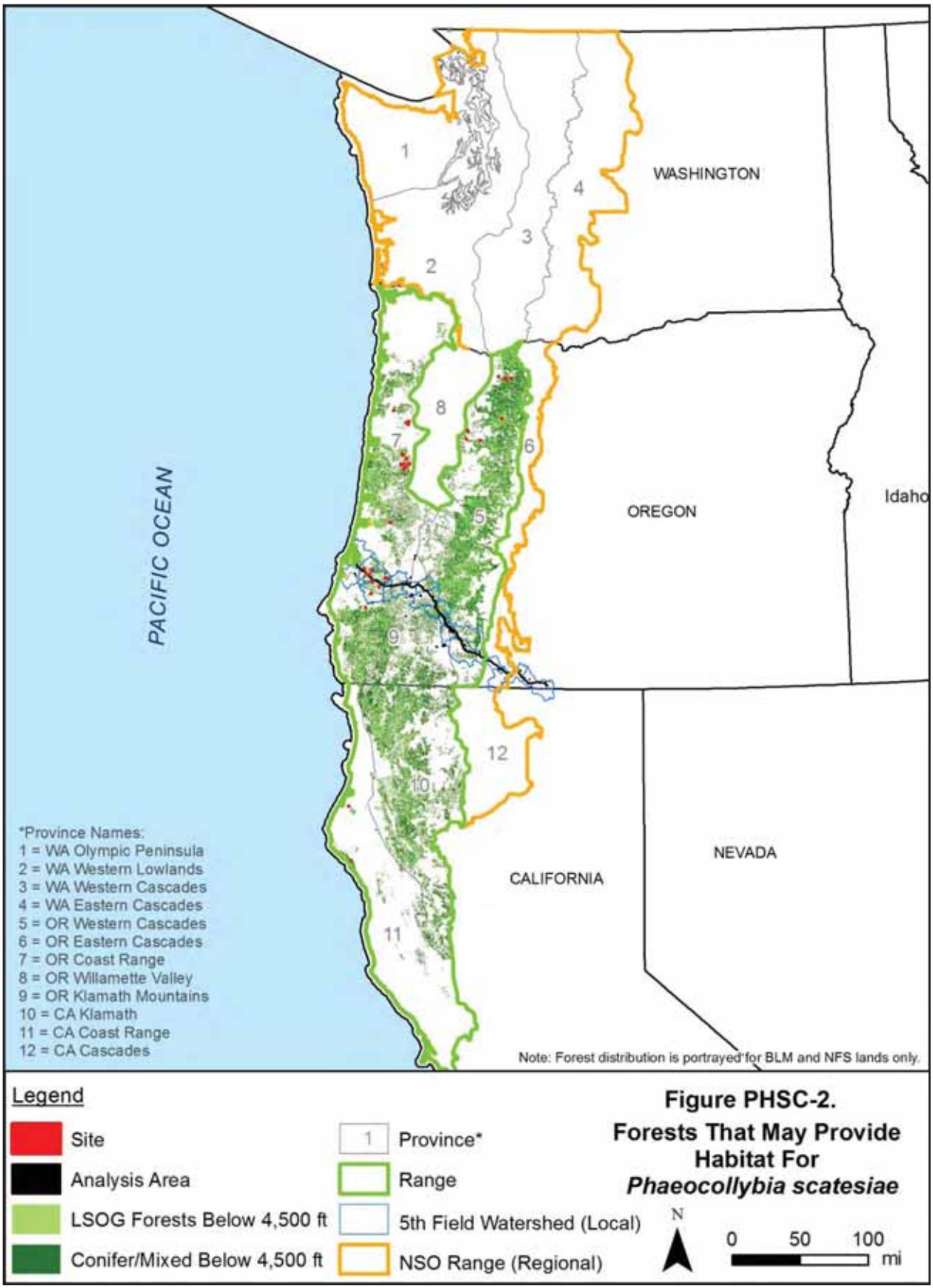


Figure PHSC-2.
Forests That May Provide Habitat For *Phaeocollybia scatesiae*

Three of 38 sites are located on private lands (at least partially), and 37 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 11 sites in the Coos Bay District. Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest. Sites managed by other BLM Districts and National Forests include two sites in the Arcata District, 19 sites in the Salem District, and five sites on the Mt. Hood National Forest.

Across the NSO range, 19 sites are located on reserve lands managed by BLM and the Forest Service, including 14 in LSRs, one in a Known Owl Activity Center, and four in Congressionally Reserved areas. This represents 51 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

P. scatesiae is primarily found in LSOG forests based on available data (31 of 38 total sites are in LSOG) and appears to require specific microclimate conditions of LSOG forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 4,300 feet msl and has only been documented in the Coast Range and Klamath Mountains in Oregon and California and western Cascade Range in Oregon. LSOG coniferous and mixed hardwood-coniferous forests within this range could provide habitat for *P. scatesiae* and support additional sites. These forests encompass an estimated 3.6 million acres (see Figure PHSC-2 and Table PHSC-4), including 2.1 million acres in reserve land allocations (57 percent of the forests). LSOG coniferous and mixed hardwood-coniferous forests below 4,500 feet msl are primarily found in the Klamath Mountains and Cascade Range. Younger coniferous and mixed forests may provide habitat for the species as they mature and develop suitable habitat conditions over time, and these forests are more widespread across the species' range (see Figure PHSC-2 and Table PHSC-4).

TABLE PHSC-4

Extent of Forests that Could Provide Habitat for *Phaeocollybia scatesiae* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 4,500 feet		LSOG Forests below 4,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	8,620,010	4,260,300	3,591,160	2,051,430
Local Area	456,860	145,080	151,360	62,690
Project Area	1,040	280	200	80

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for Oregon and California only, which is the extent of the species' currently known range.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. scatesiae* is found in three 5th field watersheds that overlap the project area (see Table PHSC-5 and Figure PHSC-3). The sites are clustered and near one another in the Coast Range and Klamath Mountains in the western portion of the local area and are one of the three groups of sites found in Oregon (see Regional Distribution discussion above). Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of LSOG coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas.

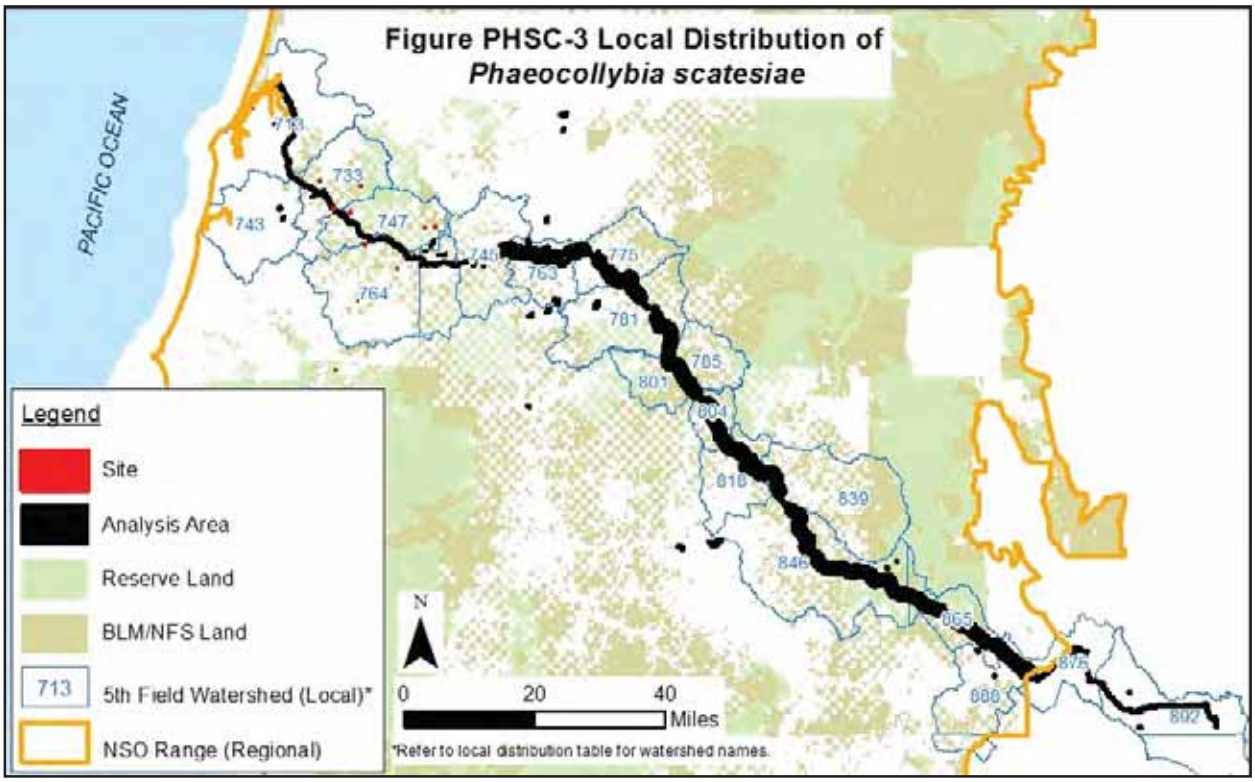
All of the 10 sites in the local area are on BLM lands (Coos Bay District), with one site partially on private land. Most of the local sites are on land designated as Other (Matrix); four sites are in LSRs, representing 40 percent of the BLM-managed sites. Sites in LSRs are in the Middle Fork and North Fork Coquille River watersheds (Table PHSC-5).

TABLE PHSC-5

Distribution of *Phaeocollybia scatesiae* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	4	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	3	3
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	3	1
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



LSOG coniferous and mixed hardwood-coniferous forests below 4,500 feet msl encompass approximately 151,360 acres, including 62,690 acres in reserve land allocations (41 percent of the forests). Other sites may also exist in the local area, particularly in the Coast Range and Klamath Mountains, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures PHSC-2 and PHSC-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *P. scatesiae*. This site is partially on BLM-managed lands (Coos Bay) and partially on private land. It is on land designated as Other (Matrix) in the North Fork Coquille River watershed. This site is part of a group of sites in the Coast Range, and several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in three total observations of the species in one location in the project area during 2011 (Siskiyou BioSurvey LLC 2012a). These recorded observations are located between MPs 27.4 and 27.5 and comprise the site in the analysis area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 37 sites on BLM- and Forest Service-managed lands in the region, representing approximately 3 percent of the sites (or one out of 38 total sites on all lands in the NSO range). Table PHSC-6 presents an overview of the features of the PCGP Project that would affect the *P. scatesiae* site. The construction corridor would affect approximately 1.0 acre (16 percent) of the site (the site is approximately 6.2 acres). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. scatesiae* in and near the project area. Due to the somewhat limited and scattered distribution of the species, the effects on one site could potentially alter the distribution of the species in the NSO range if site persistence is affected. This discussion presents a detailed analysis of the features of the PCGP Project that could affect site persistence.

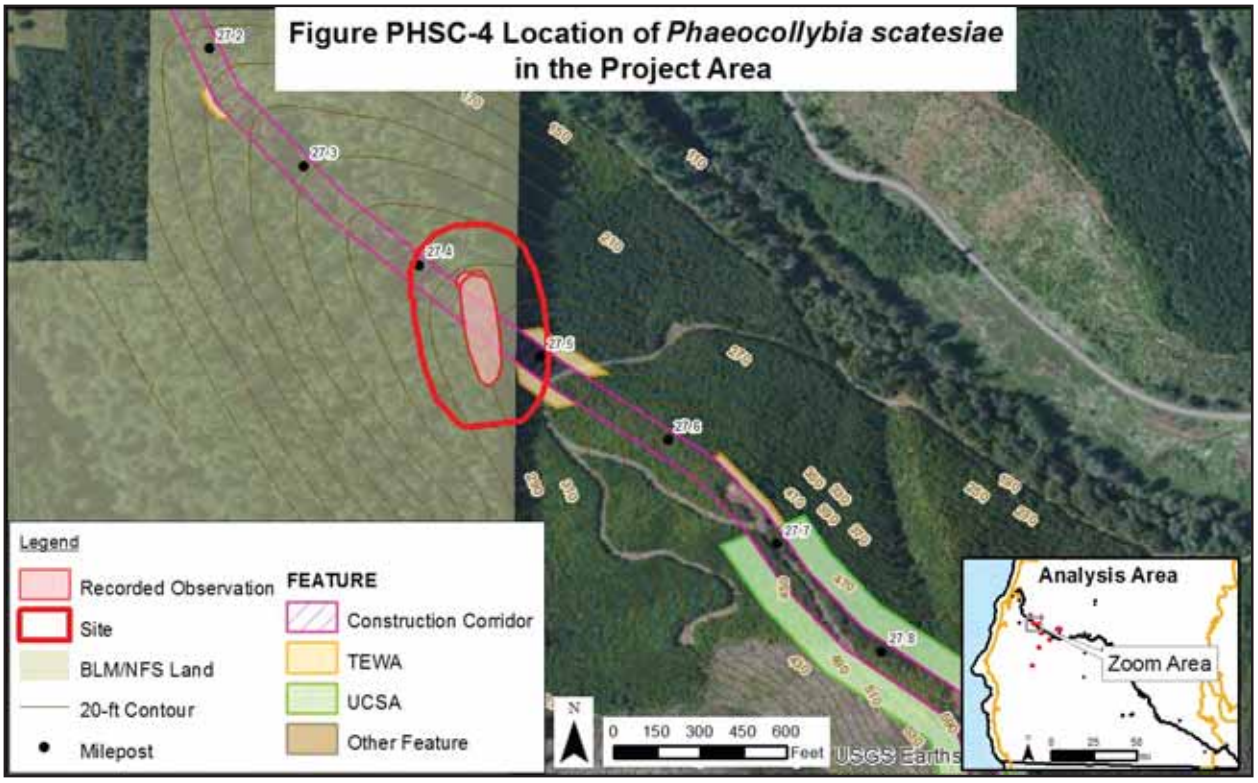
TABLE PHSC-6

Impacts to *Phaeocollybia scatesiae* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	1.0 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres

The PCGP Project would result in ground disturbance and vegetation removal across the central portion of the site between MPs 27.4-27.5. The recorded observations of the species are on both sides of the corridor. The corridor would cross through the center of the observations, but would likely avoid some of the individual observations (see Figure PHSC-4). Individuals outside the project area may also be subject to indirect effects associated with the PCGP Project, as discussed below.



Establishment of the construction corridor would disturb vegetation and soils around the recorded observations within the site and would likely result in removal of some individuals. The area within the site is primarily heavily forested, and the observations appear to be along a ridge at the edge of the forest and adjacent to a previously disturbed (possibly clear-cut) area where younger forests are present within 100 feet. The establishment of the corridor could modify microclimate conditions within the site, but could have similar effects as the past disturbance on adjacent land. The removal of forests and host trees and disturbance to soil could negatively affect *P. scatesiae* by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, but the species has demonstrated resilience to edge effects within the site, and some individuals outside the corridor are expected to persist despite the impacts. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

Based on this analysis, *P. scatesiae* is likely to persist at the site following project implementation, although individuals within the corridor would be removed. This site is one of eight sites in the local area and is part of a group of sites in the southern Coast Range in Oregon. Despite impacts to individuals, *P. scatesiae* would continue to be found in the Klamath Mountains and Coast Range in Oregon, and opportunities for dispersal across the mountain ranges would still exist based on the distribution of the sites in the region.

Across the project area, the PCGP Project would remove an estimated 140 acres of LSOG coniferous and mixed-hardwood coniferous forests below 4,500 feet msl. These impacts would

result in a reduction of habitat that may be suitable for *P. scatesiae*. Within this impact area, about 100 acres (about 71 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, but the restored areas would not return to LSOG conditions for more than 80 years and would not likely provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would also remain across the project area and would not provide habitat for the species. The permanent loss of LSOG forests below 4,500 feet msl represents less than 1 percent of the total estimated area of these forests across the species' range.

Discussion

Assuming site persistence is maintained at the one site in the project area despite impacts to individuals and habitat as a result of the PCGP Project, nine sites of *P. scatesiae* would remain on BLM land in the local area, with four in reserves, and 36 sites, including 19 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 19 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 53 percent of the *P. scatesiae* sites on BLM and NFS lands in the NSO range would continue to be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. scatesiae* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *P. scatesiae* has a somewhat limited distribution across four physiographic provinces and two states in the region and a moderate-high number of overall sites (37 on BLM and NFS lands). The species is most abundant in the Coast Range and northern Cascade Range in Oregon, but it does not appear to be well distributed in any part of its range. The currently known number of sites is an increase of 18 sites on BLM and NFS lands since 2007.
    - An estimated 51 percent of the sites (19 sites) are in reserves, which is an increase of about 10 sites in reserves since 2006 per Molina (2008).
- LSOG coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (general habitat for the species) have a somewhat limited distribution in the Klamath Mountains,

Coast Range, and western Cascade Range and encompass approximately 3.6 million acres on BLM and NFS lands with an estimated 57 percent in reserves. *P. scatesiae* is likely restricted to a subcomponent of LSOG coniferous and mixed forests based on available information on its habitat and life history requirements. A subcomponent of these forests likely provides habitat for *P. scatesiae*.

- The PCGP Project would affect one of 37 BLM- and Forest Service-managed sites of *P. scatesiae*, representing approximately 3 percent of the sites on BLM and NFS lands in the NSO range. However, site persistence is expected to be maintained at the site based on the analysis. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be the same as the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the total sites, 15 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and four are at least partially in Congressionally Reserved areas where management activities that may adversely affect *P. scatesiae* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 140 acres of LSOG coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 2.1 million acres (57 percent) of LSOG coniferous and mixed forests would remain in reserves in the species' range. Suitable habitat for *P. scatesiae* includes a subcomponent of these forests, which may be limited based on the somewhat limited distribution of the species.
- The remaining forests could support additional populations of *P. scatesiae*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.39.1 Conclusions

If implemented as proposed, the PCGP Project would likely affect some of the individuals of *P. scatesiae* at one site, but site persistence is not expected to be affected, and the PCGP Project would not modify the distribution of the species in the NSO range. The remaining sites would continue to provide a reasonable assurance of species persistence because:

- With project implementation, the number of sites on BLM and NFS lands across the region (36 sites) and on BLM lands in the local area (nine sites) would not change. Although the PCGP Project would affect individuals of *P. scatesiae* at one site, site persistence is not expected to be affected. The species' distribution and range within the NSO range would be the same as its currently known distribution and range.
- The PCGP Project would remove approximately 140 acres of LSOG coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (a negligible amount of the forests). Although an estimated 71 percent of these forests would be restored following project implementation, they would not likely provide habitat for the species during the life of the project. About 2.1 million acres (57 percent) of LSOG coniferous and mixed

hardwood-coniferous forests below 4,500 feet msl would remain in reserves (negligible change with project implementation). Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a group of sites in either the Oregon Coast Range or Cascade Range, sites are scattered across these mountain ranges and the three groups of sites are less likely to be affected by a single event.

The PCGP Project would not be able to avoid impacts to the *P. scatesiae* site in the analysis area, but individuals within the site are expected to persist following project implementation. Based on the above conclusions, avoidance of the *P. scatesiae* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. scatesiae* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.40 PHAEOCOLLYBIA SIPEI

Phaeocollybia sipei is a gilled mushroom species in the Cortinariaceae family. It does not have a common name.

2.40.1 Regulatory Status and Ranking

The 2001 ROD identifies *P. sipei* as a Category B (rare) species. The ORBIC evaluated *P. sipei* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent updates of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010 and 2013). In 2007, *P. sipei* was considered to be rare, uncommon, or threatened, but not immediately imperiled, both globally and in Oregon (G3?, S3?, respectively), although the rankings were uncertain (USDA and USDI 2007, ORBIC 2007). NatureServe currently considers *P. sipei* to be rare, uncommon, or threatened, but not immediately imperiled globally (G3?), although the ranking is uncertain. The current state ranking of the species is unknown. The species is not currently on the ORBIC Lists, although it was a List 3 species in 2007 and was subsequently removed from the list. *P. sipei* is not a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.40.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation

in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *P. sipei*. The species is most easily detected in fall, fruiting in October and November (Castellano et al. 1999). It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004, Cushman and Huff 2007). The ORBIC (2004) indicated that the mushroom appears to be long lived and to grow slowly and may be less dependent on spore dispersal (e.g., via wind or animals) than on associations with its mycorrhizal partners, which are typically conifer trees.

Range

P. sipei is endemic to the Pacific Northwest of North America and is apparently restricted to Oregon and California with most occurrences in Oregon (ORBIC 2004, Cushman and Huff 2007). An unconfirmed collection was reported from Olympic National Park in Washington; however, the ORBIC does not include the collection in the species' range (ORBIC 2004). The currently known range of the species within the NSO range based on 2014 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations limited to the Pacific Northwest. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under the Threats section below.

Population Status

The ORBIC reported *P. sipei* from 26 element occurrences within the NSO range in 2004. According to ORBIC (2004), *P. sipei* was considered to be uncommon to rare with a spotty distribution across its range in 2004. Populations of the species were considered to be stable for the short term and relatively stable for the long term. The species was detected in one location during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 42 new sites of *P. sipei* in the NSO range between 1998–2006, and 51 total sites were documented by 2006, including 16 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 49 sites on federal lands and 53 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2011 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *P. sipei*; however, the species was not observed during the surveys. Based on the increased number of sites since 1998 with increased surveys (over a 5-fold increase between 1998–2006 per Molina 2008 records), it is likely the species is more abundant than previously known and more survey effort would be expected to locate additional populations in the NSO range in Oregon and California. The current estimated number of sites and distribution of the species based on 2014 data are presented below under the Species Distribution discussion.

Habitat

P. sipei occurs as gregarious sporocarps in humus, litter, or soil in coniferous and mixed hardwood-coniferous forests (Cushman and Huff 2007, ORBIC 2004). It is found associated with the roots of western hemlock, Douglas-fir, Sitka spruce, Pacific silver fir, and red fir (Norvell 1998, Cushman and Huff 2007) and may be found in mixed stands with western red cedar, Port Orford cedar (*Chamaecyparis lawsoniana*), Pacific yew, incense cedar, bigleaf maple, tan oak (*Notholithocarpus densiflorus*), and California laurel (*Umbellularia californica*). The species generally occurs at elevations ranging between approximately 350 and 3,550 feet. It is more prevalent in low-elevation coastal forests, but has been found in montane coniferous forests, where it may be more adapted to colder, drier forests (Holthausen et al. 1994, Trappe, pers. comm. 2013). According to ORBIC (2004), *P. sipei* was generally found in mid- to late-successional or old-growth coniferous stands and appears restricted to fairly complex habitats. *P. sipei* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *Phaeocollybia* species are presumably those actions that disrupt stand conditions necessary for its survival, particularly damage to host trees and disturbance of soil and humus occupied by the fungus and host tree roots (Castellano and O'Dell 1997). Typical threats in coniferous and mixed forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, heavy thinning for fire management, and construction or maintenance of roads, trails, or campgrounds (ORBIC 2004, Castellano and O'Dell 1997). Moderate to light thinning is not considered a threat. *Phaeocollybia* species are not routinely harvested for consumption. Other specific threats to the species are not currently known. Harvest of coastal forests has likely eradicated populations of this species (Holthausen et al. 1994).

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *P. sipei* with several other species (Group 8 of Castellano and O'Dell 1997). The primary directions are to maintain habitat and microclimatic conditions at all known sites by retaining LSOG forest conditions; minimizing soil disturbance at or around known sites; and limiting disruption to host populations, particularly from fire and logging. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *P. sipei*:

- As a mycorrhizal species, *P. sipei* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.40.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. sipei* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PHSI-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 180 observations from BLM and Forest Service geodatabases were converted into 135 sites in the NSO range (region). Table PHSI-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PHSI-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PHSI-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PHSI-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 4,500 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE PHSI-1

Number of *Phaeocollybia sipei* Sites (2014)

Location*	Number of Sites
Regional Area	135
Local Area	40
Analysis Area (Project Area)	1 (0)

Data Source: Processed BLM and Forest Service GIS data, April 7, 2014
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PHSI-2

Distribution of *Phaeocollybia sipei* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	124	40	1
Forest Service	8	-	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	13	3	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.



Figure PHSI-1.
Regional Distribution of
Phaeocollybia sipei

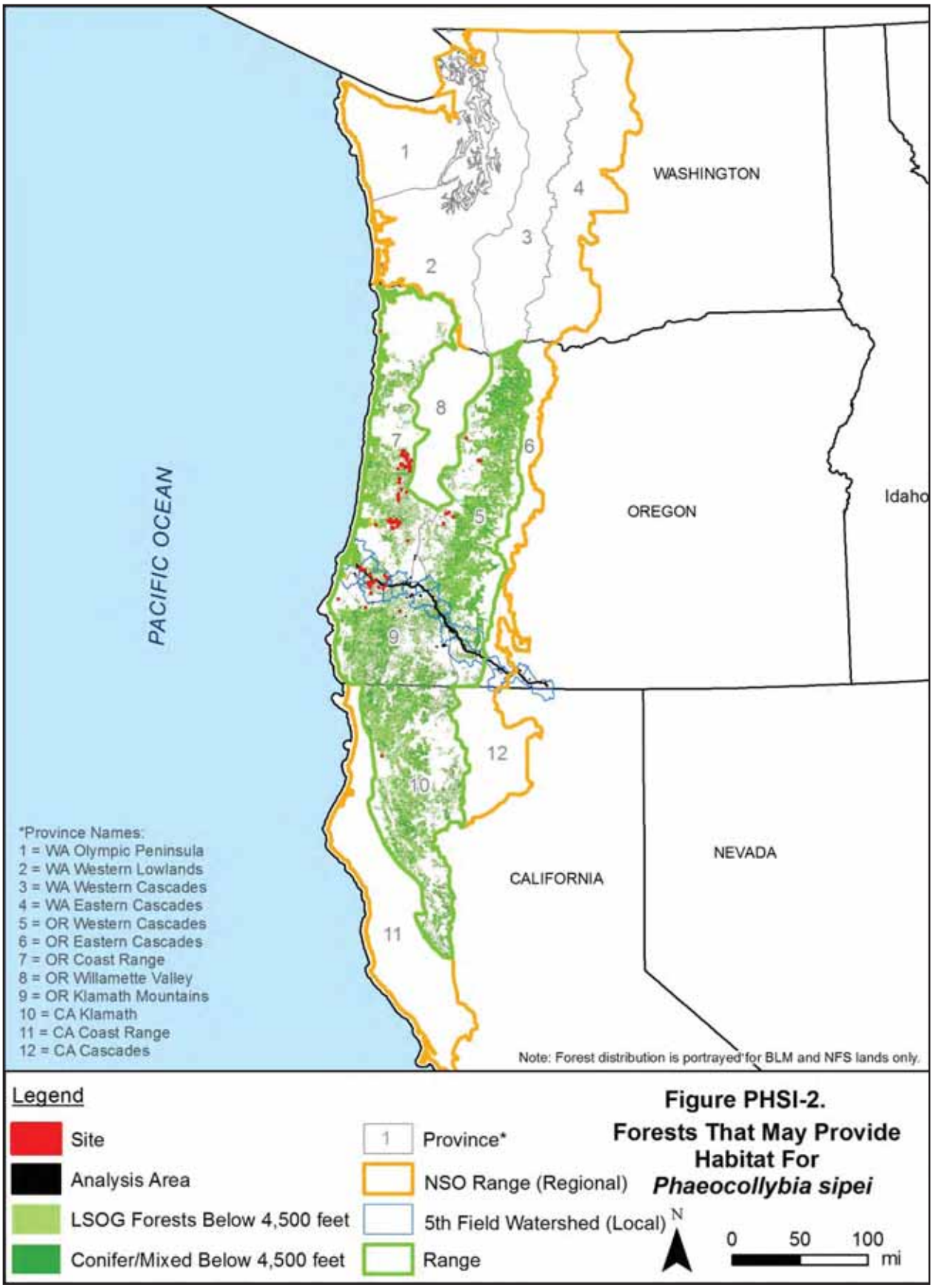


Figure PHSI-2.
Forests That May Provide Habitat For *Phaeocollybia sipei*

TABLE PHSI-3

Distribution of *Phaeocollybia sipei* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	3	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	1	-	-
Congressionally Reserved (CR)	**-**	**-**	**-**
Late Successional Reserve (LSR)	**49**	**3**	**-**
Marbled Murrelet Area (LSR3)	**5**	**4**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**3**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	76	35	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

P. sipei has a somewhat limited distribution across four physiographic provinces in Oregon (Coast Range, Klamath Mountains, and Cascades West) and California (Klamath). Most sites are found along the Coast Range in Oregon, where the sites tend to be clustered or relatively close to one another. Scattered sites are found in other areas outside the Coast Range, with a couple of groups of sites in the western Cascade Range in Oregon. *P. sipei* appears to be well distributed in the Coast Range in Oregon based on the proximity of sites to one another, which provides opportunities for dispersal, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Thirteen of 135 sites are located on private lands (at least partially), and 132 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 74 sites in the Coos Bay District, two sites in the Roseburg District, and one site in the Medford District. Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest. The remaining 54 sites on BLM and NFS lands are in the Salem and Eugene Districts and on the Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 57 sites are located on reserve lands managed by BLM and the Forest Service, including 49 in LSRs, five in Marbled Murrelet Areas, and three in Known Owl Activity Centers. This represents 43 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

P. sipei is primarily found in LSOG forests based on available data (112 of 135 total sites are in LSOG), but it is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 4,500 feet msl and has been documented in part of the NSO range, including the Coast Range, Klamath Mountains, and western Cascade Range in Oregon and Klamath Mountains in California. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the this range could provide habitat for *P. sipei* and support additional

sites. These forests encompass an estimated 8.5 million acres on BLM and NFS lands in the region, including an estimated 4.2 million acres in reserve land allocations (49 percent of the forests; Table PHSI-4). Of this acreage, an estimated 3.6 million acres are LSOG (see Figure PHSI-2), including 1.1 million acres in reserve land allocations (31 percent of the forests). Although coniferous and mixed forests below 4,500 feet msl are widespread across the species' range, LSOG forests are less common.

TABLE PHSI-4

Extent of Forests that Could Provide Habitat for *Phaeocollybia sipei* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 4,500 feet		LSOG Forests below 4,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	8,462,240	4,169,390	3,553,530	1,093,580
Local Area	456,860	145,080	151,360	62,690
Project Area	1,040	280	200	80

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

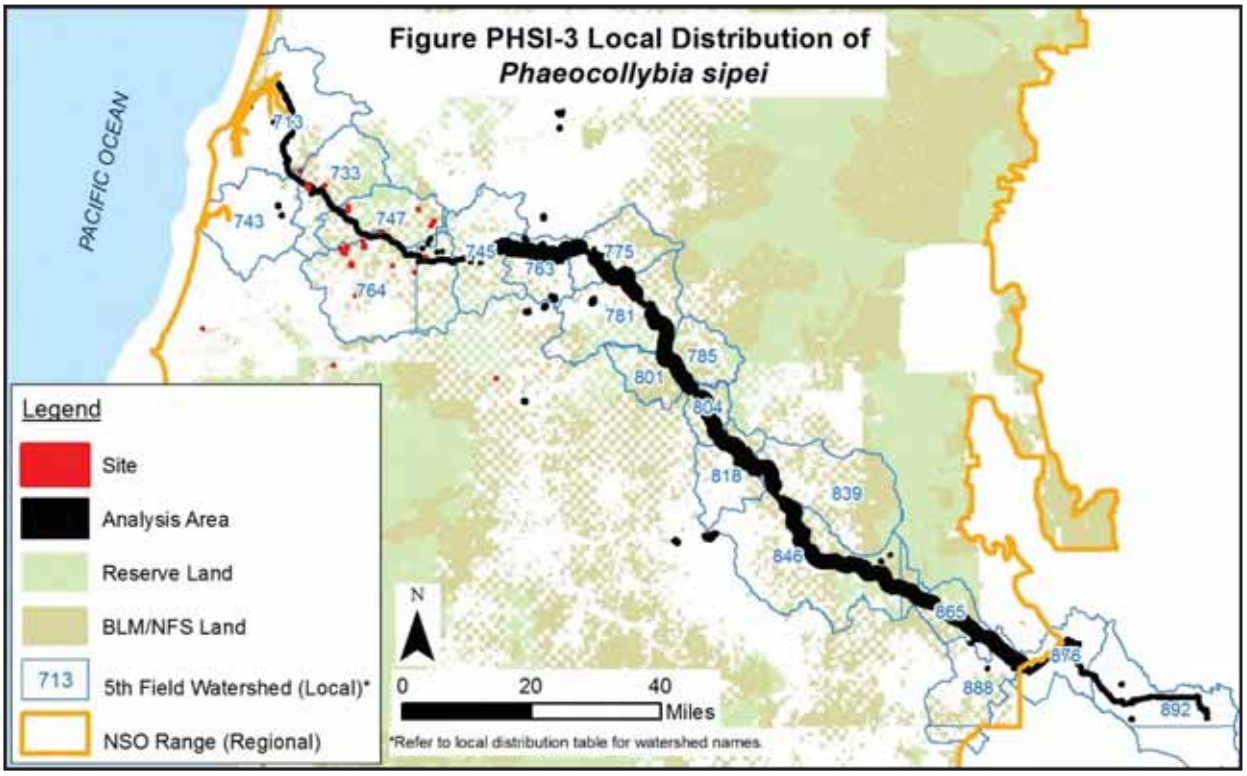
Within the local area, *P. sipei* is found in four 5th field watersheds that overlap the project area (see Table PHSI-5 and Figure PHSI-3). The sites are clustered and relatively close to one another in the southern Coast Range and Klamath Mountains in the western portion of the local area. Several sites are located to the north in the Coast Range and to the south in the Klamath Mountains. Multiple avenues of connectivity appear to be available between sites in the local area based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist between the watersheds and to nearby regional areas.

TABLE PHSI-5

Distribution of *Phaeocollybia sipei* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	9	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	1	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	22	7
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	8	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, April 7, 2014; HUC5 Watershed layer, Aug. 23, 2011



All of the 40 sites in the local area are on BLM lands. Three sites are partially on private lands. Most of the local sites are on land designated as Other (Matrix); seven sites are on reserve lands, representing 18 percent of the BLM-managed sites. The sites on reserve lands are in the Middle Fork Coquille River watershed (Table PHSI-5).

Coniferous and mixed hardwood-coniferous forests below 4,500 feet msl encompass approximately 456,860 acres on BLM and NFS lands in the local area, with 145,080 acres in reserve land allocations (32 percent of the forests). Of this acreage, an estimated 151,360 acres are LSOG, including 62,690 acres in reserves (41 percent of the forests). Other sites may also exist in the local area, particularly in the Coast Range, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures PHSI-2 and PHSI-3).

Analysis/Project Area Distribution

The analysis area contains one site of *P. sipei*, and no sites are located in the project area. The site is on BLM-managed land (Coos Bay District) and is on land designated as Other (Matrix) in the North Fork Coquille River watershed. This site is part of a group of sites in the Coast Range where the species appears to be well distributed, and several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project did not result in any observations of the species (Siskiyou BioSurvey LLC 2012a). The recorded observation of the species in the analysis area is from agency databases and was recorded in 2012. The site is located near MP 21.3.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 132 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent of the sites (or one out of 135 total sites on all lands in the NSO range). The PCGP Project would not result in any direct effects on *P. sipei* sites, but one site could be indirectly affected by activities related to the construction corridor and associated work areas. Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. sipei* near the project area.

The *P. sipei* site in the analysis area could be indirectly affected by activities within the corridor and TEWAs, but direct effects on the site are not anticipated. The establishment of the corridor could modify microclimate conditions near the site after the corridor is established. The removal of forests could negatively affect *P. sipei* in nearby areas by removing its habitat, reducing the complexity of the habitat, and reducing opportunities for dispersal, potentially affecting site persistence even though the site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

Across the project area, the PCGP Project would remove an estimated 830 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl, including 140 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *P. sipei*. Within this impact area, about 530 acres (about 64 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 160 acres of coniferous and mixed forests below 4,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 4,500 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, 39 sites of *P. sipei* would remain on BLM lands in the local area, including seven in reserves, and 131 sites, including 57 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 57 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 44 percent of the remaining *P. sipei* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. sipei* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *P. sipei* has a somewhat limited distribution across four physiographic provinces and two states in the region and a moderate-high number of overall sites (132 on BLM and NFS lands). The species appears to be well distributed in the Coast Range in Oregon. The currently known number of sites on BLM and NFS lands is an increase of about 83 sites since 2007.
    - An estimated 43 percent of the sites (57 sites) are in reserves, which is an increase of about 41 sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (general habitat for the species) are widespread across the species' range and encompass approximately 8.5 million acres on BLM and NFS lands with an estimated 49 percent in reserves. A subcomponent of these forests likely provides habitat for *P. sipei*.
- The PCGP Project would affect one of the 132 BLM- and Forest Service-managed sites of *P. sipei*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (131) would continue to be documented on BLM and NFS lands in the region with a somewhat limited distribution across Oregon and California. Many sites (39 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across four 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 57 sites are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests.
- The PCGP Project would result in a permanent loss of an estimated 160 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 4.2 million acres (49

percent) of coniferous and mixed forests and 1.1 million acres (31 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the species' range.

- The remaining forests could support additional populations of *P. sipei*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

2.40.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. sipei* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 131 sites would remain on BLM and NFS lands across the region, and 39 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *P. sipei* at one site, the site is part of the many sites in the Coast Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. sipei* would persist in the region without considering the single site as part of the population.
- The PCGP Project would remove approximately 830 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl and 140 acres of LSOG forests (a negligible amount of the forests). An estimated 64 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 4.7 million acres (51 percent) of coniferous and mixed hardwood-coniferous forests and 1.4 million acres (35 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *P. sipei* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *P. sipei* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. sipei* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.41 PHAEOCOLLYBIA SPADICEA

Phaeocollybia spadicea is a gilled mushroom species in the Cortinariaceae family. It does not have a common name. The species was described in 1957 (Smith 1957 as cited in Norvell 1998), erroneously synonymized with *P. lugubris* in 1977 (Horak 1977), and recognized as a legitimate species by Norvell in 1998 (Norvell 1998).

2.41.1 Regulatory Status and Ranking

The 2001 ROD identifies *P. spadicea* as a Category B (rare) species. The ORBIC evaluated *P. spadicea* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent updates of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010 and 2013). In 2007, the species was considered to be between rare, uncommon or threatened, but not immediately imperiled and not rare and apparently secure, but with cause for long-term concern within its global range (G3G4). In Oregon, the species was considered to be rare, uncommon, or threatened, but not immediately imperiled (S3?), although the ranking was uncertain (USDA and USDI 2007, ORBIC 2007). NatureServe currently considers *P. spadicea* to be not rare and apparently secure, but with cause for long-term concern globally (G4). The current state ranking of the species is unknown. The species is not currently on the ORBIC Lists, although it was a List 3 species in 2007 and was subsequently removed from the list. *P. spadicea* is not a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.41.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *P. spadicea.* The species is most easily detected in fall and early winter, fruiting September through December (Cushman and Huff 2007), although the species does not fruit annually (ORBIC 2004). It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates). The ORBIC (2004) indicated that the mushroom appears to grow slowly and may be less dependent on spore dispersal (e.g., via wind or animals) than on associations with its mycorrhizal partners, which are typically conifer trees.

Range

P. spadicea is endemic to the Pacific Northwest of North America, ranging from the Olympic Peninsula in Washington south along the Pacific coast to the Santa Cruz Mountains in California (ORBIC 2004). In central Oregon, its range extends east to the eastern Willamette Valley and south to the California border. The currently known range of the species within the NSO range based on 2014 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across the Pacific Northwest. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under the Threats section below.

Population Status

The ORBIC reported *P. spadicea* from approximately 57 element occurrences across the NSO range in 2004. Oregon had the highest number of occurrences with approximately 42 in 2004. Washington and California had fewer occurrences, with approximately four and nine, respectively. According to ORBIC (2004), the species was considered to be moderately declining to relatively stable for the long term and declining to stable for the short term. The species was detected in three locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 55 new sites of *P. spadicea* in the NSO range between 1998–2006, and 80 total sites were documented by 2006, including 36 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 65 sites on federal lands and 80 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2011 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *P. spadicea*; however, the species was not observed during the surveys. Based on the increased number of sites since 1998 with increased surveys (more than a 3-fold increase between 1998–2006 per Molina 2008 records), it is likely the species is more abundant than previously known and more survey effort would be expected to locate additional populations across the NSO range. The current estimated number of sites and distribution of the species based on 2014 data are presented below under the Species Distribution discussion.

Habitat

P. spadicea occurs as solitary, scattered, or gregarious sporocarps in humus litter or soil in coniferous or mixed hardwood-coniferous forests in coastal and inland regions (Cushman and Huff 2007, Norvell 1998). It is found associated with hemlock, Douglas-fir, spruce, fir, and pine trees and may be found in mixed stands with cedar, maple, tan oak, oak, and alder. The species generally occurs at elevations up to about 3,200 feet. It is more prevalent in low-elevation coastal forests, but has been found in montane coniferous forests, where it may be more adapted to colder, drier forests (Holthausen et al. 1994, Trappe, pers. comm. 2013). According to ORBIC 2004 the species appears restricted to fairly complex habitats in mature (i.e., 65 year old) to LSOG forests. The species has not been collected from disturbed habitats and is not normally found in plantation settings. *P. spadicea* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *Phaeocollybia* species are presumably those actions that disrupt stand conditions necessary for its survival, particularly damage to host trees and disturbance of soil and humus occupied by the fungus and host tree roots (Castellano and O'Dell 1997). Typical threats in coniferous and mixed forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, and hot fires (ORBIC 2004). Moderate to light thinning is not considered a threat. *Phaeocollybia* species are not routinely harvested for consumption. *P. spadicea* has been documented in the soil in areas subject to varying levels of harvest (Gordon 2012) and may be able to survive in the soil following some levels of ground disturbance or tree removal, presuming environmental conditions remain suitable. Other specific threats to the species are not currently known. Harvest of coastal forests has likely eradicated populations of this species (Holthausen et al. 1994).

Management Recommendations

For Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *P. spadicea*:

- As a mycorrhizal species, *P. spadicea* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.41.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. spadicea* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PHSP-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 136 observations from BLM and Forest Service geodatabases were converted into 125 sites in the NSO range (region). Table PHSP-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PHSP-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PHSP-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PHSP-2 displays the species' regional

distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 4,500 feet msl on BLM and NFS lands.

TABLE PHSP-1

Number of *Phaeocollybia spadicea* Sites (2014)

Location*	Number of Sites
Regional Area	125
Local Area	31
Analysis Area (Project Area)	1 (0)

Data Source: Processed BLM and Forest Service GIS data, April 7, 2014
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PHSP-2

Distribution of *Phaeocollybia spadicea* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	79	30	1
Forest Service	26	-	-
NPS	4	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	31	4	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE PHSP-3

Distribution of *Phaeocollybia spadicea* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	6	-	-
Administratively Withdrawn (AW)	-	-	-
Congressionally Reserved (CR)	**1**	**-**	**-**
Late Successional Reserve (LSR)	**46**	**4**	**-**
Marbled Murrelet Area (LSR3)	**1**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	51	26	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

P. spadicea has a wide distribution across eight physiographic provinces in Washington (Olympic Peninsula), Oregon (Coast Range, Willamette Valley, Klamath Mountains, and Cascades West), and California (Coast, Klamath, and Cascades). Most sites are found along the Coast Range in Oregon, where the sites tend to be clustered or relatively close to one another. Scattered sites are found in other areas outside the Coast Range, with a couple of groups of sites in the Klamath Mountains and western Cascade Range. *P. spadicea* appears to be well distributed in the Coast Range in Oregon based on the proximity of sites to one another, which provides opportunities for dispersal, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.



Figure PHSP-1. Regional Distribution of *Phaeocollybia spadicea*

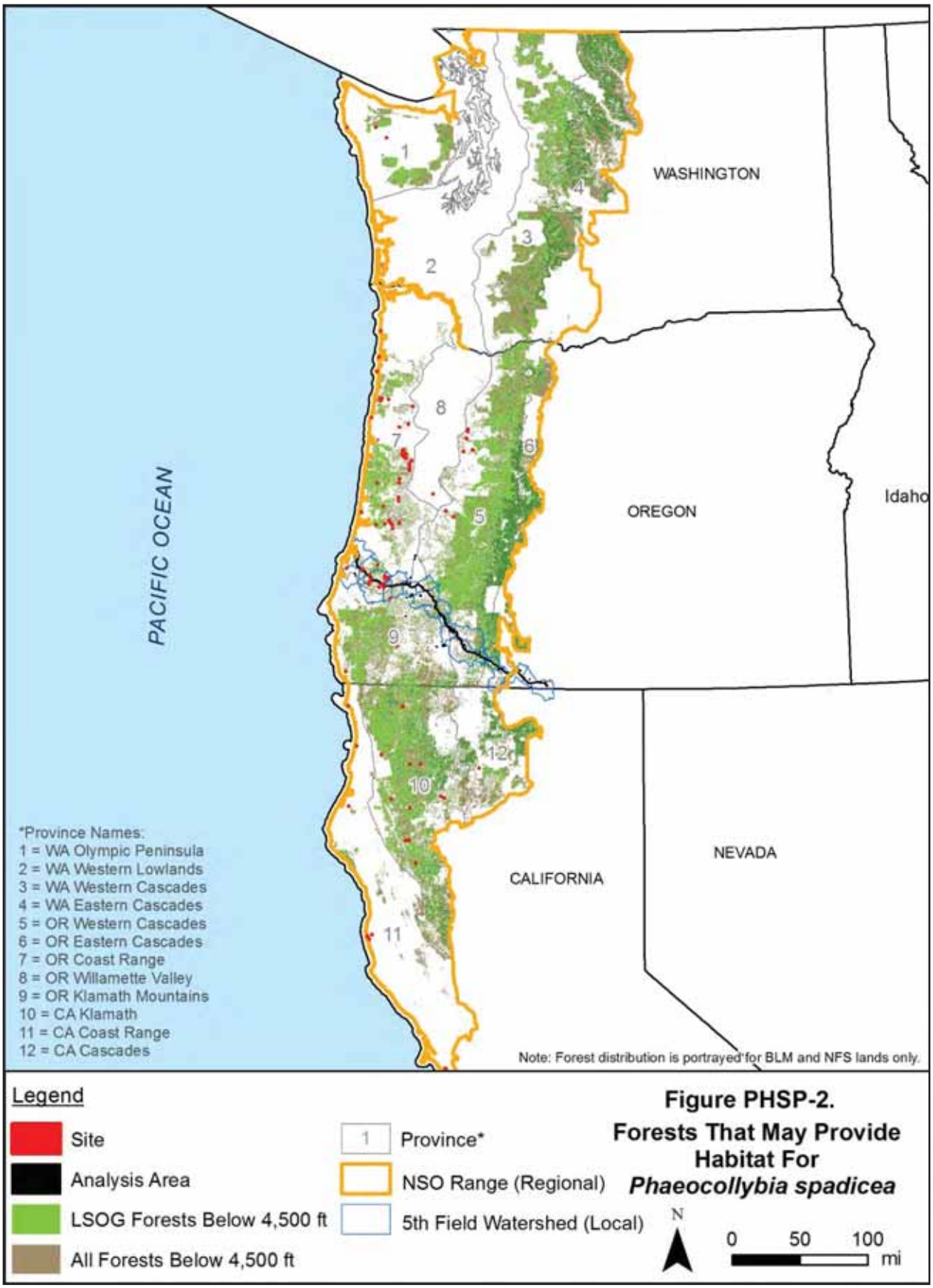


Figure PHSP-2.
Forests That May Provide Habitat For *Phaeocollybia spadicea*

Of the 125 sites in the region, 31 sites are located on private or other lands (at least partially), four sites are on NPS lands (Olympic and Redwood National Parks), and 105 sites are on BLM and NFS lands (at least partially). Sites managed by the BLM Districts that encompass the project area include 37 sites in the Coos Bay District and one site in the Roseburg District. Sites managed by the National Forests that encompass the project area include two sites on the Rogue River National Forest. The remaining 65 sites on BLM and NFS lands are in the Arcata, Salem, and Eugene Districts and on the Klamath, Shasta-Trinity, Siuslaw, and Six Rivers National Forests.

Across the NSO range, 49 sites are located on reserve lands managed by BLM and the Forest Service, including 46 in LSRs, one in a Marbled Murrelet Area, one in a Known Owl Activity Center, and one in a Congressionally Reserved Area. This represents 47 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The four NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

P. spadicea is primarily found in LSOG forests based on available data (105 of 125 total sites are in LSOG), but it is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 4,500 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the the NSO range could provide habitat for *P. spadicea* and support additional sites. These forests encompass an estimated 14.6 million acres on BLM and NFS lands in the region, including an estimated 7.5 million acres in reserve land allocations (51 percent of the forests; Table PHSP-4). Of this acreage, an estimated 5.1 million acres are LSOG (see Figure PHSP-2), including 3.1 million acres in reserve land allocations (60 percent of the forests). Although coniferous and mixed forests below 4,500 feet msl are widespread across the NSO range, LSOG forests are less common and are primarily found in the Coast Range, Klamath Mountains, and western Cascade Range.

TABLE PHSP-4

Extent of Forests that Could Provide Habitat for *Phaeocollybia spadicea* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 4,500 feet		LSOG Forests below 4,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	14,636,690	7,516,260	5,134,680	3,103,420
Local Area	510,900	153,180	154,780	63,730
Project Area	1,150	280	200	80

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. spadicea* is found in four 5th field watersheds that overlap the project area (see Table PHSP-5 and Figure PHSP-3). The sites are clustered and relatively close to one another in the Coast Range and Klamath Mountains in the western portion of the local area.

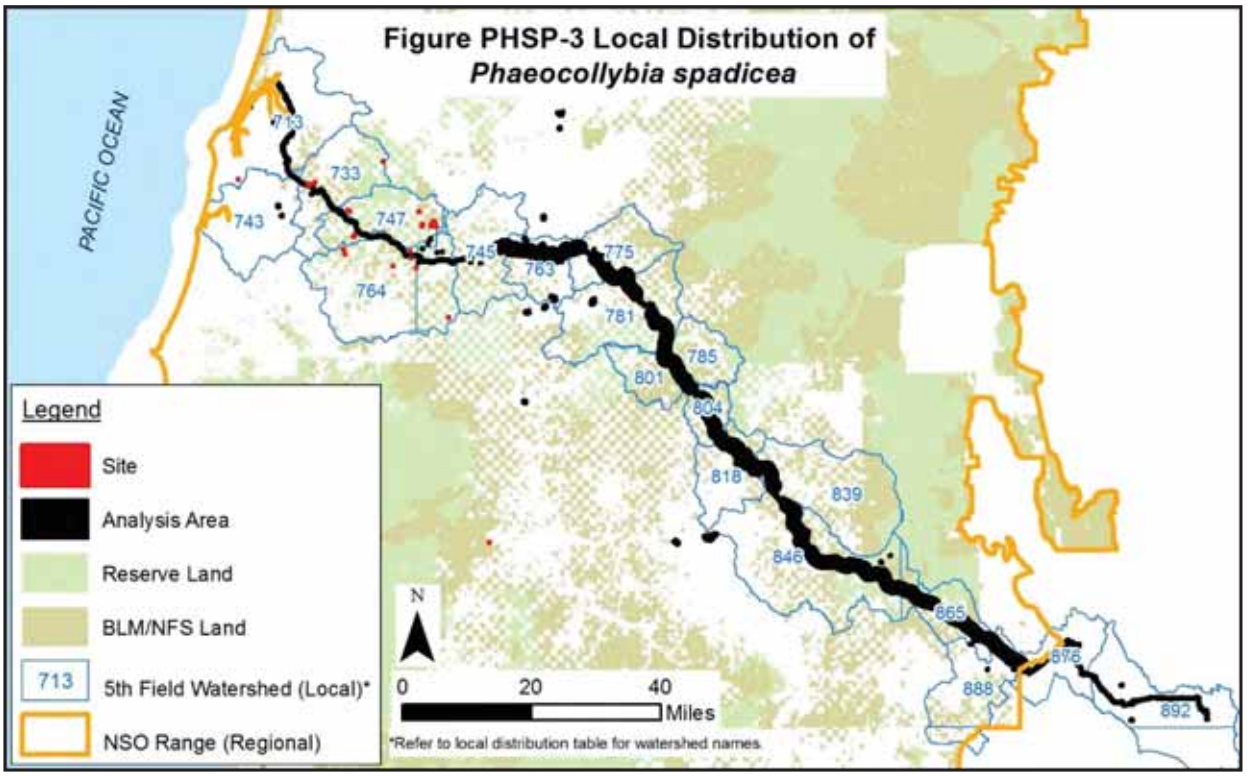
Several sites are located to the north in the Coast Range and further south in the Klamath Mountains. Multiple avenues of connectivity appear to be available between sites in the local area based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist between the watersheds and to nearby regional areas.

TABLE PHSP-5

Distribution of *Phaeocollybia spadicea* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	1	-
East Fork Coquille River (747)	16	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	8	3
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	6	1
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, April 7, 2014; HUC5 Watershed layer, Aug. 23, 2011



Of the 31 sites in the local area, 30 sites are at least partially on BLM lands, and four sites are at least partially on private lands. Most of the local sites are on land designated as Other (Matrix); four sites are on reserve lands, representing 13 percent of the BLM-managed sites. The four sites

on reserve lands are in the Middle Fork and North Fork Coquille River watersheds (Table PHSP-5).

Coniferous and mixed hardwood-coniferous forests below 4,500 feet msl encompass approximately 510,900 acres on BLM and NFS lands in the local area, with 153,180 acres in reserve land allocations (30 percent of the forests). Of this acreage, an estimated 154,780 acres are LSOG, including 63,730 acres in reserves (41 percent of the forests). Other sites may also exist in the local area, particularly in the Coast Range, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures PHSP-2 and PHSP-3).

Analysis/Project Area Distribution

The analysis area contains one site of *P. spadicea*, and no sites are located in the project area. The site is on BLM-managed land (Coos Bay District) and is on land designated as Other (Matrix) in the North Fork Coquille River watershed. This site is part of a group of sites in the Coast Range where the species appears to be well distributed, and several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project did not result in any observations of the species (Siskiyou BioSurvey LLC 2012a). The recorded observation of the species in the analysis area is from agency databases and was recorded in 2012. The site is located near MP 21.5.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 105 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 125 total sites on all lands in the NSO range). The PCGP Project would not result in any direct effects on *P. spadicea* sites, but one site could be indirectly affected by activities related to the construction corridor and associated work areas. Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. spadicea* near the project area.

The *P. spadicea* site in the analysis area could be indirectly affected by activities within the corridor and TEWAs, but direct effects on the site are not anticipated. The establishment of the corridor could modify microclimate conditions near the site after the corridor is established. The removal of forests could negatively affect *P. spadicea* in nearby areas by removing its habitat, reducing the complexity of the habitat, and reducing opportunities for dispersal, potentially affecting site persistence even though the site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

Across the project area, the PCGP Project would remove an estimated 920 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl, including 140 acres of LSOG

forests. These impacts would result in a reduction of habitat that may be suitable for *P. spadicea*. Within this impact area, about 580 acres (about 63 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 180 acres of coniferous and mixed forests below 4,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 4,500 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, 29 sites of *P. spadicea* would remain on BLM lands in the local area, including four in reserves, and 104 sites, including 49 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 49 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 47 percent of the remaining *P. spadicea* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. spadicea* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *P. spadicea* has a somewhat wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (105 on BLM and NFS lands). The species appears to be well distributed in the Coast Range in Oregon. The currently known number of sites on BLM and NFS lands is an increase of about 40 sites since 2007.
    - An estimated 47 percent of the sites (49 sites) are in reserves, which is an increase of about 13 sites in reserves since 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (general habitat for the species) are widespread across the NSO range and encompass approximately 14.6 million acres on BLM and NFS lands with an estimated 51 percent in reserves. A subcomponent of these forests likely provides habitat for *P. spadicea*.
- The PCGP Project would affect one of the 105 BLM- and Forest Service-managed sites of *P. spadicea*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (104) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (29 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across four 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 48 sites are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and one site is in a Congressional Reserve where management activities that may adversely affect *P. spadicea* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 180 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl (less than 1 percent of the total acreage in the NSO range). An estimated 7.5 million acres (51 percent) of coniferous and mixed forests and 3.1 million acres (60 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *P. spadicea*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

2.41.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. spadicea* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 104 sites would remain on BLM and NFS lands across the region, and 29 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *P. spadicea* at one site, the site is part of the many sites in the Coast Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. spadicea* would persist in the region without considering the single site as part of the population.
- The PCGP Project would remove approximately 920 acres of coniferous and mixed hardwood-coniferous forests below 4,500 feet msl and 140 acres of LSOG forests (a negligible amount of the forests). An estimated 63 percent of the forests would be

restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 7.5 million acres (51 percent) of coniferous and mixed hardwood-coniferous forests and 3.1 million acres (60 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *P. spadicea* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *P. spadicea* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. spadicea* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.42 PITHYA VULGARIS

Pithya vulgaris is a cup fungus in the Sarcoscyphaceae family. This species is commonly known as common pithya.

2.42.1 Regulatory Status and Ranking

The 2001 ROD identifies *P. vulgaris* as a Category D (uncommon) species. The ORBIC did not evaluate *P. vulgaris* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004). It considered ranking the species in the 2001 publication of *Rare, Threatened, and Endangered Species of Oregon*, but rejected the species because it was too common (ORBIC 2001). The species has not been ranked in the current or other past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.42.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

P. vulgaris is a presumed saprophyte or needle endophyte that is most easily detected in spring and fall, fruiting within several yards of snowbanks or within a few weeks of snowmelt in March through May and in November (Castellano et al. 1999). Little specific information is known about the reproductive biology of *P. vulgaris*, but as with other cup fungi, the species is presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997).

Range

P. vulgaris is found in boreal forests of the north temperate zone in North America and Europe (Castellano and O'Dell 1997). In North America, the species is found in British Columbia, Idaho, and the Pacific Northwest (Holthausen et al. 1994). In the Pacific Northwest, the fungus has been found in the Cascade Range of Washington and Oregon with vague locality data in California (Castellano and O'Dell 1997). The currently known range of the species within the NSO range based on 2014 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across North America and Europe. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

P. vulgaris was documented at 20 sites by 1994 and at between 32 and 135 new sites, some of which are unverified, between 1994–2000 (USDA and USDI 2000). The species was found in five locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 201 new sites of *P. vulgaris* in the NSO range between 1998–2006, and 210 total sites were documented by 2006, including 50 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 213 sites on federal lands and 240 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area, and persistence surveys were conducted for some species in nearby LSRs (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category D species were recorded during these surveys, and resulted in four new observations of individuals or populations of *P. vulgaris*. Based on the increased number of sites since 1998 with increased surveys (more than 23-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range, particularly in the Oregon Cascade Range where most observations have been reported. Similar to the species conspecific in California, *P. cupressina*, *P. vulgaris* is inconspicuous and may be more common than documented (The Fungi of California 2010). The current estimated number of sites and distribution of the species based on 2014 data are presented below under the Species Distribution discussion.

Habitat

P. vulgaris occurs as sporocarps growing on wet, dead, usually detached branch tips (with needles) and twigs of fir and redwood in montane areas often within several yards of snowbanks or within a few weeks of snow melt (Castellano et al. 1999). It has primarily been found at higher elevations (Holthausen et al. 1994). It has been found in old-growth, mid-seral, and regenerating forests based on observation records in agency databases. *P. vulgaris* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *P. vulgaris* are presumably those actions that disrupt stand conditions necessary for its survival, such as damage to host or overstory trees and soil, litter, and duff disturbance (Castellano and O'Dell 1997). These actions include logging that removes overstory trees and other actions that cause disturbance to the soil, such as road, trail, or campground construction. Fire is also a threat although moist, high-elevation sites have low susceptibility to wildfire. *P. vulgaris* is not routinely harvested for use as food.

Management Recommendations

As a Category D S&M species, the direction from the 2001 ROD is to manage high priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). Management recommendations were developed for *P. vulgaris* (Group 27 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat and micro-climate conditions at known sites, which will maintain viable populations of the species until additional information on the effects of various management activities can be obtained and evaluated. Populations on federal land should be managed to maintain population viability, which includes managing an area that is large enough to maintain the habitat and associated micro-climate of the known populations. In order to maintain habitat and micro-climate conditions around known locations, impacts from soil disturbing activities such as logging, recreational activities, road, trail, and campground maintenance, and fire, should be minimized, and damage to or removal of host trees should be prevented. Tree diseases should be managed to minimize the loss of overstory trees.

2.42.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. vulgaris* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PIVU-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and

project areas (PCGP Project corridor, associated work areas, and roads). An estimated 224 observations from BLM and Forest Service geodatabases were converted into 188 sites in the NSO range (region). Table PIVU-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PIVU-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PIVU-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PIVU-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE PIVU-1

Number of *Pithya vulgaris* Sites (2014)

Location*	Number of Sites
Regional Area	188
Local Area	103
Analysis Area (Project Area)	5 (5)

Data Source: Processed BLM and Forest Service GIS data, April 7, 2014
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PIVU-2

Distribution of *Pithya vulgaris* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	155	95	-
Forest Service	32	8	5
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	29	21	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE PIVU-3

Distribution of *Pithya vulgaris* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	5	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	22	-	-
Congressionally Reserved (CR)	**4**	**-**	**-**
Late Successional Reserve (LSR)	**17**	**9**	**4**
Marbled Murrelet Area (LSR3)	**2**	**2**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**3**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	138	92	2
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure PIVU-1. Regional Distribution of *Pithya vulgaris*



Figure PIVU-2.
Forests That May Provide Habitat For *Pithya vulgaris*

Regional Distribution

P. vulgaris is widely distributed across eight physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Coast Range, Willamette Valley, Cascades West and East, and Klamath Mountain), and California (Klamath). The sites are clustered in two large groups in the western Cascade Range in Oregon. Many sites are located between the two clustered groups, relatively close to one another. Sites are also clustered or near one another in the Klamath Mountains in Oregon. Scattered sites occur in other outlying areas, including the Western Cascades in Washington, the Coast Range in Oregon, and the Klamath Mountains in California. The species appears to be well distributed in the western Cascade Range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Twenty-nine of 188 sites are located on private, state, or other lands (at least partially); one site is on NPS land (Mt. Rainier National Park); and 184 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include nine sites in the Roseburg District and 145 sites in the Medford District. Sites managed by the National Forests that encompass the project area include four sites on the Umpqua National Forest, one site on the Winema National Forest, and eight sites on the Rogue River National Forest. The remaining 20 sites on BLM and NFS lands are in the Salem District and on the Gifford-Pinchot, Shasta-Trinity, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 26 sites are located on reserve lands managed by BLM and the Forest Service, including 17 in LSRs, four in Congressionally Reserved areas, three in Known Owl Activity Centers, and two in Marbled Murrelet Areas. One site overlaps two types of LSRs. The number of sites in reserves represents 14 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

P. vulgaris is primarily found in LSOG forests based on available data (172 of 188 total sites are in LSOG), but it is also found in non-LSOG forests. It may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *P. vulgaris* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the NSO range, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table PIVU-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure PIVU-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE PIVU-4

Extent of Forests that Could Provide Habitat for *Pithya vulgaris* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. vulgaris* is found in seven 5th field watersheds that overlap the project area (see Table PIVU-5 and Figure PIVU-3). The majority of the sites are in a large group in the Little Butte Creek watershed in the western Cascade Range. Sites are scattered in the Klamath Mountains and Coast Range. In the Big Butte Creek and Little Butte Creek watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests and opportunities for dispersal exist within the local area and to nearby regional areas. Several regional sites are located to the north and south in the western Cascade Range, in the immediate vicinity of the eastern-most sites in the local area.

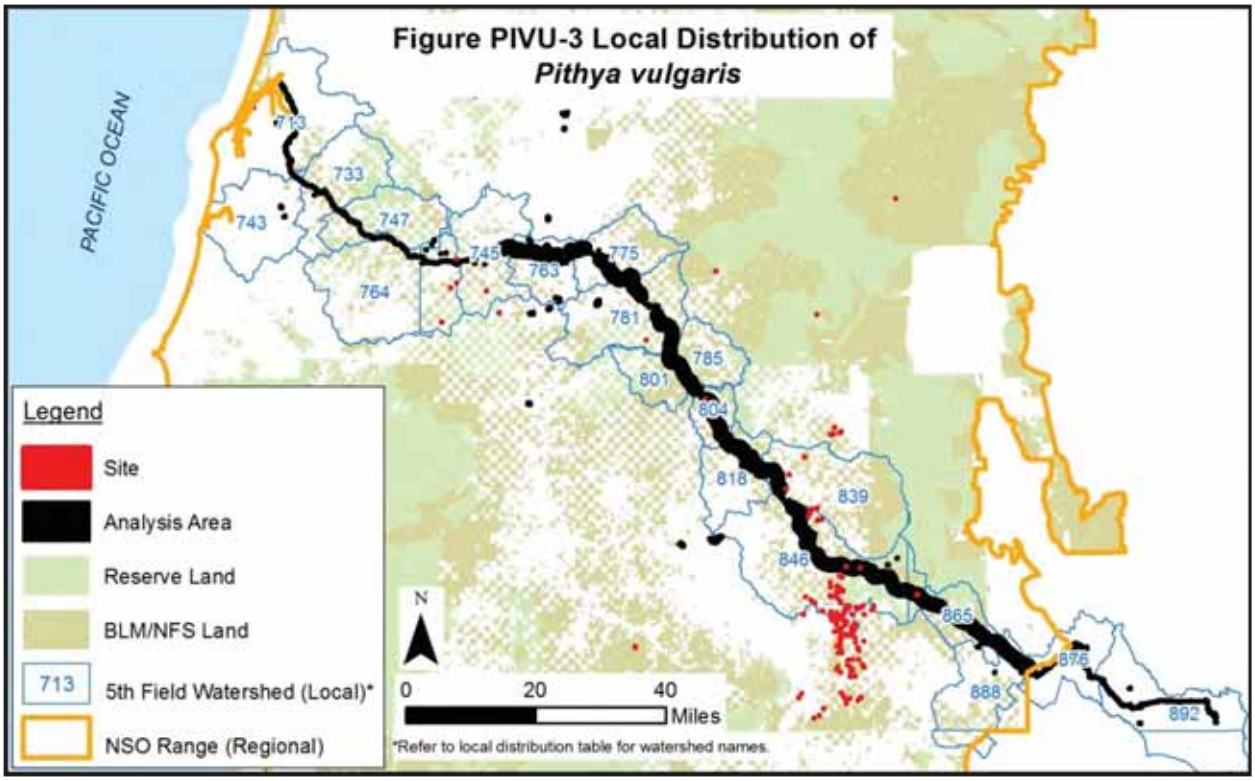
Of the 103 sites in the local area, 100 sites are on BLM or NFS lands, including 95 sites at least partially on BLM lands (Roseburg and Medford Districts) and eight sites at least partially on NFS lands (Umpqua and Rogue River National Forests). Twenty-one sites are at least partially on private, state, or other lands. Most of the local sites are at least partially on land designated as Other (Matrix); 12 sites are in LSRs, representing 12 percent of the BLM- and Forest Service-managed sites. Sites in LSRs are distributed across five watersheds (Table PIVU-5).

TABLE PIVU-5

Distribution of *Pithya vulgaris* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	7*	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	90*	7**
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	4	3
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1	1
Spencer Creek (865)	1	1**
Trail Creek (804)	1	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*One site is in Big Butte and Little Butte Creek watersheds
**One site is partially in a reserve in Little Butte Creek and Spencer Creek watersheds



Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number and distribution of sites in the local and nearby regional areas and the extent of forests that may provide suitable habitat (see Figures PIVU-2 and PIVU-3).

Analysis/Project Area Distribution

The analysis and project areas contain five sites of *P. vulgaris*, all of which are on NFS lands (Umpqua and Rogue River National Forests). The sites are located on lands designated as Other (Matrix) and LSRs, with four sites on reserve lands. The analysis area sites are distributed across three 5th field watersheds in the center portion of the analysis area. Many sites are also located in the immediate vicinity of the analysis area, in the western Cascade Range (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in seven observations of the species in four locations in or near the project area during 2010 (Siskiyou BioSurvey LLC 2012a). The seven observations comprise the five sites in the analysis area. The sites are located at MP 113.0 and between MPs 154.3 and 168.0.

Project Impacts

Analysis

The PCGP Project would affect five sites out of the 184 sites on BLM- and Forest Service-managed lands in the region, representing approximately 3 percent of the sites (or five out of 188 total sites on all lands in the NSO range). Table PIVU-6 presents an overview of the features of the PCGP Project that would affect the *P. vulgaris* sites. The construction corridor and associated work and storage areas would affect approximately 6.4 acres within the sites (about 33 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. vulgaris* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 4.3 acres of vegetation and soil within five sites and could result in the removal of *P. vulgaris* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.2 acre within one site. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *P. vulgaris* in adjacent areas by removing its habitat, disturbing soil and duff, and affecting its ability to attach to dead woody material, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 1.9 acres of understory habitat in five sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE PIVU-6

Impacts to *Pithya vulgaris* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	5	4.3 ac
Temporary Extra Work Area (TEWA)	1	0.2 ac
Uncleared Storage Area (UCSA)	5	1.9 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *P. vulgaris*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-

coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the five sites as a result of the PCGP Project, 95 sites of *P. vulgaris* would remain on BLM and NFS lands in the local area, including eight in reserves, and 179 sites, including 22 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 22 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 12 percent of the remaining *P. vulgaris* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. vulgaris* is a Category D (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *P. vulgaris* has a wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (184 on BLM and NFS lands). The species appears to be well distributed in the western Cascade Range in Oregon. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites recorded in 2007, but is still moderate-high and many sites were documented during the PCGP Project surveys.
    - An estimated 14 percent of the sites (26 sites) are in reserves, which is a decrease in the number of sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widespread across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are

documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and sites are more scattered in the mountain range. A subcomponent of these forests likely provides habitat for *P. vulgaris*.

- The PCGP Project would affect five of 184 BLM- and Forest Service-managed sites of *P. vulgaris*, representing approximately 3 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the sites, a moderate-high number of sites (179) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (95) would remain in the local vicinity of the analysis area; these sites would be distributed across five 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect four sites in reserves. Of the remaining sites, 18 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and four are at least partially in Congressionally Reserved areas where management activities that may adversely affect *P. vulgaris* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of coniferous and mixed hardwood-coniferous forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *P. vulgaris*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category D species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.42.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. vulgaris* at five sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 179 sites would remain on BLM and NFS lands across the region, and 95 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *P. vulgaris* at five sites, the majority of the sites are located in in the western Cascade Range in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. vulgaris* would persist in the region without considering the five sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be

restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55 percent) of coniferous and mixed hardwood-coniferous forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *P. vulgaris* sites in the analysis area, although some individuals within the sites may persist following project implementation. Based on the above conclusions, avoidance of the five *P. vulgaris* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. vulgaris* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.43 PLECTANIA MELASTOMA

Plectania melastoma is a cup fungus in the Sarcosomataceae family and is commonly known as jelly-like black urn.

2.43.1 Regulatory Status and Ranking

The 2001 ROD identifies *P. melastoma* as a Category F (uncommon) species. The ORBIC did not evaluate *P. melastoma* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.43.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

P. melastoma is a cup fungus and is most easily detected in the spring (Castellano et al. 2003). The species is a saprophyte, found on soil that contains small diameter (less than 10 centimeters) woody debris (Holthausen et al. 1994, Castellano et al. 2003). Little specific information is known about the reproductive biology of *Plectania* species. Other cup fungi are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997), and the same may be true of *P. melastoma.*

Range

P. melastoma has a wide range, occurring in northwest and northeast North America and in Europe (Holthausen et al. 1994). The species has a wide distribution across Washington, Oregon, and California (Castellano et al. 2003). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across North America and Europe. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

In the Pacific Northwest, *P. melastoma* is most commonly found in the Coast and Cascade ranges in Oregon (Castellano et al. 2003). The species was documented in 24 sites by 1994 and at 74 sites between 1994–2000 (USDA and USDI 2000). The species was found in 60 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 162 new sites of *P. melastoma* in the NSO range between 1998–2006, and 199 total sites were documented by 2006, including 113 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 129 sites on federal lands and 168 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category F species were recorded during these surveys and resulted in three new observations of individuals or populations of *P. melastoma*. Based on the increased number of sites since 1998 with increased surveys (more than a 5-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range, particularly in Oregon where most observations have been reported. It should also be noted that this species was removed from post-2001 S&M lists because it was considered to be common. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

P. melastoma occurs in coniferous forests, usually associated with small diameter (less than 10 centimeters) woody debris (Holthausen et al. 1994, Castellano et al. 2003). It has been found on

small woody debris of coniferous trees (*Pinus* sp.), deciduous trees (*Salix* sp.), and various shrubs (*Rosa* sp., *Rubus* sp.) in Slovakia (Glejdura et al. 2011). *P. melastoma* appears to prefer areas with a regular addition of small woody material, whether as a result of natural causes (e.g., fallen branches) or human activities (e.g., clearing power lines and leaving material behind). It occurs more often in wet areas and on debris that is covered by bryophytes (Glejdura et al. 2011). *P. melastoma* can re-establish in secondary growth after canopy closure (Holthausen et al. 1994). The species may prefer specific microclimate conditions of LSOG forests, but may not be as restricted to these conditions.

Threats

Typical threats to fungi species in coniferous and other forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). These general threats may apply to *P. melastoma*, but little information is known about more specific threats. Activities that cause mortality of individuals or groups of individuals can threaten the species' genetic diversity in localized areas (USDA and USDI 2000).

Management Recommendations

As a Category F S&M species, the direction from the 2001 ROD is that management of known sites is not necessary, but a determination needs to be made regarding which S&M category, if any, the species should be assigned to (USDA and USDI 2001). No management recommendations have been developed for *P. melastoma* because it was removed from the S&M list after 2001.

2.43.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. melastoma* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PLME-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 315 observations from BLM and Forest Service geodatabases were converted into 165 sites in the NSO range (region). Table PLME-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PLME -3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PLME-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PLME-2 displays the species' regional

distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE PLME-1

Number of *Plectania melastoma* Sites (2013)

Location*	Number of Sites
Regional Area	165
Local Area	15
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PLME-2

Distribution of *Plectania melastoma* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	104	14	-
Forest Service	54	1	1
NPS	6	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	19	2	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE PLME-3

Distribution of *Plectania melastoma* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	10	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	1	-	-
Congressionally Reserved (CR)	**6**	**-**	**-**
Late Successional Reserve (LSR)	**72**	**7**	**-**
Marbled Murrelet Area (LSR3)	**4**	**1**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**4**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	8	-	-
Other (Matrix, Riparian Reserve, Other)	57	8	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

P. melastoma has a wide distribution across eight physiographic provinces in Washington (Olympic Peninsula and Western and Eastern Cascades), Oregon (Coast Range, Willamette Valley, Cascades West, and Klamath Mountain), and California (Coast). The sites are mostly clustered or relatively close to one another in the Coast Range and Klamath Mountains in Oregon and in the western Cascade Range in Oregon and Washington. Scattered sites are present in outlying areas, including the Klamath Mountains in Oregon and the Olympic Peninsula in Washington. In California, the species occurs as a single group of clustered sites along with scattered sites in outlying areas. *P. melastoma* appears to be well distributed in the Coast Range in Oregon and in the western Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.



Figure PLME-1. Regional Distribution of *Plectania melastoma*

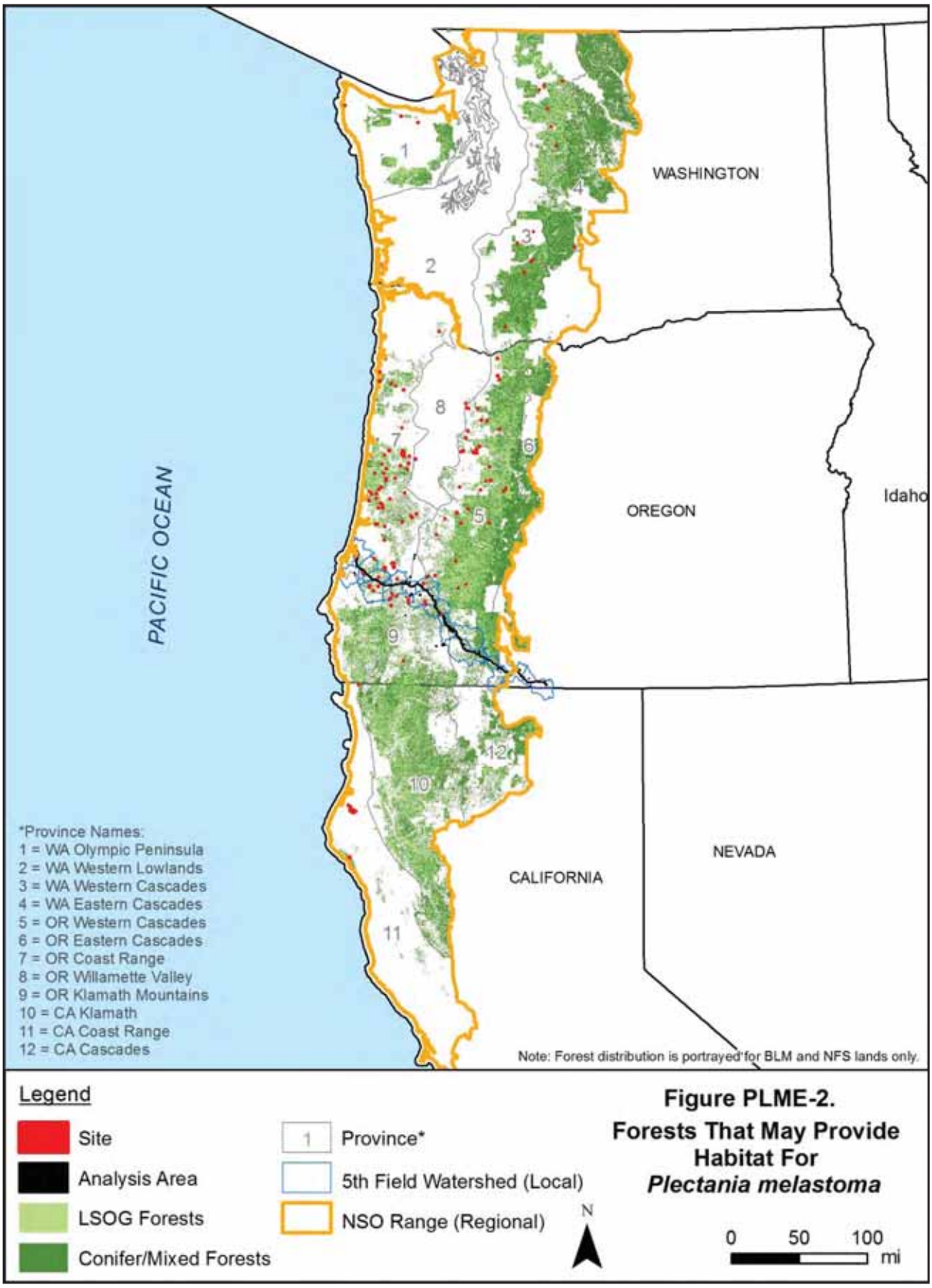


Figure PLME-2.
Forests That May Provide Habitat For *Plectania melastoma*

Nineteen of 165 sites are located on private, state or other lands (at least partially); six sites are at least partially on NPS land (Olympic and Mt. Rainier National Parks); and 158 sites are on BLM- and Forest Service-managed lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 12 sites in the Coos Bay District, one site in the Medford District, and 16 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include five sites on the Umpqua National Forest. The remaining 131 sites on BLM and NFS lands are in the Salem, Eugene, and Arcata Districts and on the Gifford-Pinchot, Mt. Baker-Snoqualmie, Siuslaw, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 86 sites are located on reserve lands managed by BLM and the Forest Service, including 72 in LSRs, six in Congressionally Reserved areas, four in Marbled Murrelet areas, and four in Known Owl Activity Centers. This represents 54 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The six NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

P. melastoma is primarily found in LSOG forests based on available data (146 of 165 total sites are in LSOG), although it has been found in younger forests as well. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests across the NSO range could provide habitat for *P. melastoma* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table PLME-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure PLME-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE PLME-4

Extent of Forests that Could Provide Habitat for *Plectania melastoma* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	290	150

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. melastoma* is found in seven 5th field watersheds that overlap the project area (see Table PLME-5 and Figure PLME-3). The sites are scattered across the western and central portions of the local area in the Coast Range, Klamath Mountains, and western Cascade Range. Across the watersheds, multiple avenues of connectivity appear to be available between

sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located to the north in the Cascade and Coast Ranges and a few sites are located to the south in the Klamath Mountains.

All of the 15 sites in the local area are on BLM or NFS lands, and two sites are partially located on private, state, or other lands. Eight of the sites are at least partially on land designated as Other (Matrix), and nine sites are at least partially in reserve lands, including seven sites in LSRs, one in a Marbled Murrelet area, and one in a Known Owl Activity Center. The amount of sites in reserve lands represents 60 percent of the BLM- and Forest Service-managed sites. Sites in reserve lands are in the Middle Fork and North Fork Coquille River, Olalla Creek-Lookingglass Creek, and South Umpqua River watersheds (Table PLME-5).

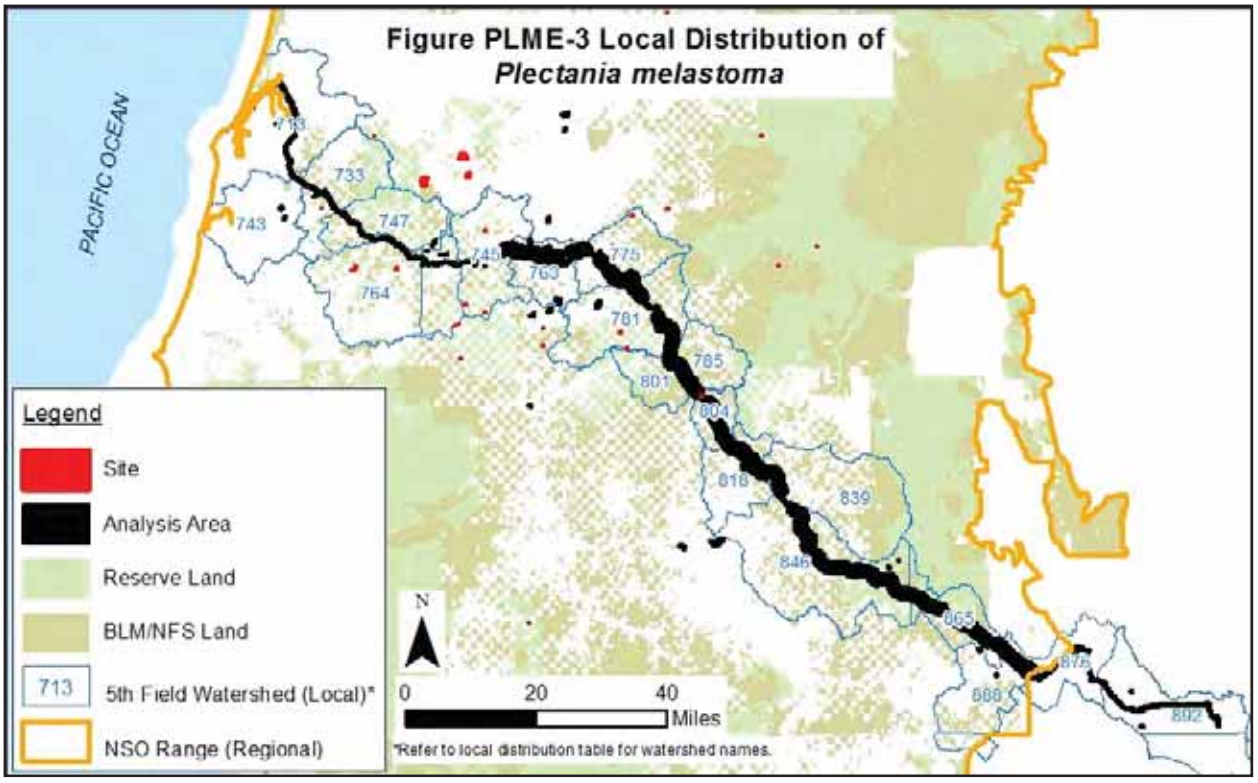
Coniferous and mixed hardwood-coniferous forests encompass approximately 1.3 million acres on BLM and NFS lands in the local area, including 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures PLME-2 and PLME-3).

TABLE PLME-5

Distribution of *Plectania melastoma* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	1	1
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	5	3
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	2	-
North Fork Coquille River (733)	1	-
Olalla Creek-Lookingglass Creek (745)	3	3
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	2	2
Spencer Creek (865)	-	-
Trail Creek (804)	1	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *P. melastoma*. This site is on NFS lands designated as Other (Matrix) on the Umpqua National Forest. It is in the Trail Creek watershed and is the easternmost site in the Klamath Mountains in Oregon. Several sites are scattered in the vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in four total observations of the species in three locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). One of these observations comprises the single site in the project area; the other observations are in sites outside the analysis area. The site is located at MP 111.9.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 158 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent of the sites (or one out of 165 total sites on all lands in the NSO range). Table PLME-6 presents an overview of the features of the PCGP Project that would affect the *P. melastoma* site. The construction corridor and associated work and storage areas would affect approximately 1.5 acres within the site (about 54 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. melastoma* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.8 acre of vegetation and soil within the site and could result in the removal of *P. melastoma* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.4 acre within the site. The establishment of the corridor could modify microclimate conditions around individuals adjacent to the corridor. The removal of trees and woody debris and disturbance to soil could negatively affect *P. melastoma* in adjacent areas by removing its habitat, disturbing soil or woody debris around trees, and affecting its association with the woody debris, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.4 acre of understory habitat in the site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE PLME-6

Impacts to *Plectania melastoma* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.8 ac
Temporary Extra Work Area (TEWA)	1	0.4 ac
Uncleared Storage Area (UCSA)	1	0.4 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *P. melastoma*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, 14 sites of *P. melastoma* would remain on BLM lands in the local area, including nine sites in reserves, and 157 sites, including 86 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 86 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 55 percent of the remaining *P. melastoma* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. melastoma* is a Category F (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, information on Category F species is insufficient to determine what level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *P. melastoma* has a wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (158 on BLM and NFS lands). The species appears to be well distributed in the Coast Range in Oregon and in the western Cascade Range in Oregon and Washington. The currently known number of sites on BLM and NFS lands is an increase of 29 sites on BLM and NFS lands since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 52 percent of the sites (86 sites) are in reserves, which is about the same proportion of sites in reserves as in 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range and Coast Range, where most sites are documented. The Klamath Mountains and other areas also contain coniferous and mixed hardwood-coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *P. melastoma*.
- The PCGP Project would affect one of 158 BLM- and Forest Service-managed sites of *P. melastoma*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the single site, a moderate-high number of sites (157) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (14 sites) would remain in the local vicinity of the analysis area; these sites would be distributed across six 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would remain about the same (55 percent). Of the remaining sites, 80 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and six are in Congressionally Reserved areas, where management activities that may adversely affect *P. melastoma* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *P. melastoma*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category F species for which pre-disturbance surveys are not applicable and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.43.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. melastoma* at a single site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 157 sites would remain on BLM and NFS lands across the region, and 14 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *P. melastoma* at one site, the site is a part of the many sites in southern Oregon where the species is fairly common. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. melastoma* would persist in the region without considering the single site as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *P. melastoma* site in the analysis area, although some individuals within the site may persist following project implementation.

Based on the above conclusions, avoidance of the *P. melastoma* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. melastoma* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.44 PLECTANIA MILLERI

Plectania milleri is a cup fungus in the Sarcosomataceae family and does not have a common name.

2.44.1 Regulatory Status and Ranking

The 2001 ROD identifies *P. milleri* as a Category B (rare) species. The ORBIC did not evaluate *P. milleri* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and did not rank the species in the current publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010 and 2013). NatureServe does not contain an account for the species, and its current glocal and state rankings are unknown. The species was ranked in the 2001, 2004, and 2007 ORBIC publications. In 2007, the species was considered to be rare, uncommon, or threatened, but not immediately imperiled globally (G3?), though the ranking was questionable. The species was also considered to be imperiled because of rarity or other factors that make it vulnerable to extirpation in Oregon (S2) (ORBIC 2007). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.44.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

P. milleri is a saprophytic fungus, forming sporpcarps on conifer duff (Holthausen et al. 1994). It is most easily detected in the spring and summer (Castellano et al. 1999). Little specific information is known about the reproductive biology of *Plectania* species. Other cup fungi are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997), and the same may be true of *P. milleri.*

Range

P. milleri is endemic to western North America, occurring in British Columbia, Idaho, Washington, and Oregon (Holthausen et al. 1994). The currently known range of the species

within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across regions of western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

In the Pacific Northwest, *P. milleri* has been found most often in the Cascade Range in Oregon. The species was documented at one site by 1994 and at nine sites between 1994–2000 (USDA and USDI 2000). The species was found in one location during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 246 new sites of *P. milleri* in the NSO range between 1998–2006, and 249 total sites were documented by 2006, including 29 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 308 sites on federal lands and 340 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *P. milleri,* and resulted in seven new observations of individuals or populations of *P. milleri*. Based on the increased number of sites since 1998 with increased surveys (83-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range, particularly in Oregon where most observations have been reported. It should also be noted that this species was removed from post-2001 S&M lists because it was considered to be common. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

Little is known about the specific habitat of *P. milleri,* but inferences can be made from habitat notes on specimen collections. In two collections from a study in 2011, *P. milleri* was found as groups or clusters of sporocarps on conifer debris in association with larch (*Larix* spp.) and grand fir trees (*Abies grandis*) (Agnello et al. 2011). Other collections note that the species is associated with mixed conifers, occurring on conifer duff (Castellano and O'Dell 1997). Based on available information, *P. milleri* may prefer certain components of LSOG forests, but it may not be restricted to LSOG forests.

Threats

Threats to *P. milleri* are presumably those actions that disrupt stand conditions necessary for their survival, particularly damage to overstory trees and disturbance to soil, litter and duff (Castellano and O'Dell 1997). Typical threats to fungi species in coniferous and other forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004).

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *P. milleri* because it was removed from the S&M list after 2001.

2.44.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. milleri* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PLMI-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 503 observations from BLM and Forest Service geodatabases were converted into 222 sites in the NSO range (region). Table PLMI-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PLMI-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PLMI-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PLMI-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands within the currently known range of the species.

TABLE PLMI-1

Number of *Plectania milleri* Sites (2013)

Location*	Number of Sites
Regional Area	222
Local Area	119
Analysis Area (Project Area)	7 (7)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PLMI-2

Distribution of *Plectania milleri* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	167	108	1
Forest Service	52	10	6
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	35	20	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.



Figure PLMI-1. Regional Distribution of *Plectania milleri*

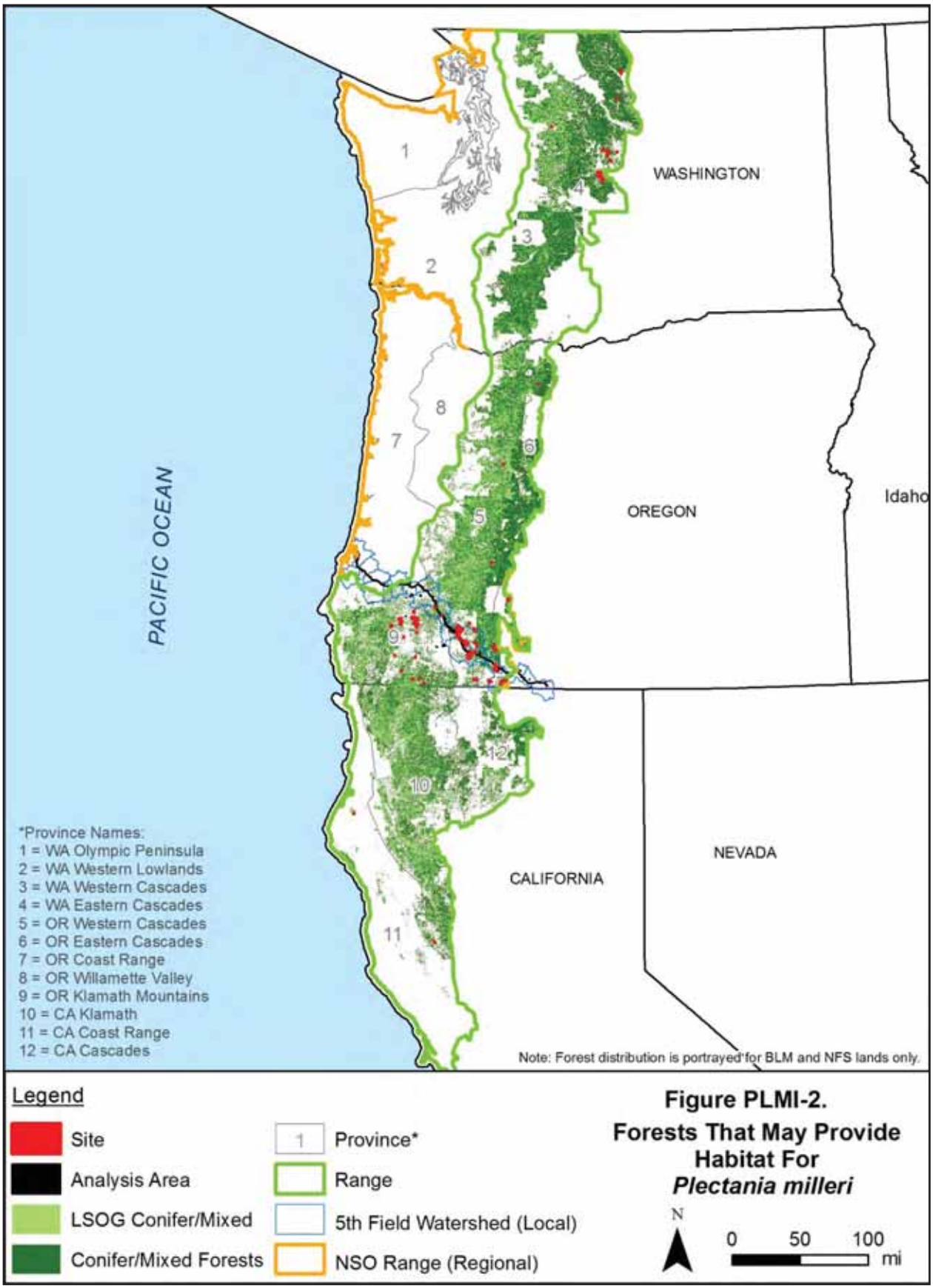


Figure PLMI-2.
Forests That May Provide Habitat For *Plectania milleri*

TABLE PLMI-3

Distribution of *Plectania milleri* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	3	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	6	-	-
Congressionally Reserved (CR)	**2**	**-**	**-**
Late Successional Reserve (LSR)	**17**	**5**	**3**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**14**	**10**	**-**
Managed Late Successional Area (MLSA)	5	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	189	112	4
Riparian Reserve**	**4**	**4**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

P. milleri has a somewhat wide distribution across seven physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Cascades West and East and Klamath Mountain) and California (Coast and Klamath). The sites are distributed in two general groups of clustered sites in southern Oregon in the Klamath Mountains and Cascade Range and in northern Washington in the Cascade Range. Scattered sites are found in California and in other parts of the Cascade Range in Oregon. *P. milleri* appears to be well distributed in the Klamath Mountains and Cascade Range in southern Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Thirty-five of 222 sites are located on private, state, or other lands (at least partially), and 219 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 31 sites in the Klamath Falls Resource Area of the Lakeview District and 135 sites in the Medford District. Sites managed by the National Forests that encompass the project area include 10 sites on the Rogue River National Forest, four sites on the Umpqua National Forest, and eight sites on the Winema National Forest. The remaining 34 sites on BLM and NFS lands are in the Arcata District and on the Mendocino, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Wenatchee, and Willamette National Forests.

Across the NSO range, 37 sites are located on reserve lands managed by BLM and Forest Service, including 17 in LSRs, two in Congressionally Reserved areas, 14 in Known Owl Activity Centers, and four in Riparian Reserves. This represents 17 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

P. milleri is more commonly found in LSOG forests based on available data (145 of 222 total sites are in LSOG), but it is also fairly common in non-LSOG forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a

wide elevation range and has only been documented in the Klamath Mountains and Cascade Range and in the Coast Range in California. Coniferous and mixed hardwood-coniferous forests within this range could provide habitat for *P. milleri* and support additional sites. These forests encompass an estimated 17.3 million acres on BLM and NFS lands in the region, including an estimated 9.5 million acres in reserve land allocations (55 percent of the forests; Table PLMI-4). Of this acreage, an estimated 5.3 million acres are LSOG (see Figure PLMI-2), including 3.2 million acres in reserve land allocations (60 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the species' range, LSOG forests are less common.

TABLE PLMI-4

Extent of Forests that Could Provide Habitat for *Plectania milleri* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	17,296,530	9,509,110	5,263,160	3,147,060
Local Area	453,550	141,670	134,380	51,560
Project Area	1,170	430	260	140

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. milleri* is found in seven 5th field watersheds that overlap the project area (see Table PLMI-5 and Figure PLMI-3). The sites are clustered and near one another in the Cascade Range, with two scattered sites located in the Klamath Mountains. These sites make up the eastern portion of the large group of sites in Oregon (see Regional Distribution discussion above). Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites occur to the north and south in the Cascade Range and to the west in the Klamath Mountains.

Of the 119 sites in the local area, 118 are at least partially located on BLM or NFS lands, and 20 sites are at least partially located on private, state, or other lands. Most of the local sites are on land designated as Other (Matrix), and 19 sites are in reserves, including five sites in LSRs, 10 sites in Known Owl Activity Centers, and four sites in Riparian Reserves. The number of sites on reserve lands represents 16 percent of the BLM- and Forest Service-managed sites. Sites on reserve lands are in the Big Butte Creek, Little Butte Creek, and Spencer Creek watersheds (Table PLMI-5).

Coniferous and mixed hardwood-coniferous forests encompass approximately 453,550 acres on BLM and NFS lands in the local area, including 141,670 acres in reserve land allocations (31 percent of the forests). Of this acreage, an estimated 134,380 acres are LSOG, including 51,560 acres in reserve land allocations (38 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures PLMI-2 and PLMI-3).

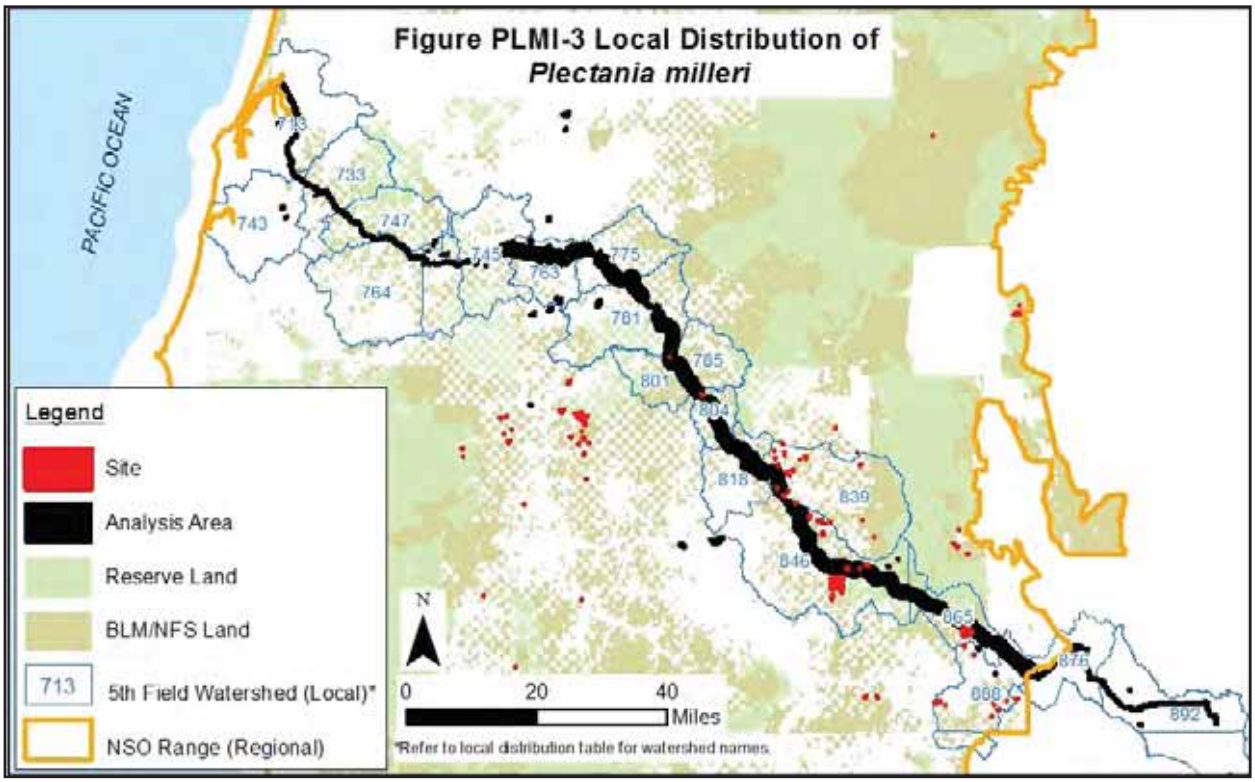
TABLE PLMI-5

Distribution of *Plectania milleri* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	23	1
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	1*	-
Klamath River-John C Boyle Reservoir (888)	15	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	64	13
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1*	-
Spencer Creek (865)	14	5
Trail Creek (804)	2	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011

*Note: Site counts are not additive because the site occurs in the Elk Creek-South Umpqua and South Umpqua River watersheds and the counts overlap:



Analysis/Project Area Distribution

The analysis and project areas contain seven sites of *P. milleri.* The sites are in the central and eastern portions of the analysis area. One site is on BLM-managed lands (Medford District), and six are on Forest Service-managed lands (Rogue River and Umpqua National Forests). Three

sites are in LSRs in the Little Butte Creek watershed, and the rest are on land designated as Other (Matrix) in the Elk Creek-South Umpqua, South Umpqua River, Trail Creek, and Spencer Creek watersheds. Several sites are located within the immediate vicinity of the sites (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in eight total observations of the species in seven locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). Six of the recorded observations comprise six of the sites in the project area; the other observations are in sites outside the analysis area. Within the project area, the six sites are located between MPs 102.5 and 156. The seventh site in the project area is from agency databases from 2000 and is located at MP 175.5.

Project Impacts

Analysis

The PCGP Project would affect seven sites out of the 219 sites on BLM- and Forest Service-managed lands in the region, representing approximately 3 percent of the sites (or seven out of 222 total sites on all lands in the NSO range). Table PLMI-6 presents an overview of the features of the PCGP Project that would affect the *P. milleri* sites. The construction corridor and associated work and storage areas would affect approximately 8.7 acres within the sites (about 40 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. milleri* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 5.8 acres of vegetation and soil within seven sites and could result in the removal of *P. milleri* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.5 acre within three sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and woody debris and disturbance to soil could negatively affect *P. milleri* in adjacent areas by removing its habitat, disturbing soil or duff around trees, and affecting its association with woody debris, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 2.3 acres of understory habitat in five sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE PLMI-6

Impacts to *Plectania milleri* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	7	5.8 ac
Temporary Extra Work Area (TEWA)	3	0.5 ac
Uncleared Storage Area (UCSA)	5	2.3 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 920 acres of coniferous and mixed hardwood-coniferous forests, including 180 acres of LSOG coniferous and mixed hardwood-coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *P. milleri*. Within this impact area, about 600 acres (about 65 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 190 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the species' range.

Discussion

Assuming site persistence cannot be maintained at the seven sites as a result of the PCGP Project, 111 sites of *P. milleri* would remain on BLM and NFS lands in the local area, including 16 in reserves, and 212 sites, including 34 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 34 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 16 percent of the remaining *P. milleri* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. milleri* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:

  - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
  - *P. milleri* has a somewhat-wide distribution across seven physiographic provinces and three states in the region and a moderate-high number of overall sites (219 on BLM and NFS lands). The species appears to be well distributed in the Klamath Mountains and Cascade Range in southern Oregon. The currently known number of sites on BLM and NFS lands is actually a decrease of sites documented since 2007, but is still moderate-high. Also, several sites were documented during PCGP Project surveys.
  - An estimated 17 percent of the sites (37 sites) are in reserves, which is an increase of about eight sites in reserves since 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widespread across the species' range and encompass approximately 17.3 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range also contains coniferous and mixed hardwood-coniferous forests, but sites are more scattered in the mountain range. A subcomponent of these forests likely provides habitat for *P. milleri*.
- The PCGP Project would affect seven of 219 BLM- and Forest Service-managed sites of *P. milleri*, representing approximately 3 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the seven sites, a moderate-high number of sites (212) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Washington, Oregon, and California. Many sites (111 sites) would remain in the local vicinity of the analysis area; these sites would be distributed across four rather than seven 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at three sites in LSRs, but the percentage of sites in reserves would be about the same (16 percent). Of the remaining sites, 12 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests. Four other sites are at least partially in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 190 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total acreage in the species' range). An estimated 9.5 million acres (55 percent) of coniferous and mixed hardwood-coniferous forests and 3.2 million acres (60 percent) of LSOG forests would remain in reserves in the species' range.
- The remaining forests could support additional populations of *P. milleri*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-

disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.44.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. milleri* at seven sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 212 sites would remain on BLM and NFS lands across the region, and 111 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *P. milleri* at seven sites, these sites are part of the many sites in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. milleri* would persist in the region without considering the seven sites as part of the population.
- The PCGP Project would remove approximately 920 acres of coniferous and mixed hardwood-coniferous forests and 180 acres of LSOG coniferous and mixed hardwood-coniferous forests (a negligible amount of the forests). An estimated 65 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.5 million acres (55 percent) of coniferous and mixed hardwood-coniferous forests and 3.2 million acres (60 percent) of LSOG coniferous and mixed hardwood-coniferous forests would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *P. milleri* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the seven *P. milleri* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *P. milleri* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.45 POLYOZELLUS MULTIPLEX

Polyozellus multiplex is a chanterelle-like mushroom species in the Thelephoraceae family and is commonly known as blue/black chanterelle.

2.45.1 Regulatory Status and Ranking

The 2001 ROD identifies *P. multiplex* as a Category B (rare) species. The ORBIC evaluated *P. multiplex* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be between not rare and apparently secure, but with cause for long-term concern, and widespread, abundant, and secure within its global range (G4G5) and was rare, uncommon, or threatened, but not immediately imperiled, in Oregon (S3). The species is on the ORBIC List 4. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.45.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *P. multiplex*. The mushroom is presumed to be ectomycorrhizal, forming symbiotic associations with the roots of conifer trees to obtain minerals, water, and nutrients (Castellano and O'Dell 1997). It is likely long-lived and slow-growing, with a low reproductive rate (ORBIC 2004). It typically grows in clusters (The Fungi of California 2010) and has been documented fruiting from June through September (Castellano et al. 1999). Spores of *P. multiplex* are assumed to disperse by wind and possibly by animal (arthropod) vectors (Castellano and O'Dell 1997).

Range

P. multiplex is known from North America and Asia (ORBIC 2004; Trappe, pers. comm. 2013). In North America, it has been documented in Canada, Alaska, the Pacific Northwest, New Mexico, Colorado, and from Michigan east to Maine (ORBIC 2004, Castellano et al. 1999). In the Pacific Northwest, the mushroom has been found along the Coast and Cascade ranges in Washington, Oregon, and California. In Oregon, *P. multiplex* was found in the Cascade Range from Mount Hood to the Rogue River based on data available in 2004 (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed in Asia and North America. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *P. multiplex* from an estimated 57 element occurrences in the Pacific Northwest in 2004. An estimated 33 of these occurrences were in Oregon, with fewer in Washington (22) and California (1) (ORBIC 2004). The ORBIC estimated that more than half of the element occurrences were in protected areas in the NSO range in 2004. In 2004, the species was considered uncommon to rare and was presumed to be relatively stable with a potential for population declines based on its habitat requirements (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 45 new sites of *P. multiplex* in the NSO range between 1998–2006, and 67 total sites were documented by 2006, including 36 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 63 sites on federal lands and 65 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *P. multiplex*, and resulted in one new observation of the species. Additional persistence surveys for other species in LSRs in nearby areas resulted in one additional incidental observation. Based on the increased number of sites since 1998 with increased surveys (3-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

P. multiplex has primarily been found in LSOG coniferous forests at mid-elevations and demonstrates a preference for older true firs (*Abies* spp.) (ORBIC 2004, Castellano et al. 1999). In the Pacific Northwest, it is presumed to be restricted to old-growth coniferous forests based on data available in 2004 (ORBIC 2004). It is primarily found in montane areas and typically in the course of intermittent streams or along the edge of seeps (i.e., in riparian reserves) (Holthausen et al. 1994). This species seems to prefer specific microclimate conditions of LSOG coniferous forests.

Threats

Threats to *P. multiplex* are those that affect its host tree and disturb the associated soil and duff, such as road and trail construction, logging, fire management activities, and recreational activities (Castellano and O'Dell 1997). Hot fires, development, and logging activities could threaten unprotected populations, as well as pollution and reductions in stand age (ORBIC 2004). The species is also collected for commercial uses, which may threaten populations (Holthausen et al. 1994). Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *P. multiplex* (Group 6 of Castellano and O'Dell 1997).

The primary guidance is to maintain current habitat and microclimate conditions by retaining LSOG forest structure and soil conditions. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. Known sites on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *P. multiplex*:

- As a mycorrhizal species, *P. multiplex* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.45.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. multiplex* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table POMU-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 104 observations from BLM and Forest Service geodatabases were converted into 84 sites in the NSO range (region). Table POMU-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table POMU-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure POMU-1 displays the regional distribution of the species across BLM and NFS lands, and Figure POMU-2 displays the species' regional distribution with the extent of coniferous forests and LSOG coniferous forests below 6,500 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE POMU-1

Number of *Polyozellus multiplex* Sites (2013)

Location*	Number of Sites
Regional Area	84
Local Area	1
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE POMU-2

Distribution of *Polyozellus multiplex* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	2	-	-
Forest Service	80	1	1
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	3	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE POMU-3

Distribution of *Polyozellus multiplex* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	2	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	18	-	-
Congressionally Reserved (CR)	**24**	**-**	**-**
Late Successional Reserve (LSR)	**19**	**1**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	27	-	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

P. multiplex is somewhat widely distributed across six physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Cascades East and West, and Klamath Mountain), and California (Klamath). Most sites are found along the Cascade Range, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the Klamath Mountains, where the species is less abundant. *P. multiplex* appears to be well distributed in the Cascade Range in Oregon and Washington based on the relative abundance of sites in the mountain range, proximity of sites to one another, and distribution of the sites across forests that may provide suitable habitat.

Three of 84 sites are at least partially located on other lands, and 82 sites are on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include two sites in the Medford District. Sites managed by the National Forests that encompass the project area include 14 sites on the Winema National Forest, four sites on the Rogue River National Forest, and four sites on the Umpqua National Forest. The remaining 58 sites on BLM and NFS lands are on the Deschutes, Gifford Pinchot, Mt. Hood, Okanogan, Wenatchee, and Willamette National Forests.

Across the NSO range, 42 sites are located on reserve lands managed by BLM and the Forest Service, including 19 in LSRs (at least partially), one in a Known Owl Activity Center, and 24 in Congressionally Reserved areas (at least partially). This represents 51 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.



Figure POMU-1. Regional Distribution of *Polyozellus multiplex*



Figure POMU-2.
Forests That May Provide Habitat For *Polyozellus multiplex*

P. multiplex is more common in LSOG forests based on available data (64 of 84 total sites are in LSOG), but is also found in non-LSOG forests. Based on current site locations, the species is primarily found in coniferous forests below about 6,300 feet msl in Oregon and Washington, but it is found at lower elevations (to about 300 feet msl) in California. Its range is also limited to the eastern part of the NSO range. Coniferous forests, including the LSOG component of these forests, within this range could provide habitat for *P. multiplex* and support additional sites. These forests encompass an estimated 14.1 million acres on BLM and NFS lands in the eastern part of the NSO range, including an estimated 7.9 million acres in reserve land allocations (56 percent of the forests; Table POMU-4). Of this acreage, an estimated 4.3 million acres are LSOG (see Figure POMU-2), including 2.6 million acres in reserve land allocations (60 percent of the forests). Coniferous forests, including LSOG coniferous forests, below 6,500 feet msl are widespread across the species' range.

TABLE POMU-4

Extent of Forests that Could Provide Habitat for *Polyozellus multiplex* on BLM and NFS Lands*

Location	Coniferous Forests below 6,500 feet		LSOG Coniferous Forests below 6,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	14,115,980	7,881,680	4,256,580	2,561,020
Local Area	353,920	110,300	121,350	45,260
Project Area	830	380	250	130

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. multiplex* is found in one 5th field watershed (Little Butte Creek) that overlaps the project area (see Table POMU-5 and Figure POMU-3). The site is on NFS land in the Rogue River National Forest and is in an LSR. The site is at the southern extent of the species' currently known range in the Cascade Range, and several other sites are located to the north within about 20 miles of the site. Connectivity may be available between the local site and the other sites in the Cascade Range based on the extent of coniferous forests, and animals and wind could transport spores across suitable habitat within the local area.

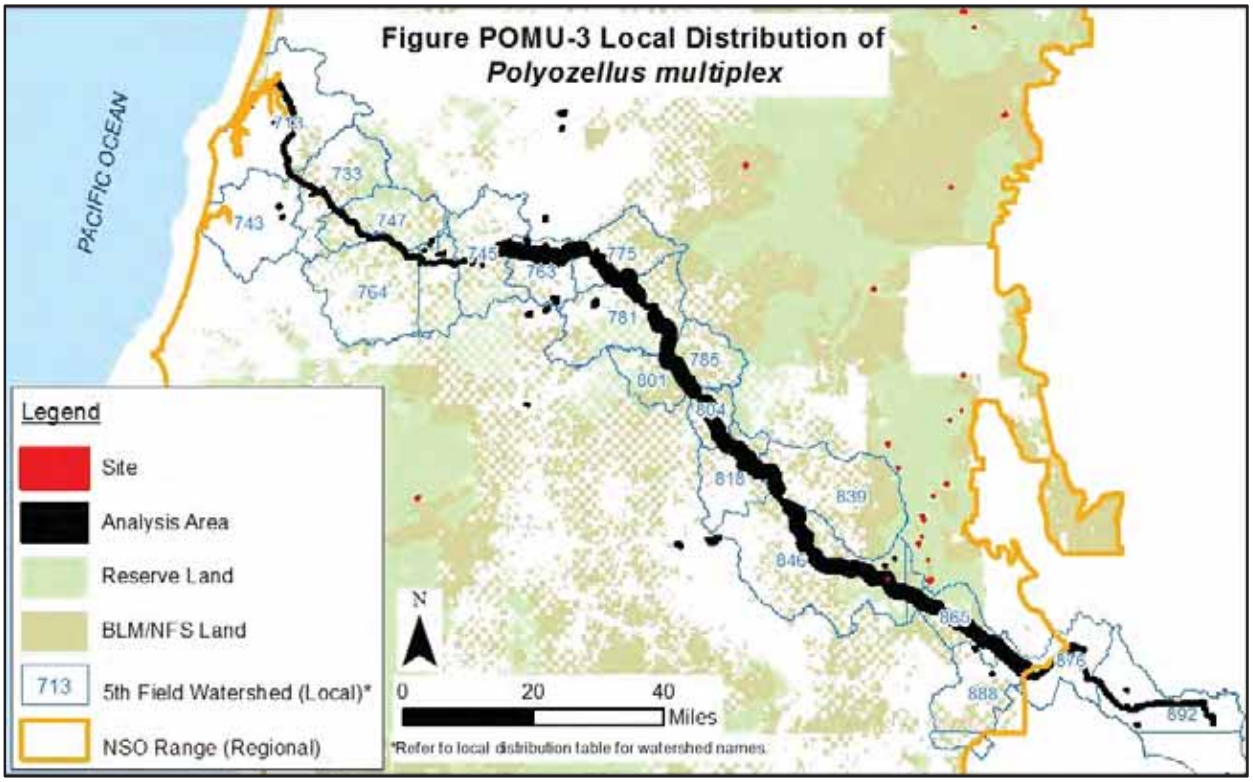
Coniferous forests below 6,500 feet msl encompass approximately 353,920 acres on BLM and NFS lands in the local area, with 110,300 acres in reserve land allocations (31 percent of the forests). Of this acreage, an estimated 121,350 acres are LSOG, including 45,260 acres in reserve land allocations (37 percent of the forests). Other sites may also exist in the Cascade Range in the local area where surveys have not been completed, based on the number of sites in nearby areas, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures POMU-2 and POMU-3).

TABLE POMU-5

Distribution of *Polyozellus multiplex* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	1	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *P. multiplex*. This site is the same one as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in two observations of the species in and near the project area (Siskiyou BioSurvey LLC 2012a). One of these recorded observations comprises the site in

the analysis area; the other observation is in a site outside the analysis area. Within the project area, the site is located between MPs 162.4 and 162.5.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 82 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 84 total sites on all lands in the NSO range). Table POMU-6 presents an overview of the features of the PCGP Project that would affect the *P. multiplex* site. The construction corridor and associated storage areas would affect approximately 1.3 acres within the site (about 34 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. multiplex* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.9 acre of vegetation and soils within the site and would likely remove individuals of *P. multiplex*. Disturbance in a TEWA would result in similar impacts on approximately 0.4 acre of the site. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and host trees and disturbance to soil could negatively affect *P. multiplex* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWA could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE POMU-6

Impacts to *Polyozellus multiplex* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.9 ac
Temporary Extra Work Area (TEWA)	1	0.4 ac
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 640 acres of coniferous forests, including 180 acres of LSOG coniferous forests, below 6,500 feet msl. These impacts would result in a reduction of habitat that may be suitable for *P. multiplex*. Within this impact area, about 460 acres (about 72 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting

in a permanent loss of about 150 acres of coniferous forests below 6,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests below 6,500 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, no sites of *P. multiplex* would remain on BLM and NFS lands in the local area, and 81 sites, including 41 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 41 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 51 percent of the remaining *P. multiplex* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. multiplex* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *P. multiplex* has a somewhat wide distribution across six physiographic provinces and three states in the region and a moderate-high number of overall sites (82 on BLM and NFS lands). The species appears to be well distributed in the Cascade Range in Oregon and Washington and is less common in the Klamath Mountains. The currently known number of sites on BLM and NFS lands is an increase of 19 sites on BLM and NFS lands since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 51 percent of the sites (42 sites) are in reserves, which is an increase of about six sites in reserves since 2006 per Molina (2008).
- Coniferous forests below 6,500 feet msl (general habitat for the species) are widespread across the eastern part of the NSO range and encompass approximately 14.1 million acres on BLM and NFS lands with an estimated 56 percent in reserves. Most of the forests, including most LSOG coniferous forests, are found in the Cascade Range and Klamath Mountains, where most sites are documented. A subcomponent of these forests likely provides habitat for *P. multiplex*.

- The PCGP Project would affect one of 82 BLM- and Forest Service-managed sites of *P. multiplex*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (81) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Washington, Oregon, and California. However, no sites would remain in the local vicinity of the analysis area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in an LSR, but the percentage of sites in reserves would be about the same (51 percent). Of the remaining sites, 19 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 24 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *P. multiplex* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 150 acres of coniferous forests below 6,500 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 7.9 million acres (56 percent) of coniferous forests and 2.6 million acres (60 percent) of LSOG coniferous forests below 6,500 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *P. multiplex*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.45.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. multiplex* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 81 sites would remain on BLM and NFS lands across the region, although no sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *P. multiplex* at one site, this site is part of a large group of sites in the Cascade Range in Oregon where the species is locally abundant and well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. multiplex* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 640 acres of coniferous forests and 180 acres of LSOG coniferous forests below 6,500 feet msl (a negligible amount of the forests). An estimated 72 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. About 7.9 million acres (56 percent) of coniferous forests and 2.6 million acres (60

percent) of LSOG coniferous forests below 6,500 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *P. multiplex* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *P. multiplex* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. multiplex* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.46 RAMARIA ARAIOSPORA

Ramaria araiospora is a coral mushroom species in the Gomphaceae family (formerly in Ramariaceae) and is commonly known as red coral mushroom. Two varieties are known: *Ramaria araiospora var. rubella* and *Ramaria araiospora var. araiospora*.

2.46.1 Regulatory Status and Ranking

The 2001 ROD identifies *R. araiospora* as a Category B (rare) species. The ORBIC evaluated *R. araiospora* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.46.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *R. araiospora*. It is presumed to be ectomycorrhizal, forming symbiotic associations with conifer trees for

translocation of minerals, water, and nutrients (Castellano and O'Dell 1997). *R. araiospora* fruits in humus or soil and matures above the ground and has been documented fruiting primarily in fall between October and November (Castellano et al. 1999, Exeter et al. 2006). Spore dispersal is assumed to be via wind and possibly animals (arthropods) (Castellano and O'Dell 1997).

Range

R. araiospora is endemic to the Pacific Northwest (ORBIC 2004). It is known from Pierce County, Washington to Mendocino County, California (Castellano and O'Dell 1997). Based on data available in 1997, the majority of populations in Oregon were in five areas within the Cascade and Coast Ranges: 1) Mt. Hood National Forest, 2) scattered clusters from the northern Willamette National Forest to the southeastern Salem District, 3) the southwest Salem District, 4) Coos Bay District, and 5) two small clusters in the Umpqua National Forest. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *R. araiospora* from an estimated 93 element occurrences in the Pacific Northwest in 2004. An estimated 44 of these occurrences were in Oregon, with fewer in California (6) and Washington (6) (ORBIC 2004). The species was found in 11 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 111 new sites of *R. araiospora* in the NSO range between 1998–2006, and 131 total sites were documented by 2006, including 43 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 109 sites on federal lands and 122 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *R. araiospora*, and resulted in five new observations of individuals or populations of *R. araiospora*. Additional persistence surveys for *R. araiospora* in LSRs in nearby areas resulted in one additional observation of the species. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (6-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

R. araiospora has been mostly found in LSOG forests, but populations have also been found in younger forests adjacent to LSOG stands (Hibler et al. 2001e). It is primarily found in coniferous forests (Exeter et al. 2006) and appears to require conifer trees to form mycorrhizal relationships (Hibler et al. 2001e). The mushroom grows in humus or soil where it is associated with true firs (*Abies* spp.), Douglas-fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and Sitka spruce (*Picea sitchensis*) (Castellano et al. 1999, Trappe, pers. comm. 2013). Based on data available in 2007, it has been found below about 5,300 feet msl (Cushman and Huff 2007). *R. araiospora* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *R. araiospora* are those that affect its host tree and disturb the soil, such as road and trail construction, logging, and campground establishment (Castellano and O'Dell 1997). Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *R. araiospora* with other *Ramaria* spp. (Group 7 of Castellano and O'Dell 1997). The primary guidance is to maintain current habitat and microclimate conditions by retaining forest structure and soil conditions. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. Known sites on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *R. araiospora*:

- As a mycorrhizal species, *R. araiospora* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.46.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *R. araiospora* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table RAAR-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that

encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 287 observations from BLM and Forest Service geodatabases were converted into 148 sites in the NSO range (region). Table RAAR-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table RAAR-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure RAAR-1 displays the regional distribution of the species across BLM and NFS lands, and Figure RAAR-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE RAAR-1

Number of *Ramaria araiospora* Sites (2013)

Location*	Number of Sites
Regional Area	148
Local Area	14
Analysis Area (Project Area)	3 (3)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE RAAR-2

Distribution of *Ramaria araiospora* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	74	13	2
Forest Service	67	1	1
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	18	5	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE RAAR-3

Distribution of *Ramaria araiospora* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	25	-	-
Adaptive Management Reserves (AMR)	7	-	-
Administratively Withdrawn (AW)	-	-	-
Congressionally Reserved (CR)	**8**	**-**	**-**
Late Successional Reserve (LSR)	**32**	**4**	**-**
Marbled Murrelet Area (LSR3)	**6**	**3**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**3**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	2	-	-
Other (Matrix, Riparian Reserve, Other)	64	8	3
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).


WASHINGTON
OREGON
CALIFORNIA
NEVADA
Idaho
PACIFIC OCEAN
1
2
3
4
5
6
7
8
9
10
11
12
*Province Names:
1 = WA Olympic Peninsula
2 = WA Western Lowlands
3 = WA Western Cascades
4 = WA Eastern Cascades
5 = OR Western Cascades
6 = OR Eastern Cascades
7 = OR Coast Range
8 = OR Willamette Valley
9 = OR Klamath Mountains
10 = CA Klamath
11 = CA Coast Range
12 = CA Cascades
Legend
Site
Analysis Area
Reserve Land
BLM/NFS Land
5th Field Watershed (Local)
1 Physiographic Province*
NSO Range (Regional)
Figure RAAR-1.
Regional Distribution of
Ramaria araiospora
N
0 50 100
mi



Figure RAAR-2.
Forests That May Provide Habitat For *Ramaria araiospora*

Regional Distribution

R. araiospora is somewhat widely distributed across seven physiographic provinces in Washington (Western Cascades and Olympic Peninsula), Oregon (Coast Range, Cascades West, and Klamath Mountains), and California (Klamath and Coast) (see Figure RAAR-1). Most sites are found along the western Cascade Range and Coast Range in Oregon, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in California and Washington in the Coast Range, Klamath Mountains, and Olympic Peninsula. *R. araiospora* appears to be well distributed in the Coast Range and western Cascade Range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Eighteen of 148 sites are located on private, state, or other lands (at least partially), and 141 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 14 sites in the Coos Bay District and two sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include 12 sites on the Umpqua National Forest. The remaining 113 sites on BLM and NFS lands are in the Arcata and Salem Districts and on the Gifford Pinchot, Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 49 sites are located on reserve lands managed by BLM and the Forest Service, including 32 in LSRs, six in Marbled Murrelet Areas, three in Known Owl Activity Centers, and eight in Congressionally Reserved areas. This represents 35 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

R. araiospora is primarily found in LSOG forests based on available data (142 of 148 total sites are in LSOG), but it is also found in non-LSOG forests and has been found in younger forests near LSOG stands. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 5,000 feet msl and has only been documented in the western part of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, in most of the NSO range, excluding the eastern Cascade Range in Oregon and Washington and Cascade Range in California, could provide habitat for *R. araiospora* and support additional sites. These forests encompass an estimated 13.7 million acres on BLM and NFS lands, including an estimated 7.6 million acres in reserve land allocations (56 percent of the forests; Table RAAR-4). Of this acreage, an estimated 5.3 million acres are LSOG (see Figure RAAR-2), including 3.3 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the western part of the NSO range, LSOG forests are less common.

TABLE RAAR-4

Extent of Forests that Could Provide Habitat for *Ramaria araiospora* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	13,707,530	7,624,230	5,329,960	3,322,720
Local Area	520,780	179,810	173,050	75,990
Project Area	1,250	490	270	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *R. araiospora* is found in three 5th field watersheds that overlap the project area (see Table RAAR-5 and Figure RAAR-3). Most sites are clustered and near one another in the Middle Fork and North Fork Coquille River watersheds in the western portion of the local area. Several sites are located in the regional area within about 30 miles north in the Coast Range. A single site is located in the Trail Creek watershed in the central portion of the local area. This site is somewhat distant from other sites; the nearest sites are more than 35 miles north in the Cascade Range. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed forests, and opportunities for dispersal exist within the local area and to nearby regional areas.

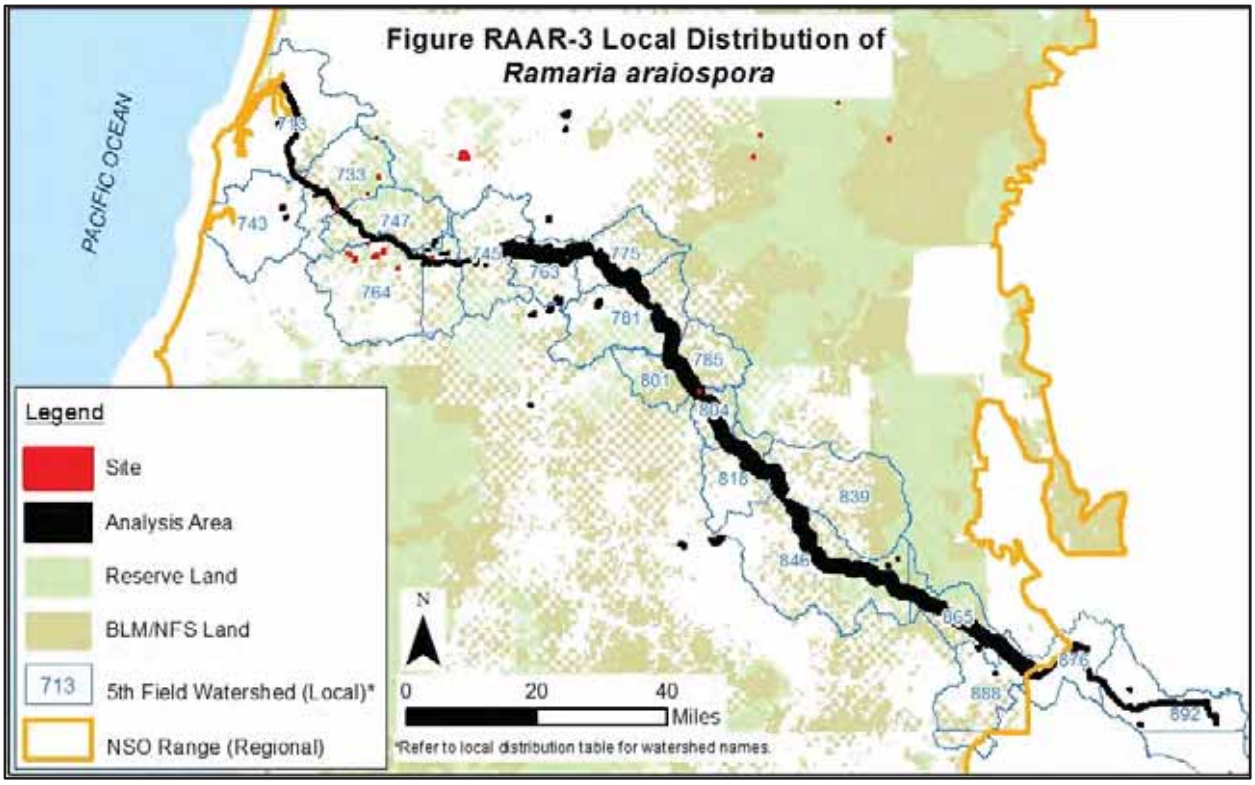
All of the 14 sites in the local area are on BLM and NFS lands (at least partially). These sites are located on lands designated as Other (Matrix), LSR, or LSR3. Five sites are at least partially on private lands. Of the 14 sites in the local area on BLM and NFS lands, five sites are on reserve lands, representing 36 percent of the sites. The sites are in LSRs in the Middle Fork and North Fork Coquille River watersheds.

TABLE RAAR-5

Distribution of *Ramaria araiospora* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	9	3
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	4	2
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	1	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 520,780 acres on BLM and NFS lands in the local area, with 179,810 acres in reserve land allocations (35 percent of the forests). Of this acreage, an estimated 173,050 acres are LSOG, including 75,990 acres in reserves (44 percent of the forests). Other sites may also exist in the Coast Range in the local area where surveys have not been completed, based on the number of sites concentrated in the mountain range in the local and nearby regional areas and the extent of forests that may provide suitable habitat (see Figures RAAR-2 and RAAR-3).

Analysis/Project Area Distribution

The analysis and project areas contain three sites of *R. araiospora*, all of which are at least partially on BLM or NFS lands. The analysis area sites are distributed across two 5th field watersheds (North Fork Coquille River and Trail Creek). The sites in the North Fork Coquille River watershed are clustered near one another, but the site in the Trail Creek watershed is somewhat distant from other sites (see Local Distribution discussion above). Several sites are also located within the immediate vicinity of the analysis area, including several on BLM lands within 10 miles in the North Fork and Middle Fork Coquille River watersheds.

Two sites are on BLM-managed lands (Coos Bay District), and one site is on Forest Service-managed lands (Umpqua National Forest). All sites are on land designated as Other (Matrix). One site is partially on private land and partially on BLM land.

Surveys for the PCGP Project resulted in seven total observations of the species in six locations in or near the project area (Siskiyou BioSurvey LLC 2012a). These recorded observations comprise the three sites in the analysis area. Within the project area, two sites are between MPs 27.2 and 27.5, and one site is at MP 111.2.

Project Impacts

Analysis

The PCGP Project would affect three sites out of the 141 sites on BLM- and Forest Service-managed lands in the region, representing approximately 2 percent of the sites (or three out of 148 total sites on all lands in the NSO range). Table RAAR-6 presents an overview of the features of the PCGP Project that would affect the *R. araiospora* sites. The construction corridor and associated work areas would affect approximately 2.9 acres within the sites (about 29 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *R. araiospora* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

TABLE RAAR-6

Impacts to *Ramaria araiospora* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	3	2.5 ac
Temporary Extra Work Area (TEWA)	2	0.4 ac
Uncleared Storage Area (UCSA)	1	0.1 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Vegetation removal and grading activities in the construction corridor would disturb about 2.5 acres of vegetation and soil within three sites and could result in the removal of *R. araiospora* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.4 acre within one site. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *R. araiospora* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.1 acre of understory habitat in three sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

Across the project area, the PCGP Project would remove an estimated 980 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 200 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *R. araiospora*. Within this impact area, about 650 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain

across the project area, resulting in a permanent loss of about 200 acres of coniferous and mixed forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the three sites as a result of the PCGP Project, 11 sites of *R. araiospora* would remain on BLM and NFS lands in the local area, including five in reserves, and 138 sites, including 49 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 49 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 36 percent of the remaining *R. araiospora* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *R. araiospora* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *R. araiospora* has a somewhat wide distribution across seven physiographic provinces and three states in the region and a moderate-high number of overall sites (141 on BLM and NFS lands). The species appears to be well distributed in the Coast Range and western Cascade Range in Oregon, but is less abundant in other parts of the region. The currently known number of sites on BLM and NFS lands is an increase of 32 sites on BLM and NFS lands since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 35 percent of the sites (49 sites) are in reserves, which is an increase of about six sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the species' range and encompass approximately 13.7 million acres on BLM and NFS lands with an estimated 56 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented, and in the Klamath Mountains, where some sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous

forests, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *R. araiospora*.

- The PCGP Project would affect three of 141 BLM- and Forest Service-managed sites of *R. araiospora*, representing approximately 2 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the three sites, a moderate-high number of sites (138) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Washington, Oregon, and California. Several sites (11 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across three 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be about the same (36 percent). Of the remaining sites, 41 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and eight are in Congressionally Reserved areas where management activities that may adversely affect *R. araiospora* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 200 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 7.6 million acres (56 percent) of coniferous and mixed forests and 3.3 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *R. araiospora*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO, particularly in the Coast Range and Cascade Range, that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.46.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *R. araiospora* at three sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 138 sites would remain on BLM and NFS lands across the region, and 11 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *R. araiospora* at three sites, these sites are part of a large group of sites in the Coast Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *R. araiospora* would persist in the region without considering the three sites as part of the population.

- The PCGP Project would remove approximately 980 acres of coniferous and mixed hardwood-coniferous forests and 200 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 7.6 million acres (56 percent) of coniferous and mixed forests and 3.3 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is somewhat widely distributed.

The PCGP Project would not be able to avoid all *R. araiospora* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the three *R. araiospora* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *R. araiospora* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.47 RAMARIA CELERIVIRESCENS

Ramaria celerivirescens is a coral mushroom species in the Gomphaceae family (formerly in Ramariaceae) and is commonly known as "gold rusty root."

2.47.1 Regulatory Status and Ranking

The 2001 ROD identifies *R. celerivirescens* as a Category B (rare) species. The ORBIC evaluated *R. celerivirescens* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.47.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *R. celerivirescens*. It is presumed to be ectomycorrhizal, forming symbiotic associations with host trees for translocation of minerals, water, and nutrients (Castellano and O'Dell 1997). *R. celerivirescens* fruits in humus or soil in October and November and matures above the ground (Castellano et al. 1999). Spore dispersal is assumed to be via wind and possibly animals (arthropods) (Castellano and O'Dell 1997).

Range

R. celerivirescens is endemic to the Pacific Northwest, where it has been found from British Columbia south to California (ORBIC 2004, Trappe, pers. comm. 2013). The species has been documented more commonly in Oregon, with populations concentrated in the western Cascade Range and Coast Range (Hibler et al. 2001e, ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *R. celerivirescens* from an estimated 75 element occurrences in the Pacific Northwest in 2004. An estimated 60 of these occurrences were in Oregon, with fewer in California (2) and Washington (11) (ORBIC 2004). About half of the occurrences were in protected areas, particularly in Oregon. Based on data available in 2004, population trends of this species were relatively stable, and it was apparently secure in Oregon (ORBIC 2004). The species was found in 14 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 97 new sites of *R. celerivirescens* in the NSO range between 1998–2006, and 110 total sites were documented by 2006, including 29 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 90 sites on federal lands and 94 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *R. celerivirescens*, and resulted in no new observations of the species. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (8-fold increase between 1998–2006 per Molina 2008 records, although none were found in the project area), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

R. celerivirescens has been found primarily in LSOG coniferous forests in association with true firs (*Abies* spp.), Douglas-fir, and western hemlock (Castellano et al. 1999, ORBIC 2004). It has also been found in urban parks and younger forests neighboring LSOG stands (Hibler et al. 2001e, Trappe, pers. comm. 2013). Coarse woody debris appears to be an important component of the species' habitat (Hibler et al. 2001e). *R. celerivirescens* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *R. celerivirescens* are those that affect its host tree and disturb the soil, such as road and trail construction, logging, and campground establishment (Castellano and O'Dell 1997). Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *R. celerivirescens* with other *Ramaria* spp. (Group 7 of Castellano and O'Dell 1997). The primary guidance is to maintain current habitat and microclimate conditions by retaining forest structure and soil conditions. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. Known sites on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *R. celerivirescens*:

- As a mycorrhizal species, *R. celerivirescens* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.47.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *R. celerivirescens* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table RACE-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and

project areas (PCGP Project corridor, associated work areas, and roads). An estimated 215 observations from BLM and Forest Service geodatabases were converted into 142 sites in the NSO range (region). Table RACE-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table RACE-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure RACE-1 displays the regional distribution of the species across BLM and NFS lands, and Figure RACE-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE RACE-1

Number of *Ramaria celerivirescens* Sites (2013)

Location*	Number of Sites
Regional Area	142
Local Area	4
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE RACE-2

Distribution of *Ramaria celerivirescens* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	21	4	1
Forest Service	118	-	-
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	4	1	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE RACE-3

Distribution of *Ramaria celerivirescens* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	20	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	10	-	-
Congressionally Reserved (CR)	**4**	**-**	**-**
Late Successional Reserve (LSR)	**29**	**-**	**-**
Marbled Murrelet Area (LSR3)	**2**	**2**	**1**
Northern Spotted Owl Activity Center (LSR4)*	**11**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	77	2	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure RACE-1. Regional Distribution of *Ramaria celerivirescens*

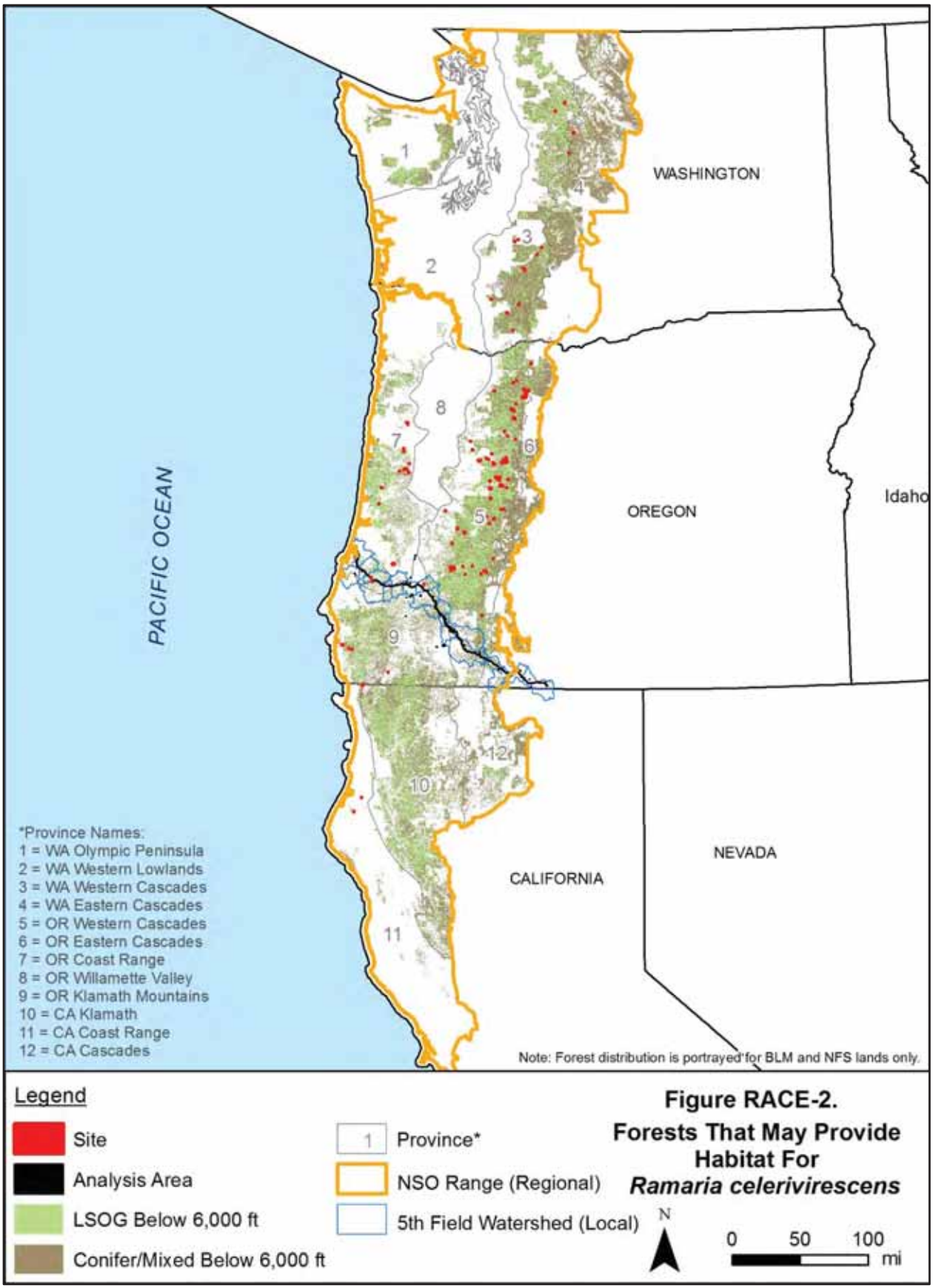


Figure RACE-2.
Forests That May Provide Habitat For *Ramaria celerivirescens*

Regional Distribution

R. celerivirescens is somewhat widely distributed across seven physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, and Klamath Mountains), and California (Coast) (see Figure RACE-1). Most sites are found along the Cascade Range and Coast Range in Oregon. Sites in the western Cascade Range tend to be clustered in Oregon and more scattered in Washington. Sites in the Coast Range and Klamath Mountains also appear more scattered. *R. celerivirescens* is less abundant outside the Cascade Range and Coast Range based on current site locations, although forests that could provide suitable habitat are somewhat widespread. *R. celerivirescens* appears to be well distributed in the western Cascade Range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Four of 142 sites are located on private lands (at least partially), one site is on NPS land (Mount Rainier National Park), and 139 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include four sites in the Coos Bay District, one site in the Medford District, and two sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include three sites on the Rogue River National Forest and 26 sites on the Umpqua National Forest. The 103 remaining sites on BLM and NFS lands are in the Arcata, Eugene, and Salem Districts and on the Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Siskiyou, Siuslaw, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 45 sites are located on reserve lands managed by BLM and the Forest Service, including 29 in LSRs (at least partially), two in Marbled Murrelet Areas, 11 in Known Owl Activity Centers (at least partially), and four in Congressionally Reserved areas. This represents 32 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

R. celerivirescens is more commonly found in LSOG forests (125 of 142 total sites are in LSOG), but it is somewhat common in non-LSOG forests and has been found in younger forests and urban parks. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 5,300 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, within this range could provide habitat for *R. celerivirescens* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the region, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table RACE-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure RACE-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE RACE-4

Extent of Forests that Could Provide Habitat for *Ramaria celerivirescens* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	80,260
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011.
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *R. celerivirescens* is found in three 5th field watersheds that overlap the project area (see Table RACE-5 and Figure RACE-3). The sites in the Middle Fork and East Fork Coquille River watersheds are near one another in the western portion of the local area. A large cluster of sites is located in the regional area within about 20 miles northeast in the Coast Range. The two sites in the Myrtle Creek watershed are also near one another in the Klamath Mountains in the central portion of the local area. This site is somewhat distant from other sites; the nearest sites are more than 20 miles northeast in the Cascade Range and more than 20 miles northwest in the Coast Range. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed forests, and opportunities for dispersal exist within the local area and to nearby regional areas.

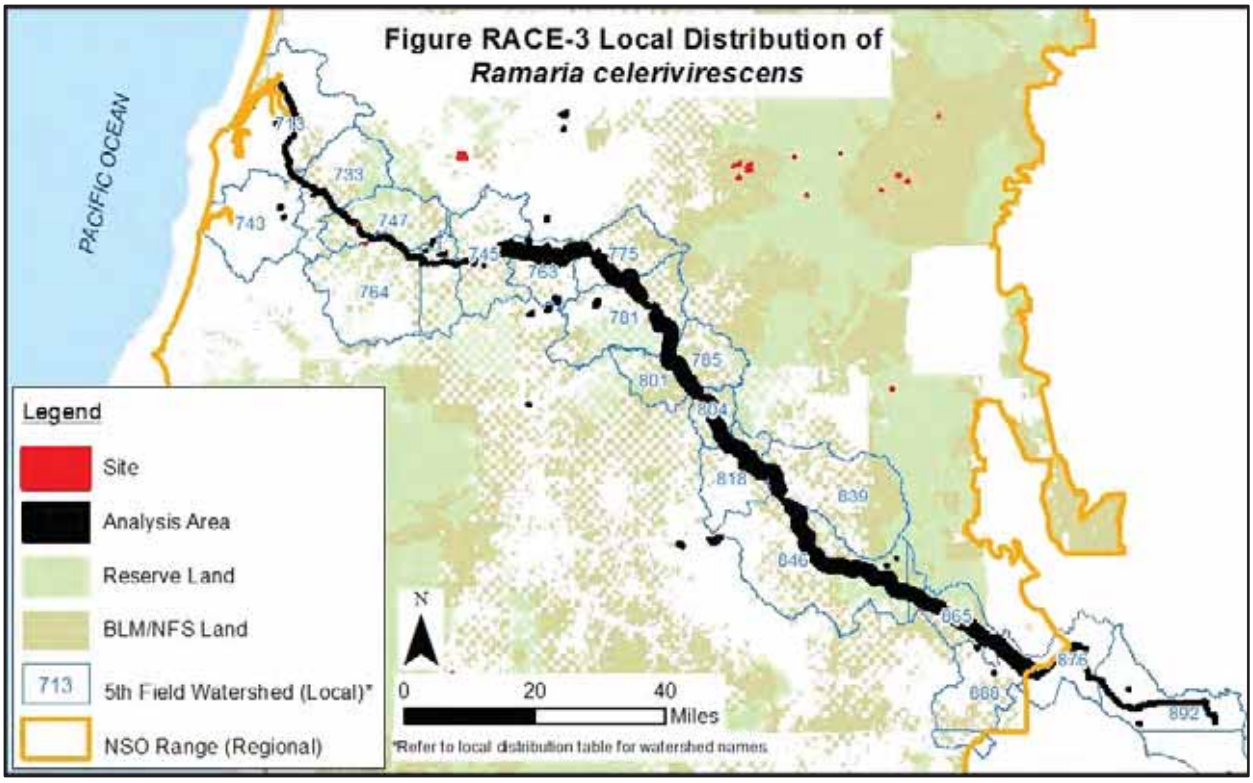
All of the four sites in the local area are on BLM lands (at least partially). Two of these sites are located on lands designated as Other (Matrix). Two sites are in Marbled Murrelet Areas, representing 50 percent of the sites in the local area. One site is partially on private land.

TABLE RACE-5

Distribution of *Ramaria celerivirescens* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	1	1
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	1	1
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	2	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 80,260 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number and distribution of sites in the region and the extent of forests that may provide suitable habitat.

Analysis/Project Area Distribution

The analysis and project areas contain one site of *R. celerivirescens*. This site is in a Marbled Murrelet Area in the East Fork Coquille River watershed, as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in no observations of *R. celerivirescens* in the survey area (Siskiyou BioSurvey LLC 2012a). The recorded observation of the species in the analysis area is from agency databases and was recorded in 2003. Within the project area, the site is near MP 32.4.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 139 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent of the sites (or one out of 142 total sites on all lands in the NSO range). Table RACE-6 presents an overview of the features of the PCGP Project that would affect the *R. celerivirescens* site. The construction corridor would affect approximately 0.8 acre within the site (about 30 percent of the site). Measures outlined in

Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *R. celerivirescens* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.8 acre of vegetation and soils within the site and could remove individuals of *R. celerivirescens*. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and host trees and disturbance to soil could negatively affect *R. celerivirescens* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE RACE-6

Impacts to *Ramaria celerivirescens* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.8 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *R. celerivirescens*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, three sites of *R. celerivirescens* would remain on BLM lands in the local area, with one in reserves, and 138 sites, including 44 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 44 sites in reserves are assumed to

have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 32 percent of the remaining *R. celerivirescens* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *R. celerivirescens* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *R. celerivirescens* has a somewhat wide distribution across seven physiographic provinces and three states in the region and a moderate-high number of overall sites (139 on BLM and NFS lands). The species appears to be well distributed in the western Cascade Range in Oregon, but is less abundant in other parts of the region. The currently known number of sites on BLM and NFS lands is an increase of 49 sites on BLM and NFS lands since 2007.
    - An estimated 32 percent of the sites (45 sites) are in reserves, which is an increase of about 16 sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented, and in the Klamath Mountains, where some sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and several sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *R. celerivirescens*.
- The PCGP Project would affect one of 139 BLM- and Forest Service-managed sites of *R. celerivirescens*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (138) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Washington, Oregon, and California. Some sites (three sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across two 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be about the same (32 percent). Of the remaining sites, 40 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and four are in Congressionally Reserved areas where management activities that may adversely affect *R. celerivirescens* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *R. celerivirescens*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO, particularly in the Coast Range and Cascade Range, that have not been discovered based on the increased number of sites documented during strategic and other surveys.

2.47.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *R. celerivirescens* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 138 sites would remain on BLM and NFS lands across the region, and three sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *R. celerivirescens* at one site, this site is part of a small cluster of sites in the Coast Range in Oregon where the species is somewhat abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *R. celerivirescens* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is somewhat widely distributed.

The PCGP Project would not be able to avoid the *R. celerivirescens* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *R. celerivirescens* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *R. celerivirescens* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.48 RAMARIA RUBRIEVANESCENS

Ramaria rubrievanescens is a coral mushroom species in the Gomphaceae family (formerly in Ramariaceae) and does not have a common name.

2.48.1 Regulatory Status and Ranking

The 2001 ROD identifies *R. rubrievanescens* as a Category B (rare) species. The ORBIC evaluated *R. rubrievanescens* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.48.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *R. rubrievanescens*. It is presumed to be ectomycorrhizal, forming symbiotic associations with conifer trees for translocation of minerals, water, and nutrients (Castellano and O'Dell 1997). *R. rubrievanescens* fruits in humus or soil and matures above the ground; fruiting has been documented most often in fall, but also between June and October in the NSO range (Castellano et al. 1999, Exeter et al. 2006). Spore dispersal is assumed to be via wind and possibly animals (arthropods) (Castellano and O'Dell 1997).

Range

R. rubrievanescens is found in the Pacific Northwest and eastern North America (ORBIC 2004). Within the Pacific Northwest, it is mostly found in Oregon, with fewer recorded observations in Washington and California. An observation of the species was also reported in southeastern

Australia in 2001, but the identification has not been confirmed (Atlas of Living Australia 2012). It has also been documented in Idaho (Trappe, pers. comm. 2013). Based on data available in 2001, the species had a scattered distribution across Oregon and a spotty distribution in California and was infrequent in Washington (Hibler et al. 2001e). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across western and eastern North America and possibly on other continents. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *R. rubrievanescens* from an estimated 54 element occurrences in the Pacific Northwest in 2004. An estimated 37 of these occurrences were in Oregon, with fewer in California (13) and Washington (4) (ORBIC 2004). The species was found in three locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 50 new sites of *R. rubrievanescens* in the NSO range between 1998–2006, and 65 total sites were documented by 2006, including 31 in reserves or protected areas. In the 2007 Final SEIS, the Forest Service and BLM reported 51 sites on federal lands and 59 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *R. rubrievanescens*, and resulted in four new observations of individuals or populations of *R. rubrievanescens*. Based on the increased number of sites since 1998 with increased surveys (4-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

R. rubrievanescens has been found primarily in LSOG coniferous forests in association with trees in the family Pinaceae (Castellano et al. 1999, ORBIC 2004). It has also been found in urban parks and younger forests neighboring LSOG stands (Hibler et al. 2001e, Trappe, pers. comm. 2013). Coarse woody debris appears to be an important component of the species' habitat (Hibler et al. 2001e). Based on data available in 2007, it was found between about 700–7,200 feet msl (Cushman and Huff 2007). *R. rubrievanescens* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *R. rubrievanescens* are those that affect its host tree and disturb the soil, such as road and trail construction, logging, and campground establishment (Castellano and O'Dell 1997). Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *R. rubrievanescens* with other *Ramaria* spp. (Group 7 of Castellano and O'Dell 1997). The primary guidance is to maintain current habitat and microclimate conditions by retaining forest structure and soil conditions. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. Known sites on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *R. rubrievanescens*:

- As a mycorrhizal species, *R. rubrievanescens* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.48.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *R. rubrievanescens* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table RARU5-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 146 observations from BLM and Forest Service geodatabases were converted into 101 sites in the NSO range (region). Table RARU5-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table RARU5-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure RARU5-1 displays the regional distribution of the species across BLM and NFS lands, and Figure RARU5-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE RARU5-1

Number of *Ramaria rubrievanescens* Sites (2013)

Location*	Number of Sites
Regional Area	101
Local Area	8
Analysis Area (Project Area)	3 (3)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE RARU5-2

Distribution of *Ramaria rubrievanescens* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	21	5	-
Forest Service	72	3	3
NPS	4	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	10	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE RARU5-3

Distribution of *Ramaria rubrievanescens* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	4	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	6	-	-
Congressionally Reserved (CR)	**14**	**-**	**-**
Late Successional Reserve (LSR)	**31**	**2**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	40	6	2
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

R. rubrievanescens is widely distributed across nine physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Coast Range, Cascades West and East, and Klamath Mountains), and California (Klamath, Cascades, and Coast) (see Figure RARU5-1). Most sites are scattered along the Cascade Range and Klamath Mountains, with a few clusters of sites in the Cascade Range. Scattered sites are located in the Coast Range, although *R. rubrievanescens* is less abundant outside the Cascade Range and Klamath Mountains based on current site locations. *R. rubrievanescens* appears to be well distributed in the Cascade Range in Oregon based on the relative abundance of sites in the mountain range, proximity of sites to one another, and the distribution of sites across forests that may provide suitable habitat.



Figure RARU5-1. Regional Distribution of *Ramaria rubrievanescens*

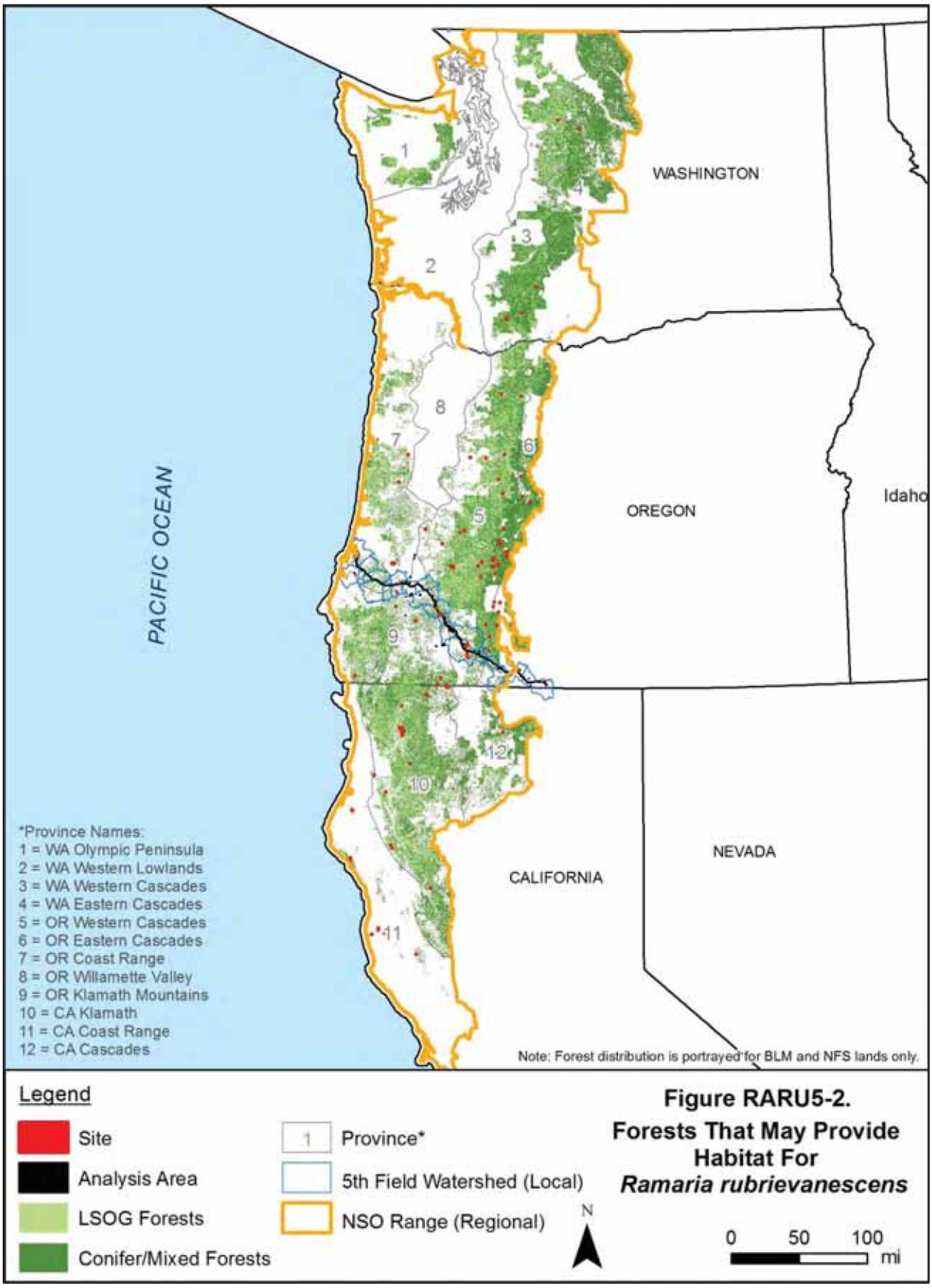


Figure RARU5-2.
Forests That May Provide Habitat For *Ramaria rubrievanescens*

Ten of 101 sites are located on private, state, or other lands (at least partially); four sites are on NPS lands (Crater Lake National Park); and 92 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Coos Bay District, eight sites in the Medford District (one site is in the Medford District and on the Siskiyou National Forest), and four sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include four sites on the Winema National Forest, five sites on the Rogue River National Forest, and 23 sites on the Umpqua National Forest. The other 47 sites on BLM and NFS lands are in the Arcata, Eugene, and Salem Districts and on the Deschutes, Gifford Pinchot, Klamath, Mendocino, Mt. Baker-Snoqualmie, Mt. Hood, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 44 sites are located on reserve lands managed by BLM and the Forest Service, including 31 in LSRs (at least partially), two in Known Owl Activity Centers, and 14 in Congressionally Reserved areas (at least partially). This represents 48 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The four NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

R. rubrievanescens is more common in LSOG forests based on available data (78 of 101 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and has been found in urban parks and younger forests near LSOG stands. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *R. rubrievanescens* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table RARU5-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure RARU5-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE RARU5-4

Extent of Forests that Could Provide Habitat for *Ramaria rubrievanescens* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	290	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *R. rubrievanescens* is distributed across five 5th field watersheds that overlap the project area (see Table RARU5-5 and Figure RARU5-3). The sites appear somewhat

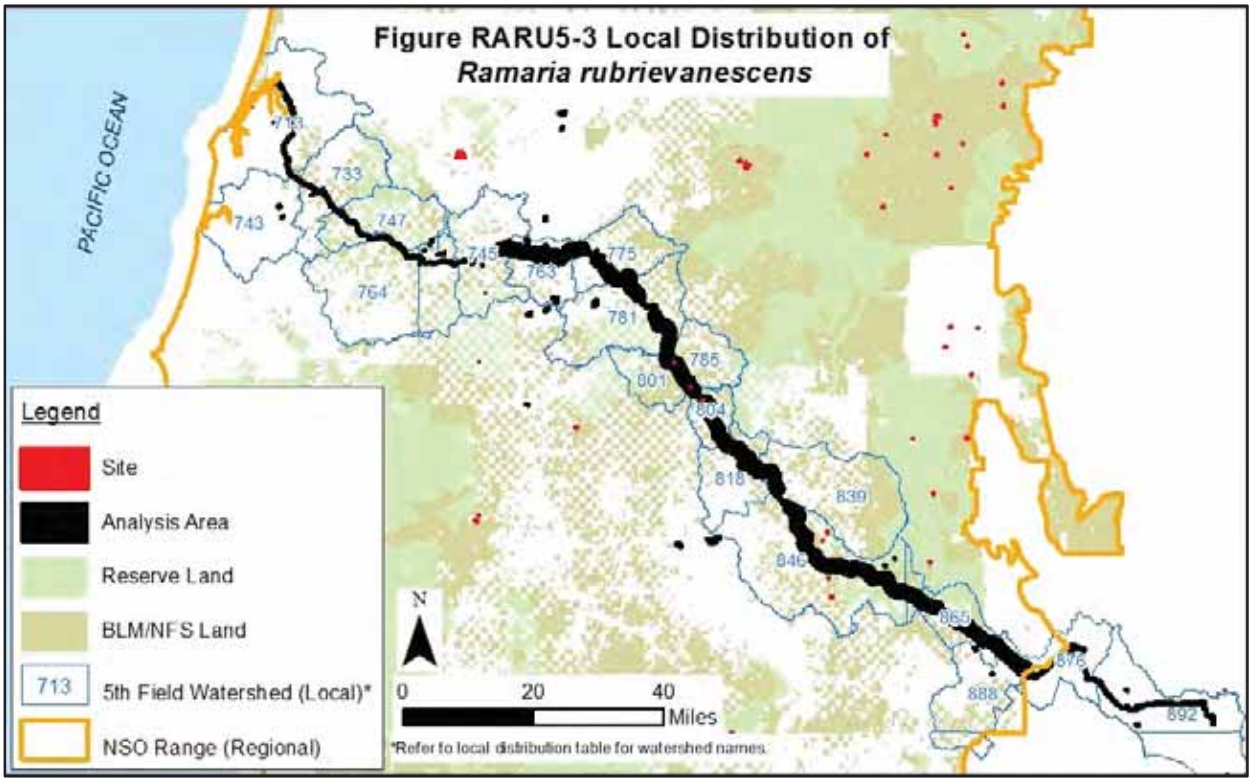
scattered across the watersheds, with sites in three general groups (Little Butte Creek, Trail Creek/Upper Cow Creek/Elk Creek-South Umpqua, and Olalla Creek-Lookingglass Creek). Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within about 30 miles in the surrounding Coast Range, Cascade Range, and Klamath Mountains.

TABLE RARU5-5

Distribution of *Ramaria rubrievanescens* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	1*	1
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	4	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	1	-
Upper Cow Creek (801)	2*	1

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
*Note: Site counts are not additive because one site occurs in both watersheds and the counts overlap.



All of the eight sites in the local area are on BLM and NFS lands. These sites are located on lands designated as Other (Matrix) and LSR. Of the eight sites in the local area, two sites are on reserve lands, representing 25 percent of the sites. The sites are in LSRs in the Elk Creek-South Umpqua, Olalla Creek-Lookingglass Creek, and Upper Cow Creek watersheds.

Coniferous and mixed hardwood-coniferous forests encompass approximately 1.3 million acres on BLM and NFS lands in the local area, including 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures RARU5-2 and RARU5-3).

Analysis/Project Area Distribution

The analysis and project areas contain three sites of *R. rubrievanescens*, all of which are on NFS lands (Umpqua National Forest). The analysis area sites are distributed across three 5th field watersheds in the Klamath Mountains in the central portion of the analysis area. The sites are located near each other, and many sites are located within the vicinity of the analysis area (see Local Distribution discussion above), although they are scattered across the mountain ranges in Oregon.

The sites are located on lands designated as Other (Matrix) and LSR. Of the three sites in the analysis area, one site is on reserve land.

Surveys for the PCGP Project resulted in five total observations of the species in four locations in or near the project area (Siskiyou BioSurvey LLC 2012a). An estimated three of these recorded observations comprise the three sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, the sites are between MPs 104.5 and 113.

Project Impacts

Analysis

The PCGP Project would affect three sites out of the 92 sites on BLM- and Forest Service-managed lands in the region, representing approximately 3 percent of the sites (or three out of 101 total sites on all lands in the NSO range). Table RARU5-6 presents an overview of the features of the PCGP Project that would affect the *R. rubrievanescens* sites. The construction corridor and associated work and storage areas would affect approximately 2.7 acres within the sites (about 39 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *R. rubrievanescens* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 2.2 acres of vegetation and soil within three sites and could result in the removal of *R. rubrievanescens* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.3 acre within two sites. The establishment of the corridor could modify

microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *R. rubrievanescens* in adjacent areas by removing its habitat, disturbing soil or woody debris around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.2 acre of understory habitat in one site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE RARU5-6

Impacts to *Ramaria rubrievanescens* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	3	2.2 ac
Temporary Extra Work Area (TEWA)	2	0.3 ac
Uncleared Storage Area (UCSA)	1	0.2 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *R. rubrievanescens*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the three sites as a result of the PCGP Project, five sites of *R. rubrievanescens* would remain on NFS lands in the local area, including one in a reserve, and 89 sites, including 43 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 43 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 48 percent of the remaining *R. rubrievanescens* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *R. rubrievanescens* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *R. rubrievanescens* has a wide, but scattered, distribution across nine physiographic provinces and three states in the region and a moderate-high number of overall sites (92 on BLM and NFS lands). The species appears to be well distributed in the Cascade Range in Oregon, but is scattered across other mountain ranges within its range in the NSO range. The currently known number of sites on BLM and NFS lands is an increase of 41 sites on BLM and NFS lands since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 48 percent of the sites (44 sites) are in reserves, which is an increase of about 13 sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *R. rubrievanescens*.
- The PCGP Project would affect three of 92 BLM- and Forest Service-managed sites of *R. rubrievanescens*, representing approximately 3 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the three sites, a moderate-high number of sites (89) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (five sites) would remain in the local vicinity of the analysis area; these sites would be distributed across three 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in an LSR, but the percentage of sites in reserves would not change. Of the remaining sites, 32 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 14 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *R. rubrievanescens* are unlikely.

- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of the forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *R. rubrievanescens*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.48.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *R. rubrievanescens* at three sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 89 sites would remain on BLM and NFS lands across the region, and five sites would remain on NFS lands in the local area. Although the PCGP Project would affect site persistence of *R. rubrievanescens* at three sites, many sites are scattered across the Cascade and Coast Ranges and Klamath Mountains in Oregon. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *R. rubrievanescens* would persist in the region without considering the three sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of all forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *R. rubrievanescens* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the three *R. rubrievanescens* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *R. rubrievanescens* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency

responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.49 RAMARIA RUBRIPERMANENS

Ramaria rubripermanens is a coral mushroom species in the Gomphaceae family and does not have a common name.

2.49.1 Regulatory Status and Ranking

The 2001 ROD identifies *R. rubripermanens* as a Category B (rare) species in Oregon. The ORBIC evaluated *R. rubripermanens* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.49.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *R. rubripermanens*. It is presumed to be ectomycorrhizal, forming symbiotic associations with conifer trees for translocation of minerals, water, and nutrients (Castellano and O'Dell 1997). *R. rubripermanens* fruits in humus or soil and matures above the ground; fruiting has been documented primarily in spring, but also in fall and between May and October in the NSO range (Castellano et al. 1999, Exeter et al. 2006, Trappe, pers. comm. 2013). Spore dispersal is assumed to be via wind and possibly animals (arthropods) (Castellano and O'Dell 1997).

Range

R. rubripermanens is endemic to the Pacific Northwest, where it has been found in Washington, Oregon, California, Idaho, and Alberta, Canada (ORBIC 2004, Trappe, pers. comm. 2013). It is mostly found in Oregon, with fewer recorded observations in Washington and California (ORBIC 2004). Based on data available in 2001, this species was considered well-represented in southern Oregon and appeared to be locally abundant in the central portion of its range in the Pacific Northwest (Hibler et al. 2001e). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other

environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *R. rubripermanens* from an estimated 146 element occurrences in the Pacific Northwest in 2004. An estimated 133 of these occurrences were in Oregon, with fewer in California (9) and Washington (3) (ORBIC 2004). Many of the occurrences were in protected areas in 2004. Based on data available in 2004, population trends of this species were unknown, but it was apparently secure in Oregon (ORBIC 2004). The species was found in 10 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 157 new sites of *R. rubripermanens* in the NSO range between 1998–2006, and 171 total sites were documented by 2006, including 41 in reserves or protected areas. In the 2007 Final SEIS, the Forest Service and BLM reported 146 sites on federal lands and 160 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). *R. rubripermanens* was a Category D species at the time and was not specifically targeted during surveys, although incidental sightings of Category D species were recorded and resulted in two new observations of a population of *R. rubripermanens*. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (12-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

R. rubripermanens has been found primarily in LSOG coniferous forests in association with trees in the family Pinaceae (Castellano et al. 1999, ORBIC 2004). It has also been found in younger forests neighboring LSOG stands and in mixed hardwood-coniferous forests (Hibler et al. 2001e, Trappe, pers. comm. 2013). Coarse woody debris appears to be an important component of the species' habitat (Hibler et al. 2001e). Based on data available in 2007, it was found between about 900–6,500 feet msl (Cushman and Huff 2007). Observations have also been recorded down to about 200 feet msl (Trappe, pers. comm. 2013). *R. rubripermanens* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *R. rubripermanens* are those that affect its host tree and disturb the soil, such as road and trail construction, logging, and campground establishment (Castellano and O'Dell 1997). Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management

recommendations were developed for *R. rubripermanens* with other *Ramaria* spp. (Group 7 of Castellano and O'Dell 1997). The primary guidance is to maintain current habitat and microclimate conditions by retaining forest structure and soil conditions. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. Known sites on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *R. rubripermanens*:

- As a mycorrhizal species, *R. rubripermanens* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.49.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *R. rubripermanens* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table RARU6-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 407 observations from BLM and Forest Service geodatabases were converted into 210 sites in the NSO range (region). Table RARU6-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table RARU6-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure RARU6-1 displays the regional distribution of the species across BLM and NFS lands, and Figure RARU6-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE RARU6-1

Number of *Ramaria rubripermanens* Sites (2013)

Location*	Number of Sites
Regional Area	210
Local Area	62
Analysis Area (Project Area)	7 (6)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE RARU6-2

Distribution of *Ramaria rubripermanens* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	100	41	1
Forest Service	95	16	6
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	29	14	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE RARU6-3

Distribution of *Ramaria rubripermanens* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	11	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	6	-	-
Congressionally Reserved (CR)	**13**	**-**	**-**
Late Successional Reserve (LSR)	**24**	**8**	**1**
Marbled Murrelet Area (LSR3)	**1**	**1**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**6**	**2**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	136	46	6
Riparian Reserve**	**2**	**2**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

R. rubripermanens is widely distributed across nine physiographic provinces in Washington (Western and Eastern Cascades and Olympic Peninsula), Oregon (Coast Range, Cascades West and East, and Klamath Mountains), and California (Klamath and Coast) (see Figure RARU6-1). Most sites are scattered along the Cascade Range and Klamath Mountains in Oregon, where many sites tend to be relatively close to one another in groups. Scattered sites are located in the Coast Range and Klamath Mountains in California and Cascade Range and Olympic Peninsula in Washington, although *R. rubripermanens* is less abundant outside Oregon based on current site locations. *R. rubripermanens* appears to be well distributed in the Cascade Range and Klamath Mountains in Oregon based on the abundance of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Twenty-nine of 210 sites are located on private, state, or other lands (at least partially); three sites are on NPS lands (Crater Lake National Park); and 194 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include two sites in the Coos Bay District, 82 sites in the Medford District, and 13 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include three sites on the Winema National Forest, nine sites on the Rogue River National Forest, and 32 sites on the Umpqua National Forest. The other 56 sites on BLM and NFS lands are on the Arcata and Salem Districts and in the Deschutes, Gifford Pinchot, Klamath, Mendocino, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Siskiyou, Six Rivers, Wenatchee, and Willamette National Forests.



Figure RARU6-1. Regional Distribution of *Ramaria rubripermanens*

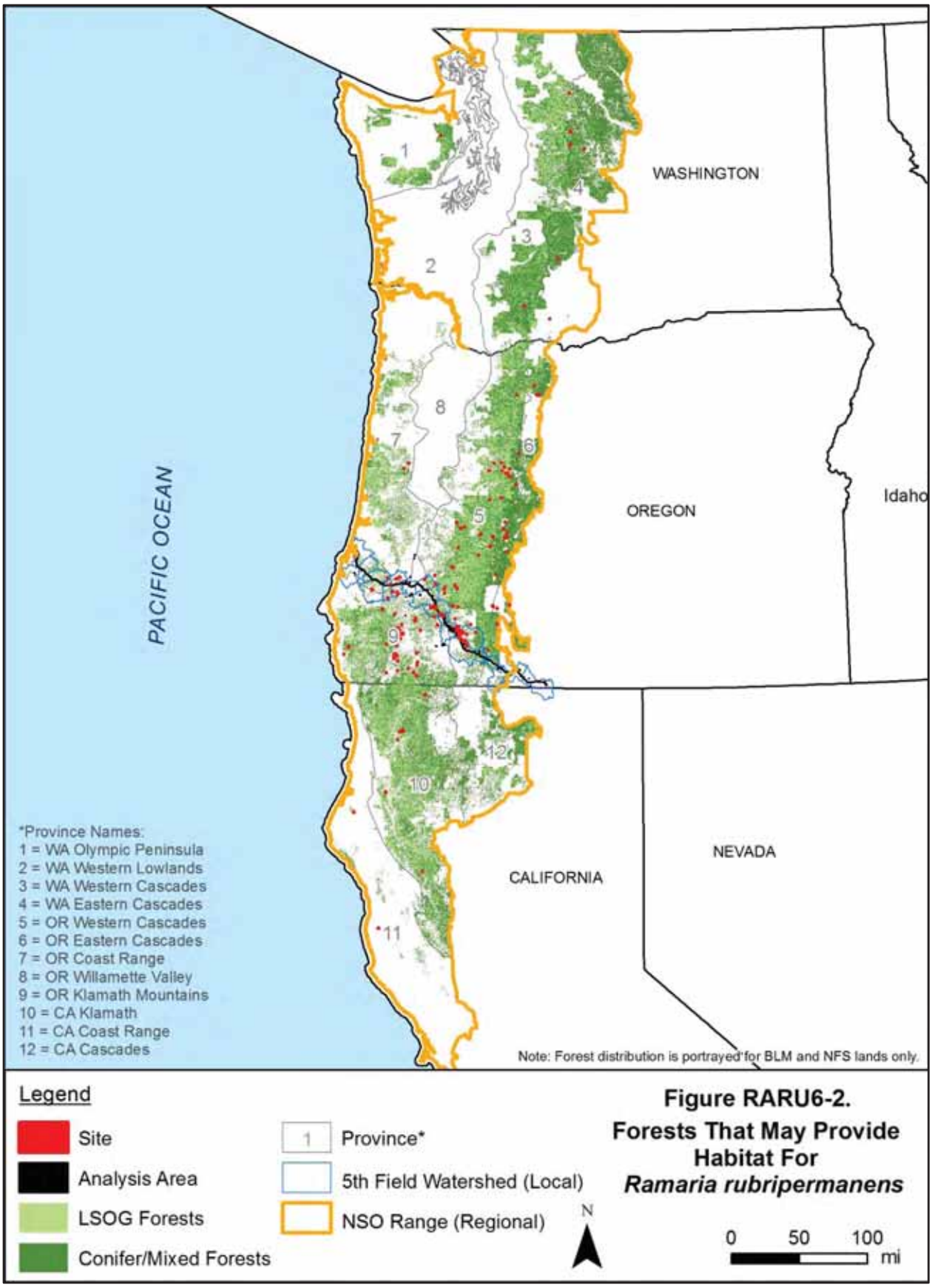


Figure RARU6-2.
Forests That May Provide Habitat For *Ramaria rubripermanens*

Across the NSO range, 46 sites are located on reserve lands managed by BLM and the Forest Service, including 24 in LSRs, one in a Marbled Murrelet Area, six in Known Owl Activity Centers, 13 in Congressionally Reserved areas, and two in Riparian Reserves. This represents 24 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

R. rubripermanens is more common in LSOG forests based on available data (162 of 210 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and has been found in urban parks and younger forests near LSOG stands. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *R. rubripermanens* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table RARU6-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure RARU6-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE RARU6-4

Extent of Forests that Could Provide Habitat for *Ramaria rubripermanens* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	290	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *R. rubripermanens* is distributed across 10 5th field watersheds that overlap the project area (see Table RARU6-5 and Figure RARU6-3). Most of the sites appear clustered and near one another in the Cascade Range and eastern Klamath Mountains, whereas sites in the Coast Range and other portions of the Klamath Mountains appear more scattered. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within about 30 miles in the surrounding Cascade Range and Klamath Mountains.

Fourteen of the 62 sites in the local area are on private lands (at least partially), and 56 sites are on BLM and NFS lands (at least partially). The BLM- and Forest Service-managed sites are located on lands designated as Other (Matrix), LSR, and Riparian Reserve. Of the 56 sites in the local area on BLM and NFS lands, 13 sites are on reserve lands, representing 23 percent of the

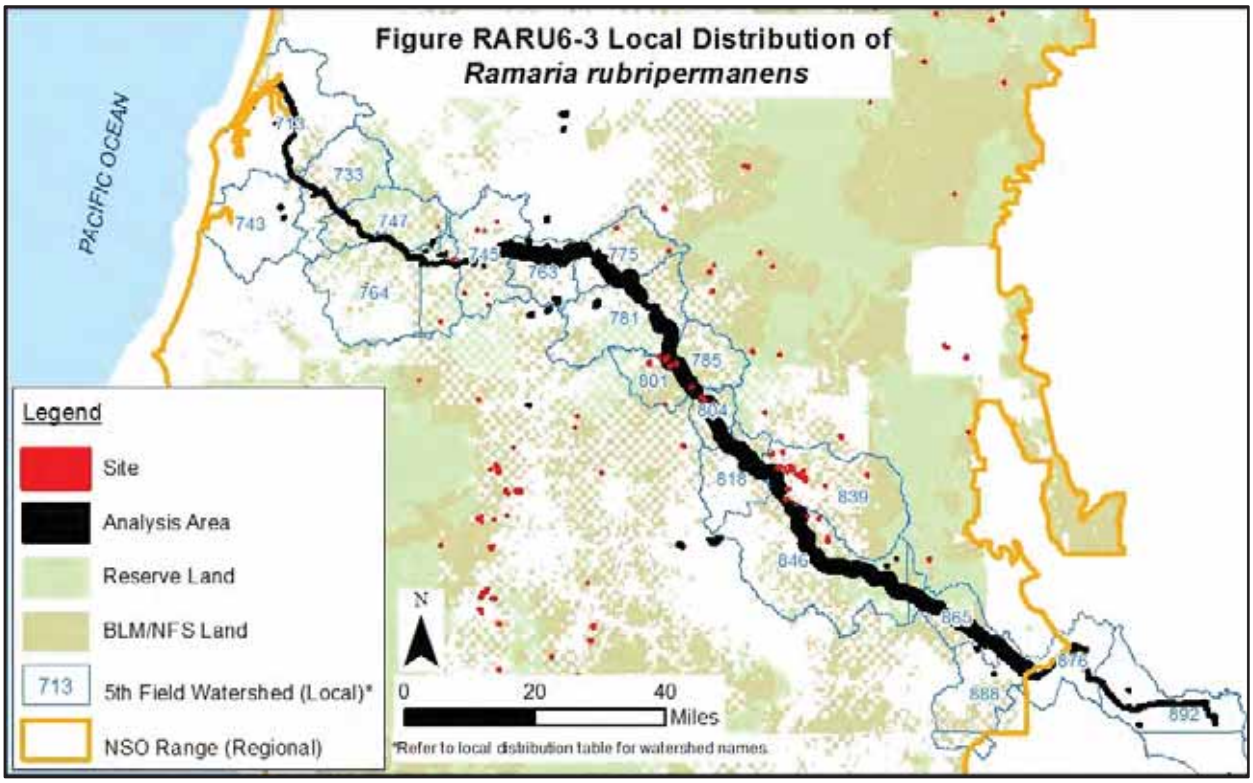
sites. The distribution of these reserve sites across the watersheds is depicted in Table RARU6-5 and on Figure RARU6-3. The sites in LSRs are distributed across six watersheds.

TABLE RARU6-5

Distribution of *Ramaria rubripermanens* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	28	2
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	1	-
Elk Creek-South Umpqua (785)	2*	1
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	5	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	3	3
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	2	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	6	5
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1*	-
Spencer Creek (865)	-	-
Trail Creek (804)	4	-
Upper Cow Creek (801)	11	1

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
* Note: Site counts are not additive because one site occurs in both watersheds and the counts overlap.



Coniferous and mixed hardwood-coniferous forests encompass approximately 1.3 million acres on BLM and NFS lands in the local area, including 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the

local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures RARU6-2 and RARU6-3).

Analysis/Project Area Distribution

The analysis area contains seven sites of *R. rubripermanens*, and the project area contains six sites. Six of the analysis area sites (all of the sites in the project area) are on NFS lands (Umpqua National Forest), and one site is on BLM land (Medford District). The analysis area sites are distributed across four 5th field watersheds in the Klamath Mountains in the central portion of the analysis area. The sites are located near each other, and many sites are located within the vicinity of the analysis area (see Local Distribution discussion above).

The sites are located on lands designated as Other (Matrix) and LSR. Of the seven sites in the analysis area, one site is on reserve land.

Surveys for the PCGP Project resulted in two total observations of the species in or near the project area (Siskiyou BioSurvey LLC 2012a). Both of these recorded observations in combination with agency records comprise the six sites in the analysis area. Within the project area, the sites are between MPs 102.5 and 113.

Project Impacts

Analysis

The PCGP Project would affect seven sites out of the 194 sites on BLM- and Forest Service-managed lands in the region, representing approximately 4 percent of the sites (or seven out of 210 total sites on all lands in the NSO range). Table RARU6-6 presents an overview of the features of the PCGP Project that would affect the *R. rubripermanens* sites. The construction corridor and associated work and storage areas would affect approximately 6.1 acres within six of the sites (about 27 percent of all sites in the analysis area). The seventh site may be subject to indirect effects associated with road improvements. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *R. rubripermanens* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 5.0 acres of vegetation and soil within six sites and could result in the removal of *R. rubripermanens* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.2 acre within two sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *R. rubripermanens* in adjacent areas by removing its habitat, disturbing soil or woody debris around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat

conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.9 acre of understory habitat in three sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE RARU6-6

Impacts to *Ramaria rubripermanens* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	6	5.0 ac
Temporary Extra Work Area (TEWA)	2	0.2 ac
Uncleared Storage Area (UCSA)	3	0.9 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *R. rubripermanens*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the seven sites as a result of the PCGP Project, 39 sites of *R. rubripermanens* would remain on BLM and NFS lands in the local area, including 11 in reserves, and 187 sites, including 45 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 45 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 24 percent of the remaining *R. rubripermanens* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *R. rubripermanens* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *R. rubripermanens* has a widespread distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (194 on BLM and NFS lands). The species appears to be well distributed in the Cascade Range and Klamath Mountains in Oregon, but is less abundant outside these mountain ranges. The currently known number of sites on BLM and NFS lands is an increase of 48 sites on BLM and NFS lands since 2007, with most sites documented during the PCGP Project surveys.
    - An estimated 24 percent of the sites (46 sites) are in reserves, which is an increase of about five sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *R. rubripermanens*.
- The PCGP Project would affect seven of 194 BLM- and Forest Service-managed sites of *R. rubripermanens*, representing approximately 4 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the seven sites, a moderate-high number of sites (187) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (39 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across seven 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in an LSR, but the percentage of sites in reserves would not change. Of the remaining sites, 30 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 13 are in Congressionally Reserved areas where management activities that may adversely affect *R. rubrievanescens* are unlikely. Two other sites are at least partially in Riparian Reserves.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of the forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *R. rubripermanens*, although the potential for the habitat to be occupied varies based on the distribution of

sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.49.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *R. rubripermanens* at seven sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 187 sites would remain on BLM and NFS lands across the region, and 39 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *R. rubripermanens* at seven sites, these sites are part of the many sites in the Cascade Range and Klamath Mountains in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *R. rubripermanens* would persist in the region without considering the seven sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of all forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *R. rubripermanens* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the seven *R. rubripermanens* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *R. rubripermanens* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.50 RAMARIA STUNTZII

Ramaria stuntzii is a coral mushroom species in the Gomphaceae family (formerly in Ramariaceae) and does not have a common name.

2.50.1 Regulatory Status and Ranking

The 2001 ROD identifies *R. stuntzii* as a Category B (rare) species in Oregon. The ORBIC evaluated R. *stuntzii* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with a cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.50.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *R. stuntzii*. It is presumed to be ectomycorrhizal, forming symbiotic associations with conifer trees for translocation of minerals, water, and nutrients (Castellano and O'Dell 1997). *R. stuntzii* fruits in humus or soil and matures above the ground; fruiting has been documented primarily in fall between October and November in the NSO range (Castellano et al. 1999, Exeter et al. 2006). Spore dispersal is assumed to be via wind and possibly animals (arthropods) (Castellano and O'Dell 1997).

Range

R. stuntzii is endemic to the Pacific Northwest, where it has only been found in Washington, Oregon, and California (ORBIC 2004). It is mostly found in Oregon, with fewer recorded observations in Washington and California. Based on data available in 2001, the species had a spotty distribution in the western Cascade Range and Coast Range in Oregon (Hibler et al. 2001e). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *R. stuntzii* from an estimated 85 element occurrences in the Pacific Northwest in 2004. An estimated 70 of these occurrences were in Oregon, with fewer in California (6) and Washington (9) (ORBIC 2004). The ORBIC estimated that about 40 percent of the element occurrences were in protected areas in 2004. Based on data available in 2004, population trends of this species were considered stable, and it was apparently secure in Oregon (ORBIC 2004). The species was found in one location during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 90 new sites of *R. stuntzii* in the NSO range between 1998–2006, and 110 total sites were documented by 2006, including 38 in reserves or protected areas. In the 2007 Final SEIS, the Forest Service and BLM reported 96 sites on federal lands and 100 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *R. stuntzii*, and resulted in one new observation of a population of *R. stuntzii*. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (5-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

R. stuntzii has been found primarily in LSOG coniferous forests in association with trees in the family Pinaceae, particularly Douglas-fir, western hemlock, and Pacific silver fir (Castellano and O'Dell 1997, ORBIC 2004, Cushman and Huff 2007). It has also been found in younger forests neighboring LSOG stands (Hibler et al. 2001e). Coarse woody debris appears to be an important component of the species' habitat (Hibler et al. 2001e). Based on data available in 2007, it was found between about 150–5,500 feet msl (Cushman and Huff 2007). *R. stuntzii* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *R. stuntzii* are those that affect its host tree and disturb the soil, such as road and trail construction, logging, and campground establishment (Castellano and O'Dell 1997). Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *R. stuntzii* with other *Ramaria* spp. (Group 7 of Castellano and O'Dell 1997). The primary guidance is to maintain current habitat and microclimate conditions by retaining forest structure and soil conditions. In order to maintain habitat

conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. Known sites on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *R. stuntzii*:

- As a mycorrhizal species, *R. stuntzii* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.50.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *R. stuntzii* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table RAST-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 261 observations from BLM and Forest Service geodatabases were converted into 123 sites in the NSO range (region). Table RAST-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table RAST-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure RAST-1 displays the regional distribution of the species across BLM and NFS lands, and Figure RAST-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE RAST-1

Number of *Ramaria stuntzii* Sites (2013)

Location*	Number of Sites
Regional Area	123
Local Area	15
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE RAST-2

Distribution of *Ramaria stuntzii* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	65	15	1
Forest Service	54	-	-
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	9	2	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE RAST-3

Distribution of *Ramaria stuntzii* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	16	-	-
Adaptive Management Reserves (AMR)	5	-	-
Administratively Withdrawn (AW)	1	-	-
Congressionally Reserved (CR)	**3**	**-**	**-**
Late Successional Reserve (LSR)	**35**	**7**	**-**
Marbled Murrelet Area (LSR3)	**2**	**1**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	4	-	-
Other (Matrix, Riparian Reserve, Other)	56	8	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

R. stuntzii is somewhat widely distributed across seven physiographic provinces in Washington (Western Cascades and Olympic Peninsula), Oregon (Coast Range, Cascades West, and Klamath Mountains), and California (Coast and Klamath) (see Figure RAST-1). Most sites are found along the western Cascade Range and Coast Range in Oregon, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the Coast Range in California and in the Klamath Mountains in Oregon, with a single site in northwestern Washington. A large group of sites is found in the southern Coast Range in Oregon. *R. stuntzii* is less abundant outside the Cascade Range and Coast Range based on current site locations. *R. stuntzii* appears to be well distributed in the Coast Range and western Cascade Range in Oregon based on the relative abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Nine of 123 sites are located on private or state lands (at least partially), one site is on NPS land (Olympic National Park), and 119 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 18 sites in the Coos Bay District, two sites in the Medford District, and three sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include three sites on the Rogue River National Forest and 14 sites on the Umpqua National Forest. The other 79 sites on BLM and NFS lands are in the Arcata, Eugene, and Salem Districts and on the Gifford Pinchot, Mt. Hood, Siskiyou, Siuslaw, Six Rivers, and Willamette National Forests.



Figure RAST-1.
Regional Distribution of *Ramaria stuntzii*

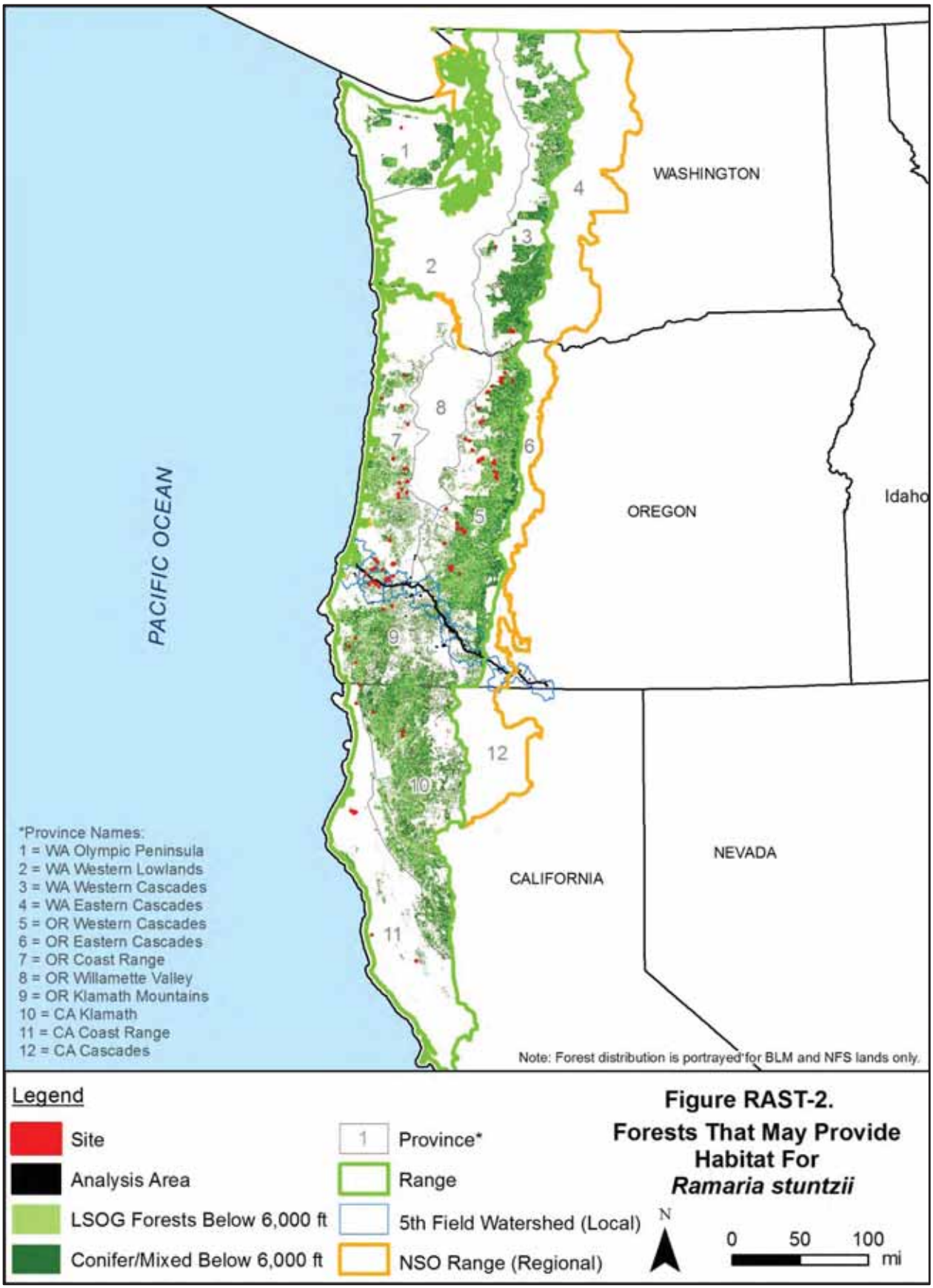


Figure RAST-2.
Forests That May Provide Habitat For *Ramaria stuntzii*

Across the NSO range, 42 sites are located on reserve lands managed by BLM and the Forest Service, including 35 in LSRs (at least partially), two in Marbled Murrelet Areas, two in Known Owl Activity Centers, and three in Congressionally Reserved areas (at least partially). This represents 35 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

R. stuntzii is primarily found in LSOG forests based on available data (116 of 123 total sites are in LSOG), but it has also been found in younger forests near LSOG stands. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 5,300 feet msl and has only been documented in the western part of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, in most of the NSO range, excluding the eastern Cascade Range in Oregon and Washington and Cascade Range in California, could provide habitat for *R. stuntzii* and support additional sites. These forests encompass an estimated 13.7 million acres on BLM and NFS lands, including an estimated 7.6 million acres in reserve land allocations (56 percent of the forests; Table RAST-4). Of this acreage, an estimated 5.3 million acres are LSOG (see Figure RAST-2), including 3.3 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are somewhat widespread across the western part of the NSO range, LSOG forests are less common.

TABLE RAST-4

Extent of Forests that Could Provide Habitat for *Ramaria stuntzii* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	13,707,530	7,624,230	5,329,960	3,322,720
Local Area	520,780	179,810	173,050	75,990
Project Area	1,250	490	270	150

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *R. stuntzii* is distributed across four 5th field watersheds that overlap the project area (see Table RAST-5 and Figure RAST-3). All of the sites are near one another in the western portion of the local area. A large cluster of sites and several scattered sites are located in the regional area within about 20 miles to the north and south in the Coast Range. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed forests, and opportunities for dispersal exist within the local area and to nearby regional areas.

All of the 15 sites in the local area are on BLM lands (at least partially). These sites are located on lands designated as Other (Matrix), LSR, and LSR3. Two sites are partially on private lands. Of the 15 sites in the local area on BLM lands, eight sites are on reserve lands, representing 53

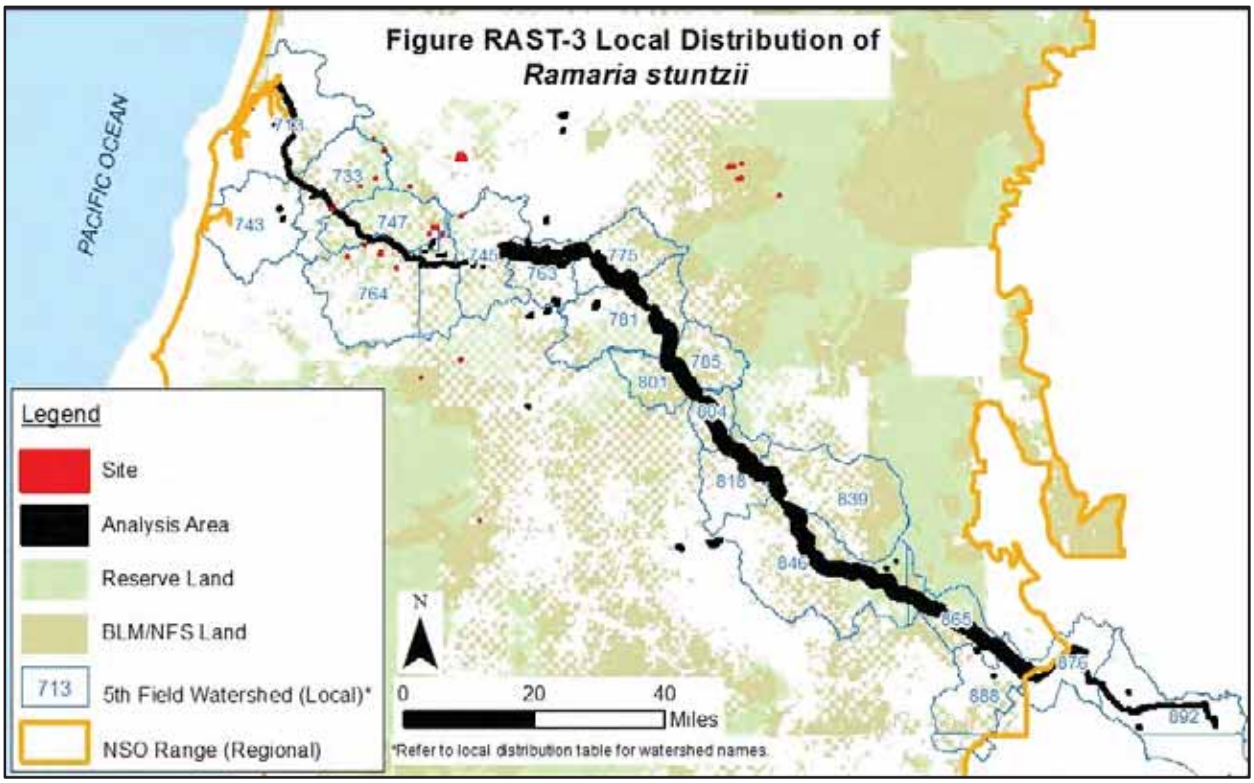
percent of the sites. The distribution of these reserve sites across the watersheds is depicted on Table RAST-5 and in Figure RAST-3. These sites are distributed across the four watersheds.

TABLE RAST-5

Distribution of *Ramaria stuntzii* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	5	1
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	5	3
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	4	3
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 520,780 acres on BLM and NFS lands in the local area, with 179,810 acres in reserve land allocations (35 percent of the forests). Of this acreage, an estimated 173,050 acres are LSOG, including 75,990 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number and

distribution of sites in the region and the extent of forests that may provide suitable habitat (see Figures RAST-2 and RAST-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *R. stuntzii*. This site is in the North Fork Coquille River watershed and is partially on BLM land and partially on private land. It is on land designated as Other (Matrix). Several other sites exist in the immediate vicinity of the analysis area (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 10 total observations of *R. stuntzii* in one location in the survey area during 2010 (Siskiyou BioSurvey LLC 2012a). These observations comprise the one site in the analysis area. Within the project area, the site is near MP 27.3.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 119 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent (or one out of 123 total sites on all lands in the NSO range). Table RAST-6 presents an overview of the features of the PCGP Project that would affect the *R. stuntzii* site. The construction corridor would affect approximately 0.2 acre within the site (about 2 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *R. stuntzii* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.2 acre of vegetation and soils within the site and could remove individuals of *R. stuntzii*. Disturbance in a TEWA would result in similar impacts on less than 0.01 acre within the site. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and host trees and disturbance to soil could negatively affect *R. stuntzii* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWA could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE RAST-6

Impacts to *Ramaria stuntzii* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.2 ac
Temporary Extra Work Area (TEWA)	1	<0.01 ac
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres

Across the project area, the PCGP Project would remove an estimated 980 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 200 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *R. stuntzii*. Within this impact area, about 650 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 200 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, 14 sites of *R. stuntzii* would remain on BLM lands in the local area, with eight in reserves, and 118 sites, including 42 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 42 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 36 percent of the remaining *R. stuntzii* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *R. stuntzii* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:

  - *R. stuntzii* has a somewhat wide distribution across seven physiographic provinces and three states in the region and a moderate-high number of overall sites (119 on BLM and NFS lands). The species is well distributed in the Coast Range and western Cascade Range in Oregon, but has a scattered distribution in other areas. The currently known number of sites on BLM and NFS lands is an increase of 23 sites since 2007, with most sites documented during the PCGP Project surveys.
  - An estimated 35 percent of the sites (42 sites) are in reserves, which is an increase of about four sites in reserves since 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the western part of the NSO range and encompass approximately 13.7 million acres on BLM and NFS lands with an estimated 56 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented, and in the Klamath Mountains, where some sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *R. stuntzii*.
- The PCGP Project would affect one of 119 BLM- and Forest Service-managed sites of *R. stuntzii*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (118) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across parts of Washington, Oregon, and California. Several sites (14 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across four 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be about the same (36 percent). Of the remaining sites, 39 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are in Congressionally Reserved areas where management activities that may adversely affect *R. stuntzii* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 200 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 7.6 million acres (56 percent) of coniferous and mixed forests and 3.3 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *R. stuntzii*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO, particularly in the Coast Range and Cascade Range, that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.50.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *R. stuntzii* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 118 sites would remain on BLM and NFS lands across the region, and 14 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *R. stuntzii* at one site, this site is part of a large group of sites in the Coast Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *R. stuntzii* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 980 acres of coniferous and mixed hardwood-coniferous forests and 200 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 7.6 million acres (56 percent) of coniferous and mixed forests and 3.3 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is somewhat widely distributed.

The PCGP Project would not be able to avoid the *R. stuntzii* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *R. stuntzii* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *R. stuntzii* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.51 RHIZOPOGON TRUNCATUS

Rhizopogon truncatus is a false truffle species in the Rhizopogonaceae family and does not have a common name.

2.51.1 Regulatory Status and Ranking

The 2001 ROD identifies *R. truncatus* as a Category D (uncommon) species. The ORBIC evaluated *R. truncatus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be not rare and apparently

secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is on the ORBIC List 4. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.51.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *R. truncatus*. It is ectomycorrhizal, forming symbiotic associations with conifer trees for translocation of minerals, water, and nutrients (ORBIC 2004). Fruiting bodies grow below ground (hypogeous), which is a distinguishing characteristic of truffles (Castellano et al. 2003). Fruiting has been documented from April through November. As with other sequestrate fungi, *R. truncatus* may be dependent on mycophagy for spore dispersal (Castellano and O'Dell 1997).

Range

R. truncatus is found in western and eastern North America, from the Sierra, Siskiyou, and Cascade mountains in California to the central Cascade Range in Oregon in the west and from North Carolina to Nova Scotia in the east (Castellano et al. 2003). In Oregon, it has been documented in Clackamas, Curry, Douglas, Jackson, Josephine, Klamath, and Lane counties. Based on data available in 2004, *R. truncatus* appeared to be relatively common in Oregon and California, as well as in eastern North America (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed in western and eastern North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *R. truncatus* from more than 300 element occurrences in North America in 2004. An estimated 50 of these occurrences were in Oregon, with fewer in California (8) and none in Washington (ORBIC 2004). The species was found in 15 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 22 new sites of *R. truncatus* in the NSO range between 1998–2006, and 53 total sites were documented by 2006, including 30 in reserves or protected areas. In the 2007 Final SEIS, the Forest Service and BLM reported 60 sites on federal lands and 87 total sites on all lands in the NSO range.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area, and persistence surveys were conducted for some species in nearby LSRs (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category D species were recorded during these surveys and resulted in six new observations of *R. truncatus*. Based on the increased number of sites since 1998 with increased surveys (70 percent increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

R. truncatus has primarily been found in coniferous forests in association with trees in the family Pinaceae and other conifers. It has been documented on true firs (*Abies* spp.), Pacific madrone (*Arbutus menziesii*), kinnikinnick or bearberry (*Arctostaphylos uva-ursi*), lodgepole pine, sugar pine (*Ponderosa lambertiana*), western white pine, ponderosa pine, red pine (*P. resinosa*), Douglas-fir, eastern hemlock (*Tsuga canadensis*), and mountain hemlock (Molina and Trappe 1994). It grows scattered or in groups (Castellano et al. 2003). In Oregon, *R. truncatus* is most commonly found in alpine habitats between 4,000–7,500 feet msl and is usually associated with mountain hemlock and subalpine fir (Trappe, pers. comm. 2013). *R. truncatus* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Similar to other *Rhizopogon* species, threats to *R. truncatus* are those that affect its host tree and disturb the soil, such as road and trail construction, logging, and campground establishment (Castellano and O'Dell 1997). Other specific threats to the species are not currently known.

Management Recommendations

As a Category D S&M species, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *R. truncatus*:

- As a mycorrhizal species, *R. truncatus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.51.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *R. truncatus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table RHTR-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 207 observations from BLM and Forest Service geodatabases were converted into 116 sites in the NSO range (region). Table RHTR-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table RHTR-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure RHTR-1 displays the regional distribution of the species across BLM and NFS lands, and Figure RHTR-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands within the currently known range of the species.

TABLE RHTR-1

Number of *Rhizopogon truncatus* Sites (2013)

Location*	Number of Sites
Regional Area	116
Local Area	17
Analysis Area (Project Area)	7 (7)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE RHTR-2

Distribution of *Rhizopogon truncatus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	47	10	1
Forest Service	60	8	6
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	22	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE RHTR-3

Distribution of *Rhizopogon truncatus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	8	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	8	-	-
Congressionally Reserved (CR)	**10**	**-**	**-**
Late Successional Reserve (LSR)	**18**	**2**	**1**
Marbled Murrelet Area (LSR3)	**1**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	63	15	6
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure RHTR-1.
Regional Distribution of *Rhizopogon truncatus*



Figure RHTR-2.
Forests That May Provide Habitat For *Rhizopogon truncatus*

Regional Distribution

R. truncatus has a somewhat wide distribution across six physiographic provinces in Oregon (Willamette Valley, Cascades East and West, and Klamath Mountain) and California (Cascades, Klamath). Most sites are found in the Klamath Mountains, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the Cascade Range and Willamette Valley with some clusters of sites in southern Oregon. *R. truncatus* is less abundant outside the Klamath Mountains based on current site locations, but is somewhat common in the Cascade Range. *R. truncatus* appears to be well distributed in the Klamath Mountains in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Twenty-two of 116 sites are located on private or state lands (at least partially); three sites are on NPS lands (Crater Lake National Park); and 106 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 41 sites in the Medford District (one site is also on the Umpqua National Forest) and five sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include one site on the Winema National Forest, 23 sites on the Rogue River National Forest and 14 sites on the Umpqua National Forest (one site is also in the Medford District). The remaining 23 sites on BLM and NFS lands are in the Salem District and on the Deschutes, Klamath, Lassen, Mt. Hood, Siskiyou, Six Rivers, and Willamette National Forests.

Across the NSO range, 30 sites are located on reserve lands managed by BLM and the Forest Service, including 18 in LSRs, one in a Marbled Murrelet Area, one in a Known Owl Activity Center, and 10 in Congressionally Reserved areas. This represents 28 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

R. truncatus is more commonly found in LSOG forests based on available data (92 of 106 total sites are in LSOG), but it is also somewhat common in non-LSOG forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation and has only been found in the eastern part of the NSO range in Oregon and California. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, within this range could provide habitat for *R. truncatus* and support additional sites. These forests encompass an estimated 11.6 million acres on BLM and NFS lands in the species' range, including an estimated 5.8 million acres in reserve land allocations (49 percent of the forests; Table RHTR-4). Of this acreage, an estimated 4.1 million acres are LSOG (see Figure RHTR-2), including 2.3 million acres in reserve land allocations (56 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the eastern part of the NSO range, LSOG forests are less common and are primarily found in the Cascade Ranges and Klamath Mountains.

TABLE RHTR-4

Extent of Forests that Could Provide Habitat for *Rhizopogon truncatus* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	11,644,590	5,754,570	4,073,820	2,286,680
Local Area	453,550	141,670	134,380	51,560
Project Area	1,170	430	260	140

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for Oregon and California only, which is the extent of the species' currently known range.

Local Distribution

Within the local area, *R. truncatus* is distributed across four 5th field watersheds that overlap the project area (see Table RHTR-5 and Figure RHTR-3). The sites are somewhat scattered across the four watersheds in the Klamath Mountains and Cascade Range; sites in the Trail Creek and Myrtle Creek watersheds are more clustered and near one another. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 20 miles to the northeast in the Cascade Range and within 30 miles to the southwest in the Klamath Mountains.

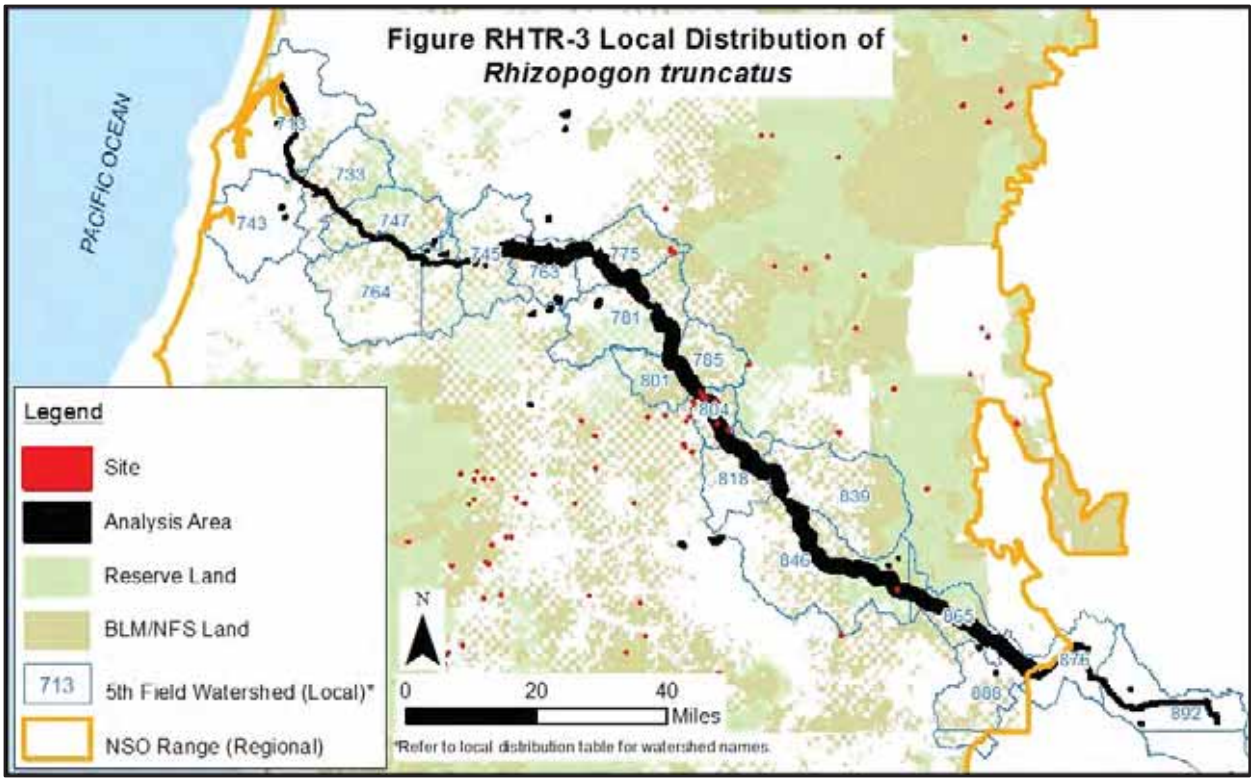
All of the sites (17 sites) in the local area are on BLM (Medford and Roseburg Districts) or NFS lands (Rogue River and Umpqua National Forests). Most of the local sites are on land designated as Other (Matrix); two sites are in LSRs, representing 12 percent of the sites. The sites in LSRs are in the Elk Creek-South Umpqua and Little Butte Creek watersheds.

TABLE RHTR-5

Distribution of *Rhizopogon truncatus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	1	1
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	2	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	3	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	11	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous forests encompass approximately 453,550 acres on BLM and NFS lands in the local area, including 141,670 acres in reserve land allocations (31 percent of the forests). Of this acreage, an estimated 134,380 acres are LSOG, including 51,560 acres in reserve land allocations (38 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number and distribution of sites in the regional and local areas and the extent of forests that may provide suitable habitat (see Figures RHTR-2 and RHTR-3).

Analysis/Project Area Distribution

The analysis and project areas contain seven sites of *R. truncatus*. These sites are on BLM- and Forest Service-managed lands in the Medford District and on the Rogue River and Umpqua National Forests. Six sites are on land designated as Other (Matrix), and one site is in an LSR. The analysis area sites are found in two 5th field watersheds (Little Butte Creek and Trail Creek). Most of the sites are clustered and near one another in the Little Butte Creek watershed, and one site is in the Trail Creek watershed. The sites are in the eastern half of the analysis area. Some other sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in six total observations of the species in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). These recorded observations comprise six of the sites in the analysis area. A recorded observation from agency databases from 2012 comprises the seventh site in the analysis area. Within the project area, five sites are between MPs 111.5 and 113.1, and one site is near MP 164.4. The seventh site is near a road to the east of MP 114.

Project Impacts

Analysis

The PCGP Project would affect seven sites out of the 106 sites on BLM- and Forest Service-managed lands in the region, representing approximately 7 percent of the sites (or seven out of 116 total sites on all lands in the NSO range). Table RHTR-6 presents an overview of the features of the PCGP Project that would affect the *R. truncatus* sites. The construction corridor and associated work and storage areas would affect approximately 7.4 acres within the sites (about 41 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *R. truncatus* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 4.6 acres of vegetation and soil within six sites and could result in the removal of *R. truncatus* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.6 acre within three sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *R. truncatus* in adjacent areas by removing its habitat, disturbing soil around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 1.5 acres of understory habitat in six sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Road improvements and establishment would disturb approximately 0.8 acre within one site and could remove habitat and extant populations or individuals of *R. truncatus*.

TABLE RHTR-6

Impacts to *Rhizopogon truncatus* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	6	4.6 ac
Temporary Extra Work Area (TEWA)	3	0.6 ac
Uncleared Storage Area (UCSA)	6	1.5 ac
Roads (TMP)	1	0.8 ac
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 920 acres of coniferous and mixed hardwood-coniferous forests, including 180 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *R. truncatus*. Within this impact area, about 600 acres (about 65 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat,

although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 190 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the species' range.

Discussion

Assuming site persistence cannot be maintained at the seven sites as a result of the PCGP Project, 10 sites of *R. truncatus* would remain on BLM and NFS lands in the local area, including one in a reserve, and 99 sites, including 29 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 29 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 29 percent of the remaining *R. truncatus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *R. truncatus* is a Category D (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *R. truncatus* has a somewhat widespread distribution across six physiographic provinces and two states in the region and a moderate-high number of overall sites (106 on BLM and NFS lands). The species appears to be well distributed in the Klamath Mountains in Oregon and is fairly abundant in the Cascade Range in Oregon. The currently known number of sites on BLM and NFS lands is an increase of 46 sites on BLM and NFS lands since 2007, with most sites documented during the PCGP Project surveys.
    - An estimated 28 percent of the sites (30 sites) are in reserves, which is about the same number of sites in reserves as in 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widely distributed across the species' range and encompass approximately 11.6 million acres on BLM and NFS lands with an estimated 49 percent in reserves. Most of the

forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. A subcomponent of these forests likely provides habitat for *R. truncatus*.

- The PCGP Project would affect seven of 106 BLM- and Forest Service-managed sites of *R. truncatus*, representing approximately 7 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the seven sites, a moderate-high number of sites (99) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Washington, Oregon, and California. Some sites (10 sites) would remain in the local vicinity of the analysis area; these sites would be distributed across four 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in an LSR, and the percentage of sites in reserves would be about the same (29 percent). Of the remaining sites, 19 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 10 are in Congressionally Reserved areas where management activities that may adversely affect *R. truncatus* are unlikely.
- The PCGP Project would remove result in a permanent loss of an estimated 190 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total acreage in the species' range). An estimated 5.8 million acres (49 percent) of the forests and 2.3 million acres (56 percent) of LSOG forests would remain in reserves in the species' range.
- The remaining forests could support additional populations of *R. truncatus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category D species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.51.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *R. truncatus* at seven sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 99 sites would remain on BLM and NFS lands across the region, and 10 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *R. truncatus* at seven sites, these sites are part of the many sites in the Klamath Mountains and western Cascade Range in Oregon where the species is fairly abundant and well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *R. truncatus* would persist in the region without considering the seven sites as part of the population.
- The PCGP Project would remove approximately 920 acres of coniferous and mixed hardwood-coniferous forests and 180 acres of LSOG forests (a negligible amount of the forests). An estimated 65 percent of the forests would be restored to similar conditions or

shrublands, but a permanent unforested corridor would remain across the project area. An estimated 5.8 million acres (49 percent) of the forests and 2.3 million acres (56 percent) of LSOG forests would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is somewhat widely distributed.

The PCGP Project would not be able to avoid impacts to all *R. truncatus* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the seven *R. truncatus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *R. truncatus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.52 SARCODON IMBRICATUS

Sarcodon imbricatus is a tooth fungus in the Bankeraceae family (formerly Hydnaceae) and is commonly known as scaly hedgehog.

2.52.1 Regulatory Status and Ranking

The 2001 ROD identifies *S. imbricatus* as a Category B (rare) species. The ORBIC did not evaluate *S. imbricatus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.52.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *S. imbricatus.* It is an ectomycorrhizal fungus, forming symbiotic associations with living trees and shrubs for

translocation of minerals, water, and nutrients (Holthausen et al. 1994). *S. imbricatus* tends to form associations with spruce trees (*Picea* spp.) or other conifers instead of hardwood trees (Arora 1986). It occurs as solitary to gregarious sporocarps and is most easily detected from the late spring through winter (Castellano et al. 2003). Other mycorrhizal fungi are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997), and the same may be true of *S. imbricatus.*

Range

S. imbricatus occurs in the Pacific Northwest, eastern North America, and Europe (Holthausen et al. 1994). In the Pacific Northwest, the mushroom has been found in northern California, Oregon, and Washington (Castellano et al. 2003). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across North America and Europe. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

In the Pacific Northwest, *S. imbricatus* is most often found in the Cascade Range in Oregon. The species was documented at 39 sites by 1994 and at 30 new sites between 1994–2000 (USDA and USDI 2000). *S. imbricatus* was considered to be abundant and widespread in 2001 (Hibler et al. 2001c). The species was found in one location during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 91 new sites of *S. imbricatus* in the NSO range between 1998–2006, and 137 total sites were documented by 2006, including 51 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 127 sites on federal lands and 154 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *S. imbricatus*, and resulted in six new observations of individuals or populations of *S. imbricatus*. Based on the increased number of sites since 1998 with increased surveys (3-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range, particularly in the Cascade Range in Oregon where most observations have been reported. It should also be noted that this species was removed from post-2001 S&M lists because it was considered to be common. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

S. imbricatus occurs as solitary or gregarious sporocarps on the ground in coniferous or mixed hardwood-coniferous forests (Castellano et al. 2003). It is most commonly found with spruce

trees and other conifers rather than hardwood species (Arora 1986). The majority of *S. imbricatus* specimens recorded in the Consortium of Pacific Northwest Herbaria note that the specimen was found with spruce trees. Other trees and shrubs found in the vicinity of *S. imbricatus* specimens include: Douglas-fir, alder, birch, fir, and huckleberry (University of Washington Herbarium 2013). In 2001, the species was considered to be highly associated with LSOG forests or with LSOG characteristics, such as large trees or large downed logs (Hibler et al. 2001c). Though *S. imbricatus* mainly occurs in LSOG forests, it can also re-establish in secondary growth if the stand is at least 100 years old (Holthausen et al. 1994). Based on available information, *S. imbricatus* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Typical threats to fungi species in coniferous and other forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). The loss of 100-year and older stands is a major threat to *S. imbricatus*, which is often found in mid- to late-successional forests (Holthausen et al. 1994).

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *S. imbricatus* because it was removed from the S&M list after 2001.

2.52.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *S. imbricatus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table SAIM-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 138 observations from BLM and Forest Service geodatabases were converted into 108 sites in the NSO range (region). Table SAIM-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table SAIM-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure SAIM-1 displays the regional distribution of the species across BLM and NFS lands, and Figure SAIM-2 displays the species' regional

distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE SAIM-1

Number of *Sarcodon imbricatus* Sites (2013)

Location*	Number of Sites
Regional Area	108
Local Area	12
Analysis Area (Project Area)	3 (3)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE SAIM-2

Distribution of *Sarcodon imbricatus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	11	5	-
Forest Service	76	7	3
NPS	4	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	18	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE SAIM-3

Distribution of *Sarcodon imbricatus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	2	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	10	-	-
Congressionally Reserved (CR)	**8**	**-**	**-**
Late Successional Reserve (LSR)	**14**	**1**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**4**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	52	10	3
Riparian Reserve	**1**	**1**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

S. imbricatus has a wide distribution across 11 physiographic provinces in Washington (Olympic Peninsula, Western Lowlands, and Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Coast, Cascades, and Klamath). Most sites are scattered across the Cascade Range, with a few clusters of sites in southern Oregon and in California. Other sites are scattered and somewhat isolated in other mountain ranges and outlying areas. *S. imbricatus* appears to be well distributed in the Cascade Range based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.



Figure SAIM-1. Regional Distribution of *Sarcodon imbricatus*

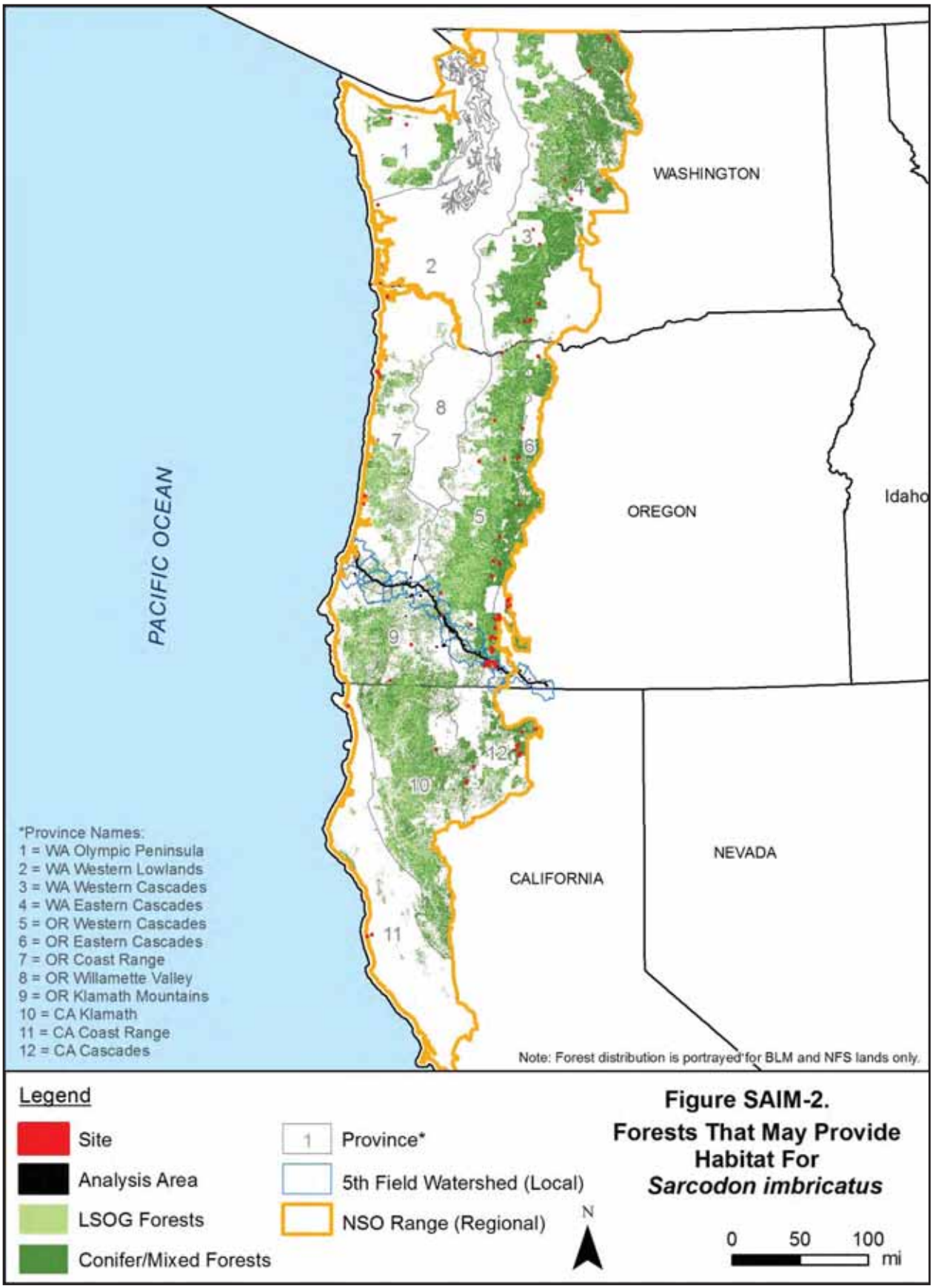


Figure SAIM-2.
Forests That May Provide Habitat For *Sarcodon imbricatus*

Eighteen of 108 sites are located on private, state, or other lands (at least partially), four sites are on NPS lands (Mt. Rainier and Olympic National Parks), and 87 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include nine sites in the Klamath Falls Resource Area of the Lakeview District, one site in the Medford District, and one site in the Roseburg District. Sites managed by the National Forests that encompass the project area include four sites on the Umpqua National Forest and 35 sites on the Winema National Forest. The remaining 58 sites on NFS lands are on the Deschutes, Gifford-Pinchot, Klamath, Modoc, Okanogan, Shasta-Trinity, Wenatchee, and Willamette National Forests.

Across the NSO range, 27 sites are located on reserve lands managed by BLM and the Forest Service, including 14 in LSRs, eight in Congressionally Reserved areas, four in Known Owl Activity Centers, and one in a Riparian Reserve. This represents 31 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The four NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

S. imbricatus is more commonly found in LSOG forests based on available data (60 of 108 total sites are in LSOG), but it is also found in younger forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *S. imbricatus* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table SAIM-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure SAIM-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE SAIM-4

Extent of Forests that Could Provide Habitat for *Sarcodon imbricatus* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	290	150

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *S. imbricatus* is found in two 5th field watersheds that overlap the project area (see Table SAIM-5 and Figure SAIM-3). Most of the sites are clustered and relatively close to one another in the eastern Cascade Range where a large group of sites is found (see Regional Distribution discussion above). A single isolated site is located in the Klamath Mountains.

Multiple avenues of connectivity appear to be available between sites in the Cascade Range based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites exist to the north in the Cascade Range.

All 12 of the local area sites are on BLM or NFS lands, including five sites on BLM lands (Lakeview District) and seven sites on NFS lands (Umpqua and Winema National Forests). Most of the local sites are on land designated as Other (Matrix), and three sites are in reserves, including one in an LSR, one in a Known Owl Activity Center, and one in a Riparian Reserve. The sites on reserve lands represent 25 percent of the local area sites. All of the sites in reserves are in the Spencer Creek watershed (Table SAIM-5).

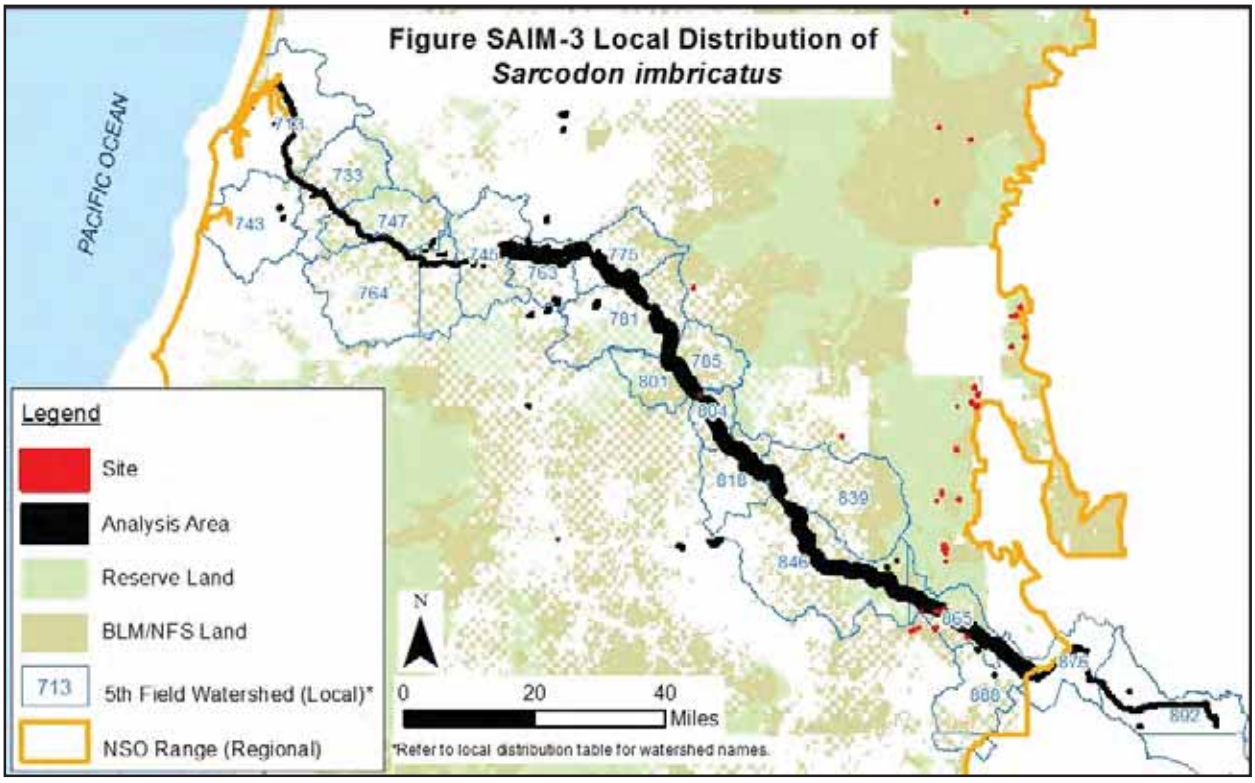
Coniferous and mixed hardwood-coniferous forests encompass approximately 1.3 million acres on BLM and NFS lands in the local area, including 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures SAIM-2 and SAIM-3).

TABLE SAIM-5

Distribution of *Sarcodon imbricatus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	11	3
Trail Creek (804)	1	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain three sites of *S. imbricatus*. The sites are on Forest Service-managed lands (Umpqua and Winema National Forests) designated as Other (Matrix). The two sites in the Spencer Creek watershed are a part of a group of sites in the eastern Cascade Range, and several sites are located within the immediate vicinity of the site (see Local Distribution discussion above). The single site in the Trail Creek watershed appears to be isolated.

Surveys for the PCGP Project resulted in seven total observations of the species in six locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a). Two of these observations comprise two of the sites in the analysis area; the other observations are in sites outside the analysis area. A recorded observation in agency databases from 1999 comprises the third site in the analysis area. Within the project area, the sites are located at MPs 111.8, 172.6, and 173.5.

Project Impacts

Analysis

The PCGP Project would affect three sites out of the 87 sites on BLM- and Forest Service-managed lands in the region, representing approximately 3 percent of the sites (or three out of 108 total sites on all lands in the NSO range). Table SAIM-6 presents an overview of the features of the PCGP Project that would affect the *S. imbricatus* sites. The construction corridor and associated work and storage areas would affect approximately 2.9 acres within the sites (about 35 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following

construction, which could minimize adverse impacts on *S. imbricatus* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 2.1 acres of vegetation and soil within three sites and could result in the removal of *S. imbricatus* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.3 acre within three sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *S. imbricatus* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.5 acre of understory habitat in two sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE SAIM-6

Impacts to *Sarcodon imbricatus* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	3	2.1 ac
Temporary Extra Work Area (TEWA)	3	0.3 ac
Uncleared Storage Area (UCSA)	2	0.5 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG coniferous and mixed hardwood-coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *S. imbricatus*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the three sites as a result of the PCGP Project, nine sites of *S. imbricatus* would remain on BLM and NFS lands in the local area, including three in reserves, and 84 sites, including 27 in reserves, would remain on BLM and NFS lands in

the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 27 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 32 percent of the remaining *S. imbricatus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *S. imbricatus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *S. imbricatus* has a wide distribution across 11 physiographic provinces and three states in the region and a moderate-high number of overall sites (87 on BLM and NFS lands). The species appears to be well distributed in the Cascade Range. The currently known number of sites on BLM and NFS lands is actually a decrease of sites documented since 2007, but is still moderate-high. Also, several sites were documented during PCGP Project surveys.
    - An estimated 25 percent of the sites (27 sites) are in reserves, which is about the same proportion of sites in reserves as documented in 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented. The Klamath Mountains and other areas also contain coniferous and mixed hardwood-coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *S. imbricatus*.
- The PCGP Project would affect three of 87 BLM- and Forest Service-managed sites of *S. imbricatus*, representing approximately 3 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the three sites, a moderate-high number of sites (84) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California.

Several sites (nine sites) would remain in the local vicinity of the analysis area; these sites would be distributed across one 5th field watershed. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be about the same (32 percent). Of the remaining sites, 18 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and eight are at least partially in Congressionally Reserved areas where management activities that may adversely affect *S. imbricatus* are unlikely. One site is in a Riparian Reserve where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG coniferous and mixed hardwood-coniferous forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *S. imbricatus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.52.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *S. imbricatus* at three sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 84 sites would remain on BLM and NFS lands across the region, and nine sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *S. imbricatus* at three sites, these sites are part of the many sites in southern Oregon where the species is fairly common. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *S. imbricatus* would persist in the region without considering the three sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG coniferous and mixed hardwood-coniferous forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG coniferous and mixed hardwood-coniferous forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where

suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *S. imbricatus* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the three *S. imbricatus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *S. imbricatus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.53 SARCOSPHAERA CORONARIA

Sarcosphaera coronaria, synonymous with *S. eximia*, is a cup fungus in the Pezizaceae family and is commonly known as velvet crown fungus.

2.53.1 Regulatory Status and Ranking

The 2001 ROD identifies *S. coronaria* as a Category B (rare) species. The ORBIC did not evaluate *S. coronaria* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, and 2013). NatureServe also does not contain an account for the species, and its current global and state rankings are unknown. The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.53.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

S. coronaria is partially hypogeous, first forming sporocarps underground and then becoming emergent or partially emergent (Arora 1986). It is an ectomycorrhizal fungus, forming symbiotic associations with living trees and shrubs for translocation of minerals, water, and nutrients (Tedersoo et al. 2006). It forms solitary to clustered sporocarps and is most easily detected from the spring through fall (Castellano et al. 2003). Little specific information is known about the

reproductive biology of *Sarcrosphaera* species. Other cup fungi are presumed to be dependent on wind and possibly on animals, particularly arthropods, for dispersal of spores (Castellano and O'Dell 1997), and the same may be true of *S. coronaria.*

Range

S. coronaria is widely distributed across the Pacific Northwest, northeast North America, China, and Europe (Holthausen et al. 1994). In the Pacific Northwest, the mushroom has been found in California, Washington, Colorado, and Idaho. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across North America, Europe, and China. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

In the Pacific Northwest, *S. coronaria* is most often found in the Cascade Range in Oregon. *S. coronaria* was not documented at any sites prior to 1994, and was documented at 27 new sites between 1994–2000 (USDA and USDI 2000). The species was found in seven locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 636 new sites of *S. coronaria* in the NSO range between 1998–2006, and 672 total sites were documented by 2006, including 176 in reserves or protected areas. In the 2007 Final SEIS (USDA and USDI 2007), the BLM and Forest Service reported 606 sites on federal lands and 748 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *S. coronaria*, and resulted in 35 new observations of individuals or populations of *S. coronaria*. Based on the increased number of sites since 1998 with increased surveys (more than 18-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range, particularly in Oregon where most observations have been reported. It should also be noted that this species was removed from post-2001 S&M lists because it was considered to be common. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

S. coronaria occurs as solitary or small clusters of sporocarps in conifer duff or under the surface of the soil in coniferous forests (Arora 1986, Castellano et al. 2003). It is found most often during the spring in mountains near melting snow (Ammirati and Trudell 2009). *S. coronaria* can re-establish in secondary growth after canopy closure (Holthausen et al. 1994). Based on available information, *S. coronaria* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Typical threats to fungi species in coniferous and other forests include: heavy logging that removes overstory trees and causes disturbance to soils, development, hot fires, and heavy thinning for fire management (ORBIC 2004). These general threats may apply to *S. coronaria*, but little information is known about more specific threats. Activities that cause mortality of individuals or groups of individuals can threaten the species' genetic diversity in localized areas (USDA and USDI 2000).

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *S. coronaria* because it was removed from the S&M list after 2001.

2.53.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *S. coronaria* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table SACO-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 996 observations from BLM and Forest Service geodatabases were converted into 478 sites in the NSO range (region). Table SACO-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table SACO-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure SACO-1 displays the regional distribution of the species across BLM and NFS lands, and Figure SACO-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE SACO-1

Number of *Sarcrosphaera coronaria* Sites (2013)

Location*	Number of Sites
Regional Area	478
Local Area	183
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE SACO-2

Distribution of *Sarcrosphaera coronaria* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	195	166	-
Forest Service	270	15	1
NPS	4	-	-
Fish and Wildlife Service	1	-	-
Other (Private, State, etc.)	63	44	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE SACO-3

Distribution of *Sarcrosphaera coronaria* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	7	-	-
Congressionally Reserved (CR)	**5**	**-**	**-**
Late Successional Reserve (LSR)	**100**	**8**	**-**
Marbled Murrelet Area (LSR3)	**2**	**1**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**19**	**10**	**-**
Managed Late Successional Area (MLSA)	1	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	343	166	1
Riparian Reserve**	**6**	**6**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

S. coronaria has a wide distribution across 10 physiographic provinces in Washington (Olympic Peninsula and Western and Eastern Cascades), Oregon (Coast Range, Cascades West and East, Willamette Valley, and Klamath Mountain), and California (Klamath and Cascades). Most sites are found in the Cascade Range in southern Oregon, where they are clustered and relatively close to one another. Sites are scattered across other areas of the region, but are relatively close to one another in the Cascade Range in Washington and California and Klamath Mountains and Coast Range in southern Oregon. The species appears to be well distributed in its range in southern Oregon and in the eastern Cascade Range in Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Sixty-three of 478 sites are located on private, state, or other lands (at least partially), four sites are on NPS lands (Crater Lake, Mt. Rainier, and Olympic National Parks), one site is on U.S. Fish and Wildlife Service land, and 463 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Coos Bay District, 138 sites in the Klamath Falls Resource Area of the Lakeview District, 41 sites in the Medford District, and 15 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include 16 sites on the Umpqua National Forest and the 210 sites on the Winema National Forest. The remaining 59 sites on NFS lands are on the Deschutes, Gifford-Pinchot, Klamath, Mendocino, Okanogan, Shasta-Trinity, Wenatchee, and Willamette National Forests.



Figure SACO-1.
Regional Distribution of *Sarcosphaera coronaria*

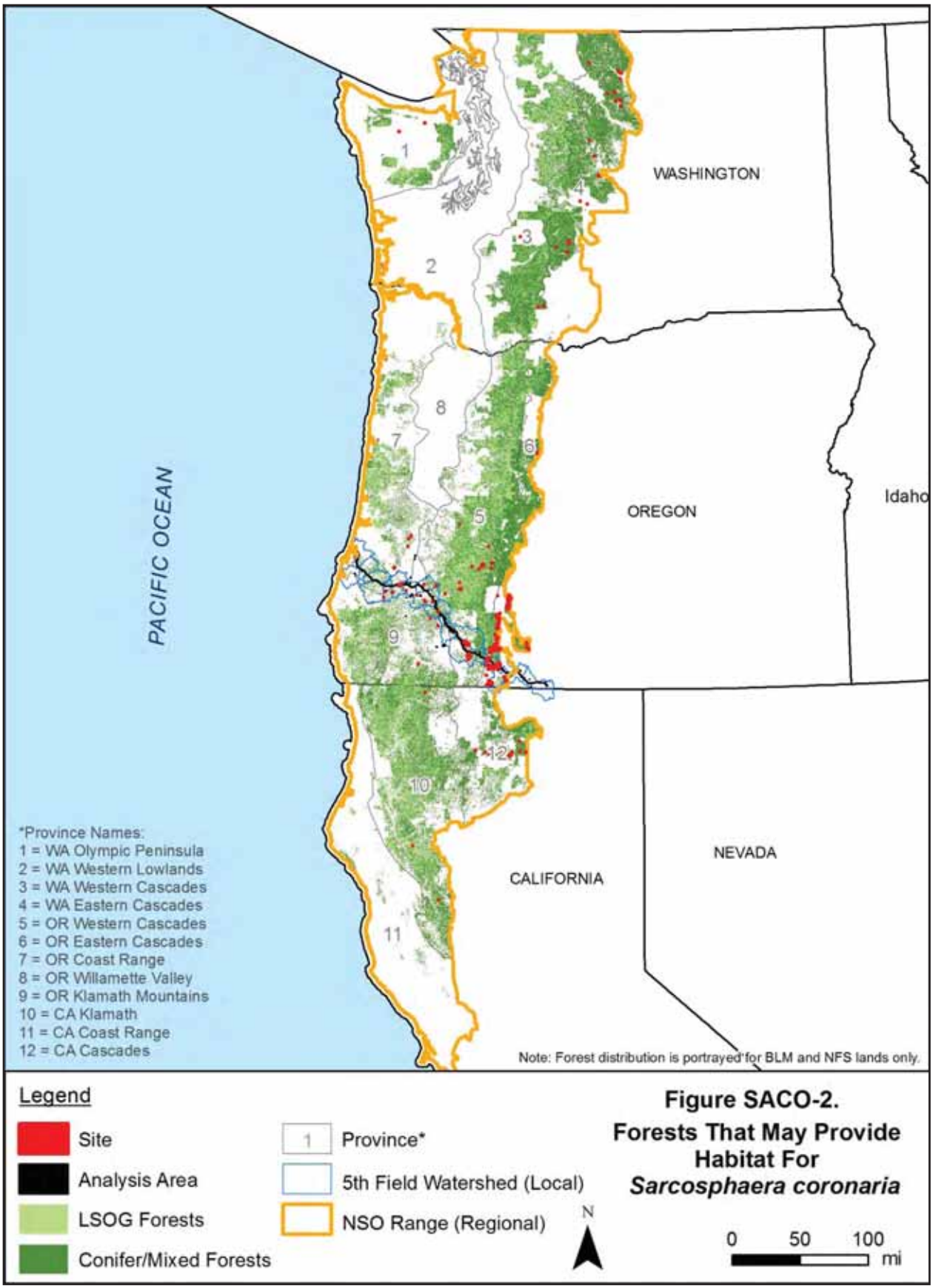


Figure SACO-2.
Forests That May Provide Habitat For *Sarcosphaera coronaria*

Across the NSO range, 132 sites are located on reserve lands managed by BLM and Forest Service, including 100 in LSRs, five in Congressionally Reserved areas, two in Marbled Murrelet areas, 19 in Known Owl Activity Centers, and six in Riparian Reserves. This represents 29 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The four NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

S. coronaria is more commonly found in LSOG forests based on available data (241 of 478 total sites are in LSOG), but it is also relatively common in non-LSOG forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *S. coronaria* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table SACO-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure SACO-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE SACO-4

Extent of Forests that Could Provide Habitat for *Sarcrosphaera coronaria* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	290	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *S. coronaria* is found in 10 5th field watersheds that overlap the project area (see Table SACO-5 and Figure SACO-3). The sites are clustered and near one another in the Cascade Range and are more scattered in the Klamath Mountains. The local area sites are part of the group of sites in southern Oregon (see Regional Distribution discussion above). Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located to the north of the local area sites in the Cascade Range and Coast Range.

Of the 183 sites in the local area, 179 sites are at least partially located on BLM or NFS lands, and 44 sites are at least partially located on private, state, or other lands. Most of the local sites are on land designated as Other (Matrix), and 25 sites are in reserves, including eight sites in LSRs, one site in a Marbled Murrelet area, 10 sites in Known Owl Activity Centers, and six sites in Riparian Reserves. The number of sites on reserve lands represents 14 percent of the BLM-

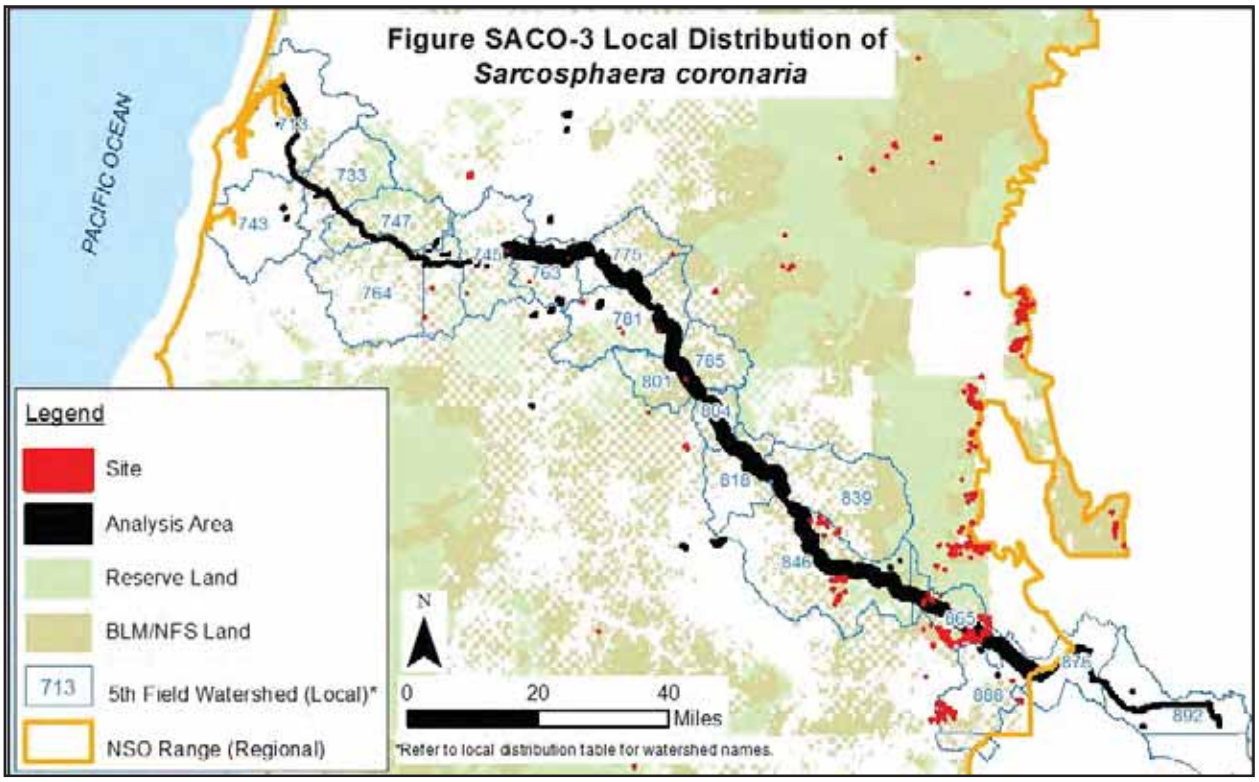
and Forest Service-managed sites. Sites on reserve lands are in seven out of the 10 watersheds (Table SACO-5).

TABLE SACO-5

Distribution of *Sarcrosphaera coronaria* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	1	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	34	1
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	37	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	2	-
Middle South Umpqua River (763)	1	-
Myrtle Creek (775)	2	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	3	2
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	4	3
Spencer Creek (865)	98	17
Trail Creek (804)	-	-
Upper Cow Creek (801)	1	1

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous forests encompass approximately 1.3 million acres on BLM and NFS lands in the local area, including 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the

local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures SACO-2 and SACO-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *S. coronaria*. This site is on Forest Service-managed land (Winema National Forest) on land designated as Other (Matrix). This site is part of a group of sites in the eastern Cascade Range, and several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 66 total observations of the species in 35 locations in or near the project area during 2010-2012 (Siskiyou BioSurvey LLC 2012a). All observations of the species from the PCGP Project surveys are outside the analysis area. The recorded observation of the species in the analysis area is from agency databases and was recorded in 2000. Within the project area, the site is at MP 168.8.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 463 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent of the sites (or one out of 478 total sites on all lands in the NSO range). Table SACO-6 presents an overview of the features of the PCGP Project that would affect the *S. coronaria* site. The construction corridor and associated work and storage areas would affect approximately 0.8 acre within the site (about 30 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *S. coronaria* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.6 acre of vegetation and soil within the site and could result in the removal of *S. coronaria* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.2 acre within the site. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *S. coronaria* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.05 acre of understory habitat in the site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

TABLE SACO-6

Impacts to *Sarcosphaera coronaria* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.6 ac
Temporary Extra Work Area (TEWA)	1	0.2 ac
Uncleared Storage Area (UCSA)	1	0.05 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG coniferous and mixed hardwood-coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *S. coronaria*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, 178 sites of *S. coronaria* would remain on BLM and NFS lands in the local area, including 25 in reserves, and 462 sites, including 132 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 132 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 29 percent of the remaining *S. coronaria* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *S. coronaria* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:

  - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
  - *S. coronaria* has a wide distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (463 on BLM and NFS lands). The species appears to be well distributed in its range in southern Oregon and in the eastern Cascade Range in Washinton. The currently known number of sites on BLM and NFS lands is actually a decrease of sites documented since 2007, but is still moderate-high. Also, many sites were documented during PCGP Project surveys.
  - An estimated 29 percent of the sites (132 sites) are in reserves, which is an increase in the proportion of sites in reserves since 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *S. coronaria*.
- The PCGP Project would affect one of 463 BLM- and Forest Service-managed sites of *S. coronaria*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (462) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (178 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across 10 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites on reserve lands, and the percentage of sites in reserves would be about the same (29 percent). Of the remaining sites, 121 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and five are in Congressionally Reserved areas where management activities that may adversely affect *S. coronaria* are unlikely. Six other sites are in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG coniferous and mixed hardwood-coniferous forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *S. coronaria*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-

disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.53.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *S. coronaria* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 462 sites would remain on BLM and NFS lands across the region, and 178 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *S. coronaria* at one site, the site is part of many sites in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *S. coronaria* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG coniferous and mixed hardwood-coniferous forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG coniferous and mixed hardwood-coniferous forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *S. coronaria* site in the project area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *S. coronaria* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *S. coronaria* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.54 SEDECULA PULVINATA

Sedecula pulvinata is a sequestrate mushroom and false truffle species in the Sedeculaceae family and does not have a common name.

2.54.1 Regulatory Status and Ranking

The 2001 ROD identifies *S. pulvinata* as a Category B (rare) species. The ORBIC evaluated *S. pulvinata* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be rare, uncommon, or threatened, but not immediately imperiled, within its global range (G3). In Oregon, it was considered to be critically imperiled because of extreme rarity or because it is somehow especially vulnerability to extinction or extirpation (S1). The species is on the ORBIC List 3. It is not considered a BLM or Forest Service Sensitive species in Oregon, but it is a Forest Service Strategic species.

2.54.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *S. pulvinata*. It may be ectomycorrhizal, forming symbiotic associations with conifer trees for translocation of minerals, water, and nutrients, although little research has been conducted on the species due to its rarity (Castellano and O'Dell 1997). As with other sequestrate fungi, spore dispersal is presumed to depend on mycophagy or consumption of fungi and spores by animals. The mushroom produces large fruiting bodies at or just under the surface of the soil (hypogeous) (ORBIC 2004). Fruiting has been documented from June through September (Castellano et al. 1999).

Range

S. pulvinata has been found in disjunct populations in Colorado, Idaho, Lassen Volcanic National Park in California, and Mt. Shasta in California (Castellano and O'Dell 1997). It has only recently been found in Oregon as part of the surveys for the PCGP Project (Siskiyou BioSurvey LLC 2012a) and during surveys on the Fremont-Winema National Forest (Fremont-Winema National Forest 2010). Outside the Pacific Northwest, it has been reported in the Great Basin, Colorado, and three locations in California, including Lassen Volcanic National Park, Lassen National Forest, and Sierra National Forest (ORBIC 2004, Castellano and O'Dell 1997). It has also been documented in Arizona on the Coconino Plateau near Flagstaff and the Kaibab Plateau near Jacob Lake (States and Gaud 1997). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have

likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *S. pulvinata* from an estimated 12 element occurrences in western North America in 2004. Most of these occurrences were in the southwest, with only one reported occurrence in California (ORBIC 2004). In 2004, *S. pulvinata* was widely distributed across the western United States, but it had a patchy distribution and was very rare in the range of the NSO (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented no new sites of *S. pulvinata* in the NSO range between 1998–2006, and only one site was documented by 2006, which was not in a reserve or protected area. Three occurrences were reported in Oregon on the Fremont-Winema National Forest outside of the NSO range during surveys in 2009–2010 (Fremont-Winema National Forest 2010). In the 2007 Final SEIS, the Forest Service and BLM did not report any sites of the species.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *S. pulvinata*, and resulted in one new observation of a population of *S. pulvinata*. Based on the low number of sites and the minimal increase in the number of sites since 1998 with increased surveys, this species appears to be truly rare in the NSO range, and more survey effort may not necessarily locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

S. pulvinata appears to be restricted to relatively dry areas of coniferous forests at relatively high elevation ranges and with little annual rainfall (ORBIC 2004, Castellano and O'Dell 1997). It is typically associated with the roots of white fir, subalpine fir, red fir, Engelmann spruce (*Picea engelmannii*), and lodgepole pine (Castellano and O'Dell 1997). At mid to high elevations, it has been found in association with mountain hemlock (Holthausen et al. 1994). Based on data available in 1994, *S. pulvinata* was primarily associated with LSOG forests and may require abundant coarse woody debris along the forest floor. Based on available information, *S. pulvinata* is presumed to be restricted to specific microclimate conditions of LSOG coniferous forests at mid to high elevations.

Threats

Threats to *S. pulvinata* are those that affect its potential host tree and disturb the soil, such as road and trail construction, logging, fire management activities, and recreational activities (Castellano and O'Dell 1997). Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management

recommendations were developed for *S. pulvinata* with several other species (Group 12 of Castellano and O'Dell 1997). The primary guidance for *S. pulvinata* is to identify likely habitat on federal lands and protect the habitat until populations are found during survey efforts. Known locations should be managed to protect an area large enough to maintain the habitat and microclimate conditions of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *S. pulvinata*:

- As a mycorrhizal species, *S. pulvinata* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.54.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *S. pulvinata* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table SEPU-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated three observations from BLM and Forest Service geodatabases were converted into one site in the NSO range (region). Table SEPU-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table SEPU-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure SEPU-1 displays the regional distribution of the species across BLM and NFS lands, and Figure SEPU-2 displays the species' regional distribution with the extent of coniferous and LSOG coniferous forests above 4,500 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE SEPU-1

Number of *Sedecula pulvinata* Sites (2013)

Location*	Number of Sites
Regional Area	1
Local Area	1
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE SEPU-2

Distribution of *Sedecula pulvinata* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	-	-	-
Forest Service	1	1	1
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	-	-	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011

TABLE SEPU-3

Distribution of *Sedecula pulvinata* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	-	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	-	-	-
Congressionally Reserved (CR)	**-**	**-**	**-**
Late Successional Reserve (LSR)	**1**	**1**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	-	-	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Bolded allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

S. pulvinata has a limited distribution in one physiographic province in Oregon (Cascades West). The site is on the Rogue River National Forest in an LSR. No other sites are documented in the region. Some other sites have been recorded in agency databases in Lake County, Oregon, and Tehama County, California, but these are outside the NSO range. *S. pulvinata* is not well distributed within its range in the NSO range.

The *S. pulvinata* site is in an LSOG coniferous forest at about 4,500 feet msl. LSOG coniferous forests above 4,500 feet msl in the Cascade Range in Oregon could provide habitat for *S. pulvinata* and support additional sites. These forests encompass an estimated 407,120 acres on BLM and NFS lands in the mountain range, including an estimated 228,980 acres in reserve land allocations (56 percent of the forests; Table SEPU-4). LSOG coniferous forests above 4,500 feet msl are a limited habitat in the Cascade Range. Younger coniferous forests may provide habitat for the species as they mature and develop suitable habitat conditions over time, and these forests are more widespread (see Figure SEPU-2 and Table SEPU-4).

TABLE SEPU-4

Extent of Forests that Could Provide Habitat for *Sedecula pulvinata* on BLM and NFS Lands*

Location	Coniferous Forests above 4,500 feet		LSOG Coniferous Forests above 4,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	1,852,820	986,150	407,120	228,980
Local Area	109,990	55,610	32,980	18,820
Project Area	310	210	100	70

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for the Oregon Cascade Range only, which is the extent of the species' currently known range.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.



Figure SEPU-1. Regional Distribution of *Sedecula pulvinata*

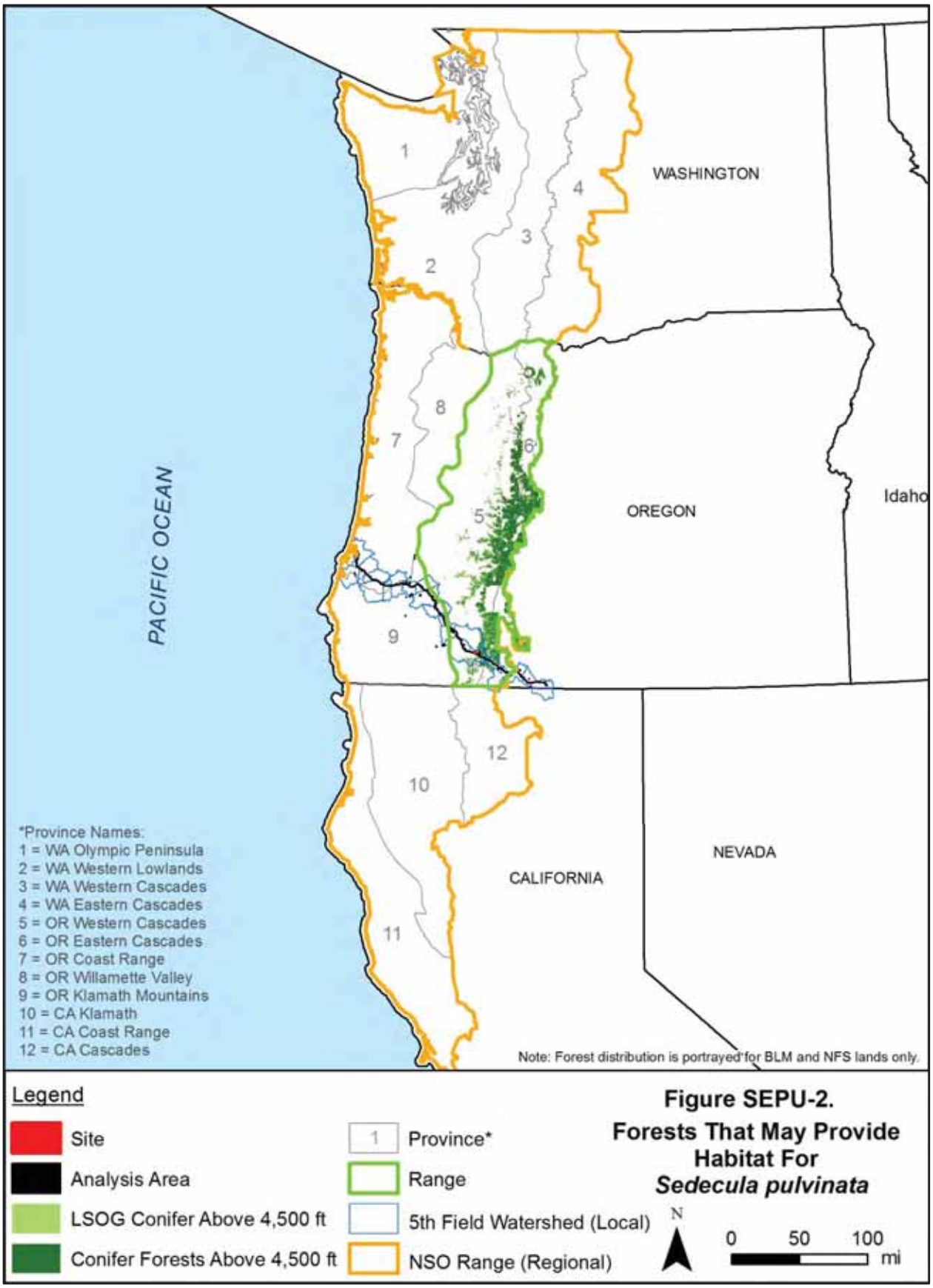


Figure SEPU-2.
Forests That May Provide Habitat For *Sedecula pulvinata*

Local Distribution

S. pulvinata is found in one 5th field watershed (Little Butte Creek) that overlaps the project area (see Table SEPU-5). This site is the same one described in the Regional Distribution discussion above.

TABLE SEPU-5

Distribution of *Sedecula pulvinata* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	1	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

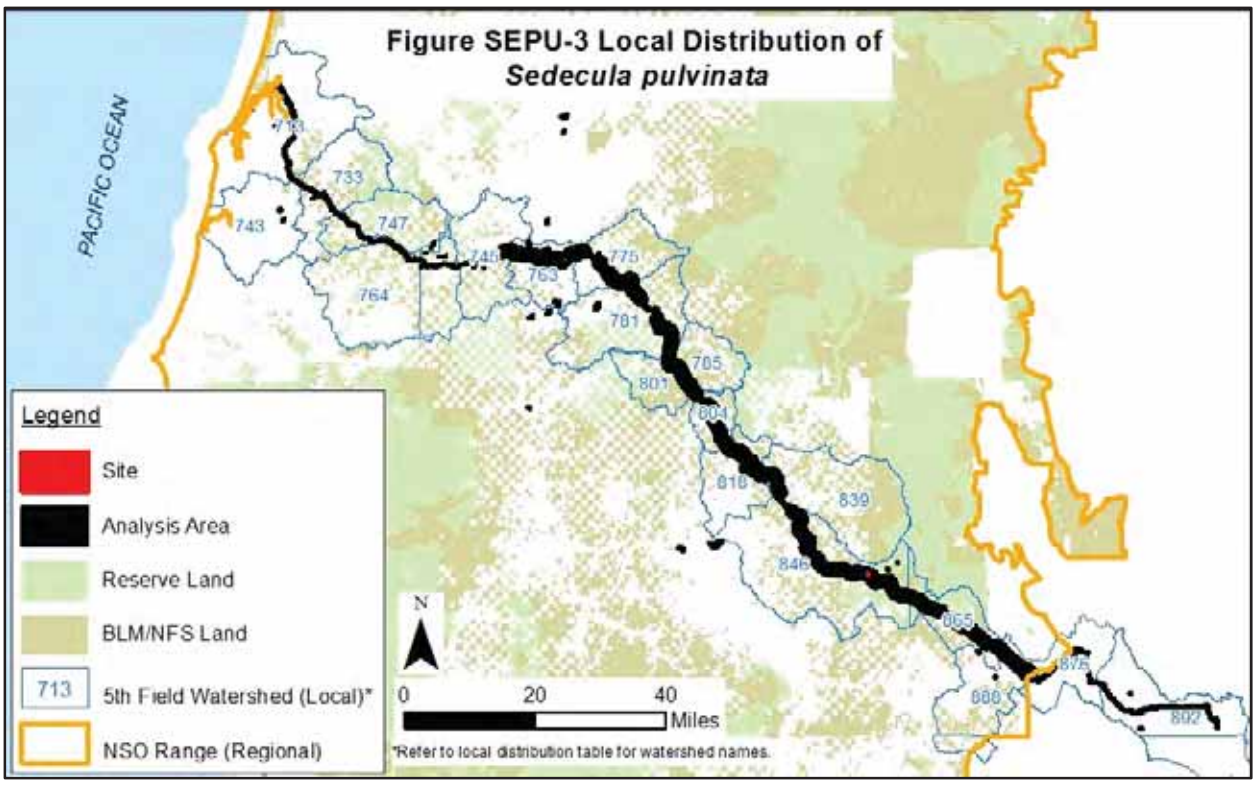
Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011

LSOG coniferous forests above 4,500 feet msl encompass approximately 32,980 acres on BLM and NFS lands in the Cascade Range in the local area, with 18,820 acres in reserve land allocations (57 percent of the forests). Other sites may be located in the Cascade Range in areas that have not been previously surveyed.

Analysis/Project Area Distribution

The analysis and project areas contain one site of *S. pulvinata*. This is the same site described in the Regional and Local Distribution discussions above.

Surveys for the PCGP Project resulted in three observations of *S. pulvinata* in one location in the survey area during 2010–2011 (Siskiyou BioSurvey LLC 2012a). These recorded observations were between MPs 158.1 and 158.2 and comprise the single site in the analysis area.



Project Impacts

Analysis

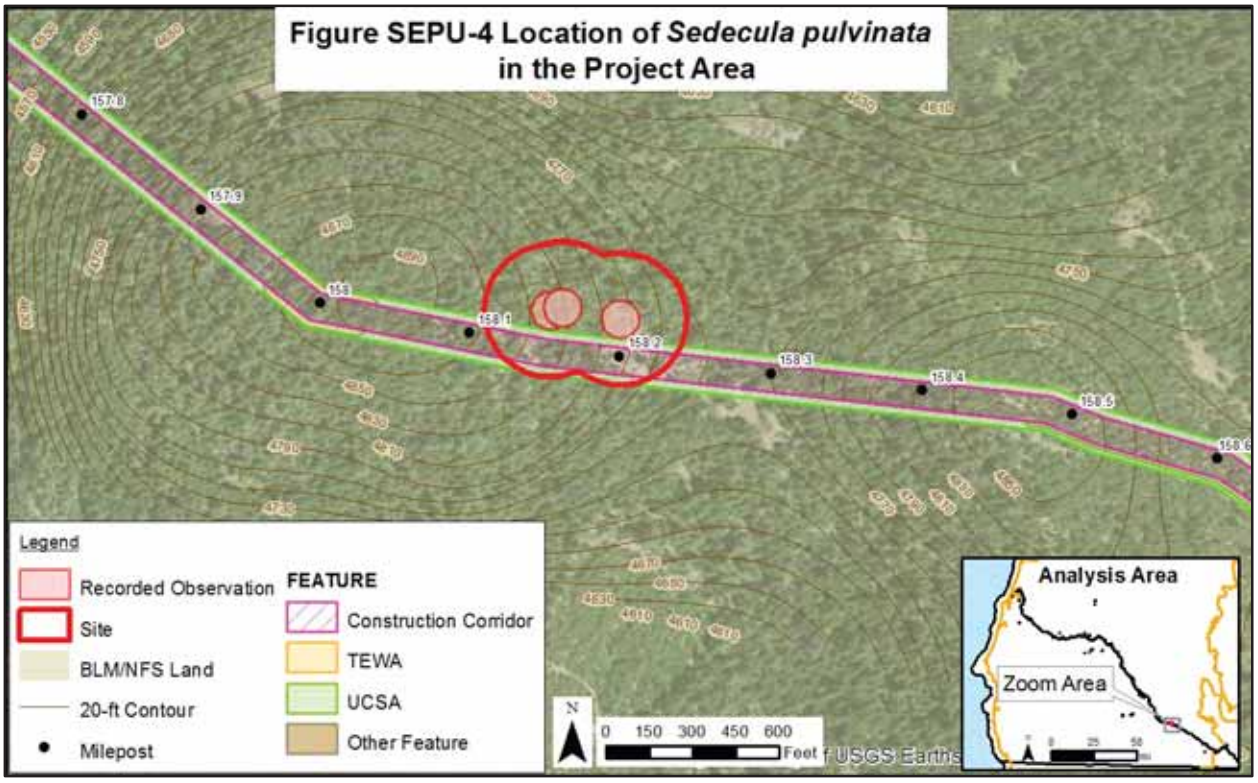
The PCGP Project would affect the only site of *S. pulvinata* in the region. Table SEPU-6 presents an overview of the features of the PCGP Project that would affect the *S. pulvinata* site. The construction corridor and associated storage areas would affect approximately 2.0 acres (32 percent) of the site (the site is approximately 6.3 acres), and the corridor would cross through the southern portion of the site (see Figure SEPU-4). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *S. pulvinata* in and near the project area. Because the PCGP Project would affect the only *S. pulvinata* site in the NSO range, the effects on the site could restrict the distribution of the species in the NSO range if site persistence is affected. This discussion presents a detailed analysis of the features of the PCGP Project that could affect site persistence.

TABLE SEPU-6

Impacts to *Sedecula pulvinata* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	1.3 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	1	0.7 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.



The PCGP Project would result in ground disturbance and vegetation removal in the southern portion of the site between MPs 158.1-158.2. The recorded observations of the species are in the center of the project area and may not be directly affected by activities within the corridor (see Figure SEPU-4).

Establishment of the construction corridor would disturb vegetation and soils around the recorded observations within the site and could result in removal of individuals. The area within the site is forested on an east-facing slope and is near the top of a hill. The establishment of the corridor could modify microclimate conditions around the recorded observations. The removal of forests and host trees and disturbance to soil would negatively affect *S. pulvinata* by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, affecting site persistence. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs could also damage individuals and would disturb understory habitat within the site, which could modify microhabitats around the observations, potentially making the habitat no longer suitable for the species.

Based on this analysis, *S. pulvinata* is not likely to persist at the site following project implementation. This site is the only site in the local and regional areas. It is important for dispersal of the species in the Cascade Range. If the species does not persist at this site, *S. pulvinata* would no longer be documented in the NSO range, and opportunities for dispersal into the region would be extremely limited.

Across the project area, the PCGP Project would remove an estimated 80 acres of LSOG coniferous forests above 4,500 feet msl. These impacts would result in a reduction of habitat that may be suitable for *S. pulvinata*. Within this impact area, about 60 acres (75 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, but these areas would not return to LSOG conditions for more than 80 years and would not likely provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would also remain across the project area and would not provide habitat for the species. The permanent loss of LSOG coniferous forests above 4,500 feet msl represents less than 1 percent of the total estimated area of these forests in the Cascade Range in Oregon.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, no sites of *S. pulvinata* would remain in the local area or in the NSO range.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *S. pulvinata* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD has increased information on the distribution of *S. pulvinata*, as noted below:
    - *S. pulvinata* has a limited distributed in one physiographic province and one state in the region and a low total number of sites (one on NFS land). The species is not well distributed within its range. However, the site is a newly recorded site since 2007 and was a result of the PCGP Project surveys.
    - The site is in an LSR, which is an increase in the number of sites in reserves since 2006 per Molina (2008).
- LSOG coniferous forests above 4,500 feet msl (general habitat for the species) are somewhat limited in the Cascade Range in Oregon and encompass approximately 407,120 acres on BLM and NFS lands with an estimated 56 percent in reserves. *S. pulvinata* is likely restricted to a subcomponent of LSOG coniferous forests based on available information on its habitat and life history requirements. A subcomponent of these forests likely provides habitat for *S. pulvinata*.
- The PCGP Project would affect the only site of *S. pulvinata* in the NSO range. Assuming site persistence cannot be maintained at the site, no sites would continue to be documented on BLM or NFS lands in the region. The extent of the species' range within the NSO range following implementation of the PCGP Project would be substantially reduced, and the species would no longer be documented in the NSO range.

- The PCGP Project would affect site persistence at one site in an LSR, which would remove the only site in a reserve. No sites of *S. pulvinata* would remain in the region.
- The PCGP Project would result in a permanent loss of an estimated 80 acres of LSOG coniferous forests above 4,500 feet msl (less than 1 percent of the total acreage in the Cascade Range in Oregon). An estimated 228,980 acres (56 percent) of LSOG coniferous forests above 4,500 feet would remain in reserves in the species' range. Suitable habitat for *S. pulvinata* includes a subcomponent of these forests, which may be limited based on the limited distribution of the species.
- The remaining forests could support additional populations of *S. pulvinata*, although the potential for the habitat to be occupied is is based on the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites may exist in the range of the NSO that have not been discovered based on the increased number of sites documented during surveys associated with the PCGP Project.

2.54.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *S. pulvinata* at one site and would modify the distribution of the species within the range of the NSO. The remaining sites may not provide a reasonable assurance of species persistence because:

- With project implementation, no sites would remain on BLM or NFS lands across the region. This site is important for the persistence of the species in the NSO range. The species' distribution and range within the NSO range would be substantially restricted if site persistence is affected.
- The PCGP Project would remove approximately 80 acres of LSOG coniferous forests above 4,500 feet msl (a negligible amount of the forests). Although an estimated 75 percent of these forests would be restored following project implementation, they would not likely provide habitat for the species during the life of the project. About 228,980 acres (56 percent) of LSOG coniferous forests above 4,500 feet msl would remain in reserves (negligible change with project implementation). Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

Based on these conclusions, the single *S. pulvinata* site in the analysis area is necessary for the persistence of the species in the NSO range, and the PCGP Project must avoid impacts to the site. The *S. pulvinata* site is part of a cluster of sites of S&M species between MPs 157.7 and 158.4; other species in the area include *Clavariadelphus sachalinensis*, *Gomphus kauffmanii*, and *Spathularia flavida*. The segment of the construction corridor, along with associated TEWAs and UCSAs, should be moved at least 165 feet (50 meters) to the south of the currently proposed alignment, such that the northern edge of the work area is shifted outside the site boundary (see Figure SEPU-4 for reference). The nearest edge of the corridor, TEWA, or UCSA should be entirely outside (south) of the site (the large red circle depicted in Figure SEPU-4), providing a no-disturbance buffer of at least 70 meters from the nearest observation point and the outside edge of disturbance caused by clearing and construction activities. In addition, the applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the

site and adjacent habitat over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.55 SPARASSIS CRISPA

Sparassis crispa is a cauliflower mushroom species in the Sparassidaceae family and is commonly known as cauliflower mushroom or curly sparassis.

2.55.1 Regulatory Status and Ranking

The 2001 ROD identifies *S. crispa* as a Category D (uncommon) species. The ORBIC evaluated *S. crispa* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.55.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *S. crispa*. It grows solitary and is believed to be parasitic on conifers (The Fungi of California 2010). Some individuals grow quite large and can be the size of a bushel basket. It is a root parasite and may cause rootrot, although it rarely kills its host tree (Holthausen et al. 1994). Fruiting has been documented mostly in fall, although it can be identified in nearly every season in the Pacific Northwest (Castellano et al. 2003). The mushroom fruits annually at the base of the same tree and may continue to fruit following forest management activities, except if the stand is clear-cut (Holthausen et al. 1994).

Range

S. crispa is widespread in Europe and North America (Castellano et al. 2003) and has been found in Japan (ORBIC 2004). In Europe, it is primarily known from Scandinavia and northern countries. In North America, it has been found in British Columbia and eastern and western states, including Arizona, Massachusetts, New Hampshire, Pennsylvania, Virginia, California, Oregon, and Washington. In the range of the NSO, *S. crispa* is widely distributed from Marin County, California to the Cascade Range and Olympic Peninsula in Washington (Castellano et al. 2003). In 2004, most populations in the Pacific Northwest were in Oregon in the Cascade and Coast ranges (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across coniferous forests in Europe, Asia, and North America. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *S. crispa* from more than 300 element occurrences worldwide in 2004. An estimated 38 of these occurrences were in Oregon, with fewer in California (10) and Washington (11) (ORBIC 2004). In 2004, population trends of *S. crispa* were considered relatively stable over the long term, and the species was apparently common across its range, despite being locally uncommon in some areas (ORBIC 2004). The species was found in one location during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 53 new sites of *S. crispa* in the NSO range between 1998–2006, and 86 total sites were documented by 2006, including 21 in reserves or protected areas. In the 2007 Final SEIS, the Forest Service and BLM reported 77 sites on federal lands and 79 total sites on all lands in the NSO range. This species is edible, and observations of the species may not always be reported or recorded in agency databases.

Equivalent-effort surveys for Category B species were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area, and persistence surveys were conducted for some species in nearby LSRs (Siskiyou BioSurvey LLC 2012a). Incidental sightings of Category D species were recorded during these surveys and resulted in one new observation of *S. crispa*. Based on the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

S. crispa has been primarily found in low-elevation coniferous forests in association with very large conifer trees (Holthausen et al. 1994). In the Pacific Northwest, it is typically found within 6 feet of the base of a living conifer tree, such as Douglas-fir, Bishop pine (*Pinus muricata*), and Monterey pine (*P. radiata*) (Castellano et al. 2003, The Fungi of California 2010). *S. crispa* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *S. crispa* are those activities that affect its host conifer tree, such as logging, road and trail construction, and similar activities (ORBIC 2004). Other specific threats to the species are not currently known.

Management Recommendations

As a Category D S&M species, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). The 2007

Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *S. crispa*:

- As a wood saprobe, *S. crispa* individuals probably do not extend beyond the available substrate (log, stump etc). Retention of habitat patches across a landscape could provide possible areas of refugia and potential areas for colonization. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.55.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *S. crispa* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table SPCR-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 157 observations from BLM and Forest Service geodatabases were converted into 101 sites in the NSO range (region). Table SPCR-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table SPCR-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure SPCR-1 displays the regional distribution of the species across BLM and NFS lands, and Figure SPCR-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE SPCR-1

Number of *Sparassis crispa* Sites (2013)

Location*	Number of Sites
Regional Area	101
Local Area	16
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE SPCR-2

Distribution of *Sparassis crispa* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	38	13	-
Forest Service	48	4	1
NPS	4	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	22	3	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE SPCR-3

Distribution of *Sparassis crispa* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	8	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	2	-	-
Congressionally Reserved (CR)	**1**	**-**	**-**
Late Successional Reserve (LSR)	**17**	**1**	**-**
Marbled Murrelet Area (LSR3)	**2**	**2**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	58	15	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

S. crispa is widely distributed across nine physiographic provinces in Washington (Western Lowlands, Olympic Peninsula, and Western Cascades), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Coast and Klamath) (see Figure SPCR-1). Most sites are found along the western Cascade Range, where the sites tend to be clustered or relatively close to one another in groups. Several clusters of sites are located in the Coast Range in Oregon, but sites in other areas are more scattered. *S. crispa* is less abundant outside the Cascade Range and Coast Range based on current site locations, but sites are widespread across the region. *S. crispa* appears to be well distributed in the western Cascade Range in Oregon based on the relative abundance of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Twenty-two of 101 sites are located on private, state, or other lands (at least partially); four sites are on NPS lands (Mount Rainier and Olympic National Parks); and 85 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 13 sites in the Coos Bay District, three sites in the Medford District (one site is partially on the Umpqua National Forest), and three sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include four sites on the Rogue River National Forest and 19 sites on the Umpqua National Forest (one site is partially in the Medford District). The remaining 44 sites on BLM and NFS lands are in the Arcata, Eugene, and Salem Districts and on the Deschutes, Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Siskiyou, Six Rivers, and Willamette National Forests.



Figure SPCR-1. Regional Distribution of *Sparassis crispa*



Figure SPCR-2. Forests That May Provide Habitat For *Sparassis crispa*

Across the NSO range, 21 sites are located on reserve lands managed by BLM and the Forest Service, including 17 in LSRs, two in Marbled Murrelet Areas, two in Known Owl Activity Centers, and one in a Congressionally Reserved area. This represents 25 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The four NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

S. crispa is more commonly found in LSOG forests based on available data (81 of 101 total sites are in LSOG), but it is also somewhat common in non-LSOG forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 5,600 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *S. crispa* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the region, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table SPCR-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure SPCR-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE SPCR-4

Extent of Forests that Could Provide Habitat for *Sparassis crispa* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *S. crispa* is distributed across six 5th field watersheds that overlap the project area (see Table SPCR-5 and Figure SPCR-3). A large group of sites is located in the East Fork and Middle Fork Coquille River watersheds in the Coast Range, and a large cluster of sites is located about 5 miles to the north of these sites in the region. A small group of sites is located in the Elk Creek-South Umpqua, Trail Creek, and Upper Cow Creek watersheds in the Klamath Mountains. Several sites are located within about 35 miles to the north and south of these sites. A single site is found in the Little Butte Creek watershed in the Cascade Range; this site is somewhat isolated from other sites in the local area, as well as other sites in the region.

All 16 of the sites in the local area are on BLM (Coos Bay, Medford, and Roseburg Districts) and NFS lands (Rogue River and Umpqua National Forests). Most of the local sites are on land designated as Other (Matrix); four sites are in LSRs, representing 25 percent of the sites. Three

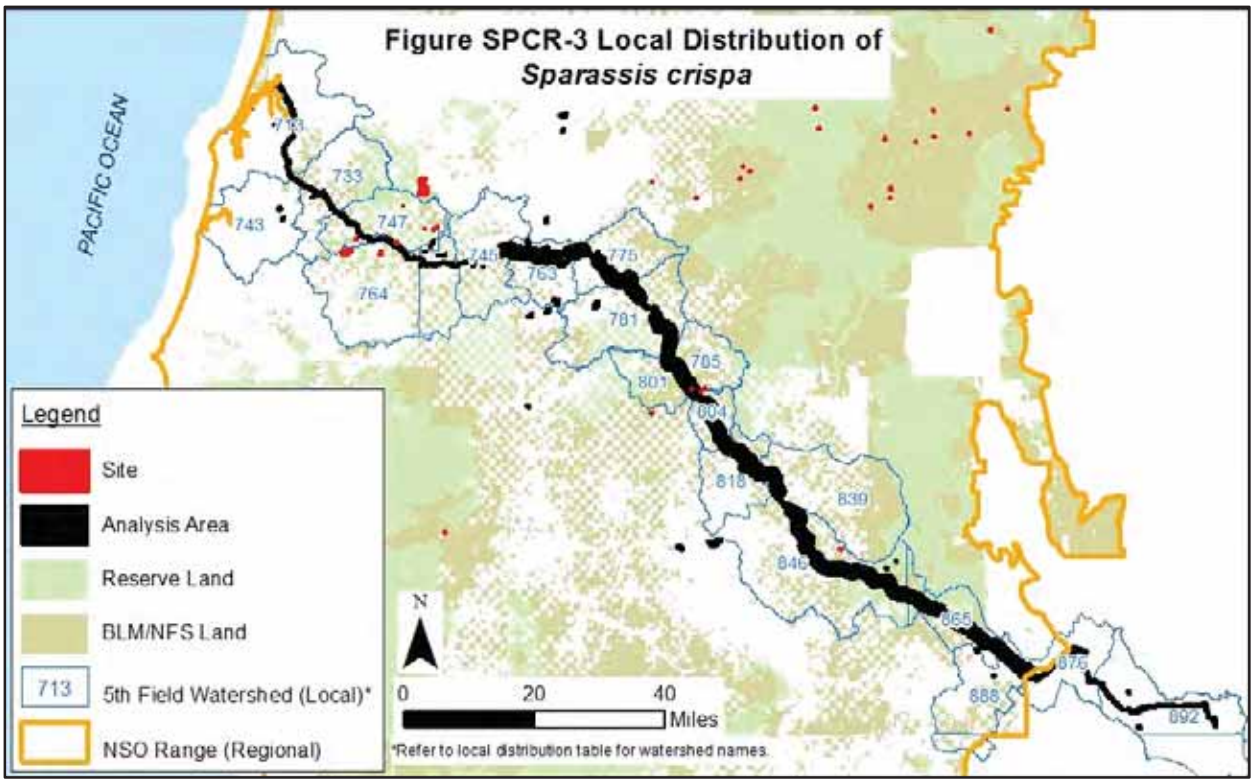
sites are partially on private and other lands. The four sites in reserves are in the East Fork and Middle Fork Coquille River watersheds.

TABLE SPCR-5

Distribution of *Sparassis crispa* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	8	2
Elk Creek-South Umpqua (785)	1	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	2	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	3	2
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	1	-
Upper Cow Creek (801)	1	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number and

distribution of sites in the region and the extent of forests that may provide suitable habitat (see Figures SPCR-2 and SPCR-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *S. crispa*. The site is in the Upper Cow Creek watershed in the Klamath Mountains near the central portion of the analysis area. Several other sites are located within the immediate vicinity of the site (see Local Distribution discussion above). This site is on Forest Service-managed lands (Umpqua National Forest) on land designated as Other (Matrix).

Surveys for the PCGP Project resulted in one observation of the species near MP 109.7 just outside the project area (Siskiyou BioSurvey LLC 2012a). This recorded observation comprises the one site in the analysis area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 85 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 101 total sites on all lands in the NSO range). Table SPCR-6 presents an overview of the features of the PCGP Project that would affect the *S. crispa* site. The construction corridor and associated work areas would affect approximately 0.8 acre within the site (about 35 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *S. crispa* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.7 acre of vegetation and soils within the site and could remove individuals of *S. crispa*. Disturbance in a TEWA would result in similar impacts on about 0.1 acre within the site. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and soil and ground disturbance could negatively affect *S. crispa* in adjacent areas by removing its habitat, disturbing soil or woody debris around trees or roots of trees, and affecting its association with the roots, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE SPCR-6

Impacts to *Sparassis crispa* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.7 ac
Temporary Extra Work Area (TEWA)	1	0.1 ac
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *S. crispa*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, 15 sites of *S. crispa* would remain on BLM and NFS lands in the local area, with four in reserves, and 84 sites, including 21 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 21 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 25 percent of the remaining *S. crispa* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *S. crispa* is a Category D (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:

  - *S. crispa* has a wide distribution across nine physiographic provinces and three states in the region and a moderate-high number of overall sites (85 on BLM and NFS lands). The species appears to be well distributed in western Cascade Range in Oregon, but has a scattered distribution in other parts of its range in the NSO range. The currently known number of sites on BLM and NFS lands is an increase of eight sites on BLM and NFS lands since 2007, with one site documented during the PCGP Project surveys.
  - An estimated 25 percent of the sites (21 sites) are in reserves, which is the same number of sites in reserves in 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented, and in the Klamath Mountains, where some sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *S. crispa*.
- The PCGP Project would affect one of 85 BLM- and Forest Service-managed sites of *S. crispa*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (84) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (15 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across five 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would not change. Of the remaining sites, 21 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and one is in a Congressionally Reserved area where management activities that may adversely affect *S. crispa* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *S. crispa*, although the potential for the habitat to be occupied varies based on the distribution of sites and habitat. This is a Category D species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.55.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *S. crispa* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 84 sites would remain on BLM and NFS lands across the region, and 15 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *S. crispa* at one site, this site is part of a small group of sites in the Klamath Mountains in Oregon. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *S. crispa* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid the *S. crispa* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *S. crispa* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *S. crispa* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

2.56 SPATHULARIA FLAVIDA

Spathularia flavida is a cup or club mushroom species in the Cudoniaceae family (formerly in Geoglossaceae) and is commonly known as fairy fan or yellow fairy fan.

2.56.1 Regulatory Status and Ranking

The 2001 ROD identifies *S. flavida* as a Category B (rare) species. The ORBIC evaluated *S. flavida* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between not rare

and apparently secure, but with cause for long-term concern, and widespread, abundant, and secure within its global range (G4G5) and was rare, uncommon, or threatened, but not immediately imperiled, in Oregon (S3). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.56.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *S. flavida*. Members of this species complex occur in a wide variety of habitats although fruiting bodies tend to be associated with forested areas (ORBIC 2004). Fruiting typically occurs in summer and fall in the NSO range (Castellano et al. 2003), but is more common between October and December in Oregon (Trappe, pers. comm. 2013).

Range

S. flavida is widely distributed across the northern hemisphere, including North America and Europe, and has been reported from Japan (ORBIC 2004). In North America, the species occurs in the Pacific Northwest from British Columbia south into Arizona, across southern Canada, the Great Lakes region, and on the east coast from Nova Scotia to Massachusetts. Within the range of the NSO, it has been reported from Marin County, California to northern Washington (Castellano et al. 2003). Based on data available in 2003, the species was found in Oregon in scattered populations from the California border to Mt. Hood National Forest in the north. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across Europe, Asia, and North America. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *S. flavida* from an estimated 43 element occurrences in the Pacific Northwest in 2004. An estimated 20 of these occurrences were in Oregon, with fewer in California (7) and Washington (16) (ORBIC 2004). In 2004, population trends of *S. flavida* were unknown, but it was considered widespread and relatively abundant (ORBIC 2004). The species was found in nine locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 26 new sites of *S. flavida* in the NSO range between 1998–2006, and 50 total sites were documented by 2006, including 22 in

reserves or protected areas. In the 2007 Final SEIS, the Forest Service and BLM reported 29 sites on federal lands and 43 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). These surveys targeted all Category B species, including *S. flavida*, and resulted in three new observations of individuals or populations of *S. flavida*. Based on the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

S. flavida is found in a variety of forest types, ranging from coniferous to hardwood forests (ORBIC 2004). It grows in clusters or fairy rings on litter or woody debris (Castellano et al. 2003). It has been found in open canopy forests associated with campgrounds and in young closed canopy plantations with very little needle litter (Trappe, pers. comm. 2013). Based on data available in 2007, it was found up to about 5,500 feet msl (Cushman and Huff 2007). *S. flavida* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *S. flavida* are presumably those actions that disrupt stand conditions necessary for its survival and result in changes in humidity at the soil level, alterations of species diversity, and modifications to light patterns, particularly in arid regions (ORBIC 2004). Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *S. flavida*:

- As a litter saprobe, *S. flavida* may be associated with forest litter, duff or debris. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.56.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *S. flavida* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table SPFL-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 126 observations from BLM and Forest Service geodatabases were converted into 82 sites in the NSO range (region). Table SPFL-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table SPFL-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure SPFL-1 displays the regional distribution of the species across BLM and NFS lands, and Figure SPFL-2 displays the species' regional distribution with the extent of all forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE SPFL-1

Number of *Spathularia flavida* Sites (2013)

Location*	Number of Sites
Regional Area	82
Local Area	10
Analysis Area (Project Area)	2 (2)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE SPFL-2

Distribution of *Spathularia flavida* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	21	8	2
Forest Service	44	1	-
NPS	4	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	18	1	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE SPFL-3

Distribution of *Spathularia flavida* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	2	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	2	-	-
Congressionally Reserved (CR)	**2**	**-**	**-**
Late Successional Reserve (LSR)	**28**	**3**	**2**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**-**	**-**	**-**
Managed Late Successional Area (MLSA)	1	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	34	6	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure SPFL-1. Regional Distribution of *Spathularia flavida*

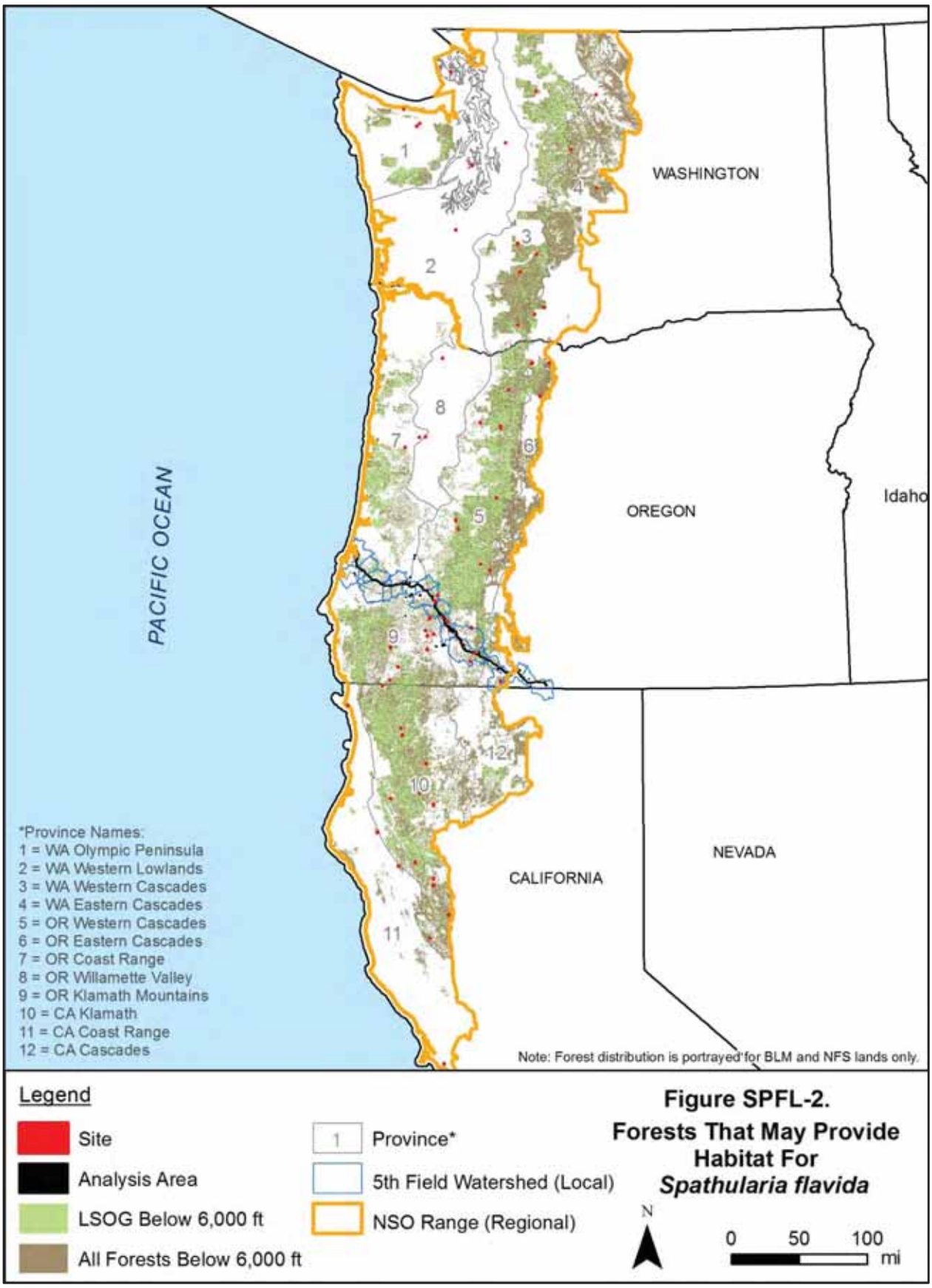


Figure SPFL-2.
Forests That May Provide Habitat For *Spathularia flavida*

Regional Distribution

S. flavida is widely distributed across all physiographic provinces in Washington (Olympic Peninsula, Western Lowlands, and Western and Eastern Cascades), Oregon (Coast Range, Willamette Valley, Cascades West and East, and Klamath Mountain), and California (Coast, Klamath, and Cascade) (see Figure SPFL-1). Although the sites are widespread across the region, they have a scattered distribution, with few clusters or groups of sites. The species is most abundant along the Cascade Range and is less abundant in other areas. Based on the distribution of sites across the species' currently known range, *S. flavida* does not appear to be well distributed within its range in the NSO range.

Eighteen of 82 sites are located on private or other lands (at least partially); four sites are on NPS land (Olympic, North Cascades, and Mount Rainier National Parks); and 65 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Klamath Falls Resource Area of the Lakeview District, 12 sites in the Medford District, and three sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include four sites on the Rogue River National Forest and four sites on the Umpqua National Forest. The remaining 41 sites on BLM and NFS lands are in the Arcata and Salem Districts and on the Gifford Pinchot, Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Shasta-Trinity, Siskiyou, Siuslaw, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 30 sites are located on reserve lands managed by BLM and the Forest Service, including 28 in LSRs and two in Congressionally Reserved areas. This represents 46 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The four NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

S. flavida is more commonly found in LSOG forests based on available data (56 of 82 total sites are in LSOG), but it is somewhat common in non-LSOG forests and has also been found in plantations and campground settings. Based on current site locations, the species is found in all forest types below about 5,300 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests, including the LSOG component of these forests, within this range could provide habitat for *S. flavida* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 10.4 million acres in reserve land allocations (54 percent of the forests; Table SPFL-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure SPFL-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl are widespread, LSOG forests are less common and are primarily found along the Cascade Range and Klamath Mountains.

TABLE SPFL-4

Extent of Forests that Could Provide Habitat for *Spathularia flavida* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	19,194,850	10,381,240	6,092,570	3,750,320
Local Area	611,850	199,720	185,170	80,260
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *S. flavida* is distributed across four 5th field watersheds that overlap the project area (see Table SPFL-5 and Figure SPFL-3). The sites are scattered across the watersheds in the Klamath Mountains and Cascade Range in the eastern half of the local area. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous, mixed, and hardwood forests, and opportunities for dispersal exist within the local area and to nearby regional areas.

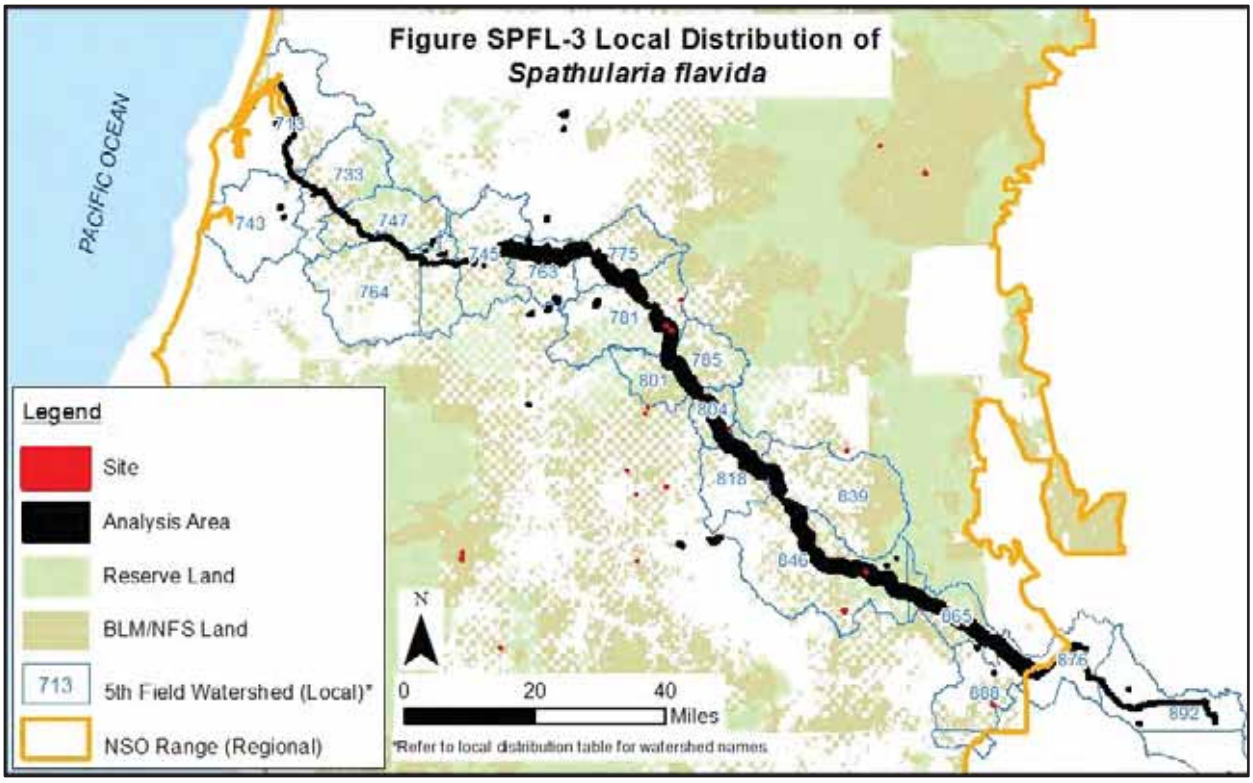
Nine sites in the local area are on BLM and NFS lands, including one site in the Klamath Falls Resource Area of the Lakeview District, four sites in the Medofrd District, three sites in the Roseburg District, and one site on the Rogue River National Forest. Six of the sites are on land designated as Other (Matrix); three sites are in LSRs, representing 33 percent of the sites on BLM and NFS lands. One site is on private land. The sites in LSRs are in the Little Butte Creek and South Umpqua River watersheds (Table SPFL-5).

TABLE SPFL-5

Distribution of *Spathularia flavida* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	2	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	3	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	3	2
Spencer Creek (865)	-	-
Trail Creek (804)	2	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 611,850 acres on BLM and NFS lands in the local area, including 199,720 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 185,170 acres are LSOG, including 80,260 acres in reserve land allocations (43 percent of the forests). Sites may also exist in the local area where surveys have not been completed, based on the distribution of sites in the local and regional areas and the extent of forests that may provide suitable habitat (see Figures SPFL-2 and SPFL-3).

Analysis/Project Area Distribution

The analysis and project areas contain two sites of *S. flavida*. These sites are in LSRs on BLM-managed land (Roseburg District) in the South Umpqua River 5th field watershed. The sites are near one another in the central portion of the analysis area, and the nearest local sites are within 15 miles. Few other sites are located within the immediate vicinity of the project area; however, several sites are scattered across the Cascade Range and Klamath Mountains in the region (see Local and Regional Distribution discussions above).

Surveys for the PCGP Project resulted in five total observations of the species in three locations in or near the project area (Siskiyou BioSurvey LLC 2012a). An estimated four of these recorded observations comprise the two sites in the analysis area; the other observation is in a site outside the analysis area. Within the project area, the two sites are between MPs 97 and 98.4.

Project Impacts

Analysis

The PCGP Project would affect two sites out of the 65 sites on BLM- and Forest Service-managed lands in the region, representing approximately 3 percent of the sites (or two out of 82 total sites on all lands in the NSO range). Table SPFL-6 presents an overview of the features of the PCGP Project that would affect the *S. flavida* sites. The construction corridor and associated work and storage areas would affect approximately 2.4 acres within the sites (about 44 percent of the sites) (see Figure SPFL-4). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *S. flavida* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

TABLE SPFL-6

Impacts to *Spathularia flavida* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	2	1.6 ac
Temporary Extra Work Area (TEWA)	1	0.3 ac
Uncleared Storage Area (UCSA)	1	0.6 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the sites would be subject to impacts from multiple project activities.

Vegetation removal and grading activities in the construction corridor would disturb about 1.6 acres of vegetation and soil within two sites and could result in the removal of *S. flavida* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.3 acre within one site. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests, litter, and woody debris and disturbance to soil could negatively affect *S. flavida* in adjacent areas by removing its habitat and affecting its association with litter or woody debris, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.6 acre of understory habitat in one site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *S. flavida*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed,

and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the two sites as a result of the PCGP Project, seven sites of *S. flavida* would remain on BLM and NFS lands in the local area, including one in a reserve, and 63 sites, including 28 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 28 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 44 percent of the remaining *S. flavida* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *S. flavida* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *S. flavida* has a wide, but scattered, distribution across 12 physiographic provinces and three states in the NSO range and a moderate-high number of overall sites (65 on BLM and NFS lands). The species has a scattered distribution across the region and is most abundant in the Cascade Range. The currently known number of sites on BLM and NFS lands is an increase of 36 sites on BLM and NFS lands since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 46 percent of the sites (30 sites) are in reserves, which is an increase of about eight sites in reserves since 2006 per Molina (2008).
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 54 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous, mixed hardwood-coniferous, and hardwood forests, but sites are less abundant in these areas. A subcomponent of these forests likely provides habitat for *S. flavida*.

- The PCGP Project would affect two of 65 BLM- and Forest Service-managed sites of *S. flavida*, representing approximately 3 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the sites, a moderate-high number of sites (63) would continue to be documented on BLM and NFS lands in the region with a wide, but scattered, distribution across Washington, Oregon, and California. Several sites (seven sites) would remain in the local vicinity of the analysis area with some other sites in the nearby region. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at two sites in LSRs, and the percentage of sites in reserves would be about the same (44 percent). Of the remaining sites, 26 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and two are at least partially in Congressionally Reserved areas where management activities that may adversely affect *S. flavida* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *S. flavida*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.56.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *S. flavida* at two sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 63 sites would remain on BLM and NFS lands across the region, and seven sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *S. flavida* at two sites, these sites are part of several sites scattered across the Cascade Range and Klamath Mountains. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *S. flavida* would persist in the region without considering the two sites as part of the population.
- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.4 million acres (54 percent) of coniferous, mixed hardwood-coniferous, and hardwood forests and 3.8

million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *S. flavida* sites in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the two *S. flavida* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *S. flavida* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

2.57 TREMISCUS HELVELLOIDES

Tremiscus helvelloides is a jelly mushroom species in the Auriculariaceae family (formerly in Hydnaceae) and is commonly known as apricot jelly or red jelly fungus. Its name was recently changed to *Guepinia helvelloide*s, but the 2011 Settlement Agreement refers to the species by its former name, which is used in this report. The species has also been known as *Phlogiotis helvelloides*.

2.57.1 Regulatory Status and Ranking

The 2001 ROD identifies *T. helvelloides* as a Category B (rare) species. The ORBIC evaluated *T. helvelloides* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between not rare and apparently secure, but with cause for long-term concern, and widespread, abundant, and secure within its global range (G4G5) and was not rare and apparently secure, but with cause for long-term concern, in Oregon (S4). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.57.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *T. helvelloides*. It is a saprobe that grows on soil or buried woody debris (Holthausen et al. 1994) and is found solitary or in fairy rings in duff, soil, or rotten wood under conifer trees (Castellano et al. 2003). It has been reported to fruit in late summer and fall and occasionally in spring (Castellano et al. 2003), but it has also been observed fruiting in winter and appears to thrive in cool, moist weather (Trappe, pers. comm. 2013). Fruiting may take place in the same location for two or more years, but information on how old the mycelium can be is unknown (ORBIC 2004).

Range

T. helvelloides is widespread, but locally rare, in cool coniferous forests of north temperate regions, including North America, Europe, and Japan. In North America, it has been reported from Alaska south to California and east into Idaho (ORBIC 2004), as well as in Canada and south to Puerto Rico and Mexico (Trappe, pers. comm. 2013). Based on data available in 2003, it was widely distributed in the NSO range from northern California to Washington, with particularly dense clusters of populations in Douglas and Jackson counties in Oregon (Castellano et al. 2003). In Oregon, *T. helvelloides* has primarily been found in the Cascade and Coast Ranges and Siskiyou Mountains (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed in Europe, Asia, and North America. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *T. helvelloides* from more than 300 element occurrences worldwide in 2004. An estimated 112 of these occurrences were in California, Oregon, and Washington, with the majority (estimated 80) found in Oregon and fewer in Washington (15) and California (17) (ORBIC 2004). In 2004, population trends of *T. helvelloides* were unknown, but its populations in Oregon appeared to be secure (ORBIC 2004). The species was found in three locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). Molina (2008) documented 70 new sites of *T. helvelloides* in the NSO range between 1998–2006, and 110 total sites were documented by 2006, including 32 in reserves or protected areas. In the 2007 Final SEIS, the Forest Service and BLM reported 86 sites on federal lands and 112 total sites on all lands in the NSO range.

Pre-disturbance surveys are not practical for Category B species, but equivalent-effort surveys were conducted during 2010–2012 in old-growth stands in the PCGP Project area and within 100 feet of the project area to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a). *T. helvelloides* was a Category D species at the time and was not specifically targeted during the surveys, although incidental sightings of Category D species were recorded and resulted in 20 new observations of individuals or populations of *T. helvelloides*. These observations have increased the number of

sites documented in BLM and Forest Service records by about 20 percent. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (2-fold increase between 1998–2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

Based on data available in 2004, *T. helvelloides* has typically been found in mesic coniferous forests where the humidity is high and the moss layer is well-developed (ORBIC 2004). Holthausen et al. (1994) indicated that the mushroom was commonly found in riparian zones in the Pacific Northwest, including along perennial and intermittent streams and seasonal streams with narrow channels (i.e., in riparian reserves). The mushroom has also been found along trail sides in younger coniferous forests and is more commonly found in closed canopy forests (Trappe, pers. comm. 2013). In the Pacific Northwest, it has been found in forest litter or humus in a variety of coniferous habitats at elevations between about 800–4,000 feet msl (Forest Service and BLM 2002). *T. helvelloides* may prefer specific microclimates of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to *T. helvelloides* are those that remove coniferous forests, such as logging, development, and related activities (ORBIC 2004). Extensive habitat alteration could affect the species such that it needs decades to recover and be able to fruit. Clear-cutting across seasonal streams and in riparian areas may also threaten the species (Holthausen et al. 1994). Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *T. helvelloides*:

- As a litter saprobe, *T. helvelloides* may be associated with forest litter, duff or debris. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.57.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *T. helvelloides* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table TRHE-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 429 observations from BLM and Forest Service geodatabases were converted into 206 sites in the NSO range (region). Table TRHE-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table TRHE-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure TRHE-1 displays the regional distribution of the species across BLM and NFS lands, and Figure TRHE-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,500 feet msl on BLM and NFS lands.

TABLE TRHE-1

Number of *Tremiscus helvelloides* Sites (2013)

Location*	Number of Sites
Regional Area	206
Local Area	96
Analysis Area (Project Area)	11 (10)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE TRHE-2

Distribution of *Tremiscus helvelloides* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	130	90	9
Forest Service	59	8	2
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	40	15	2

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE TRHE-3

Distribution of *Tremiscus helvelloides* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	7	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	3	-	-
Congressionally Reserved (CR)	**11**	**-**	**-**
Late Successional Reserve (LSR)	**37**	**12**	**2**
Marbled Murrelet Area (LSR3)	**1**	**1**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**9**	**4**	**1**
Managed Late Successional Area (MLSA)	2	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	123	82	9
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure TRHE-1.
Regional Distribution of *Tremiscus helvelloides*

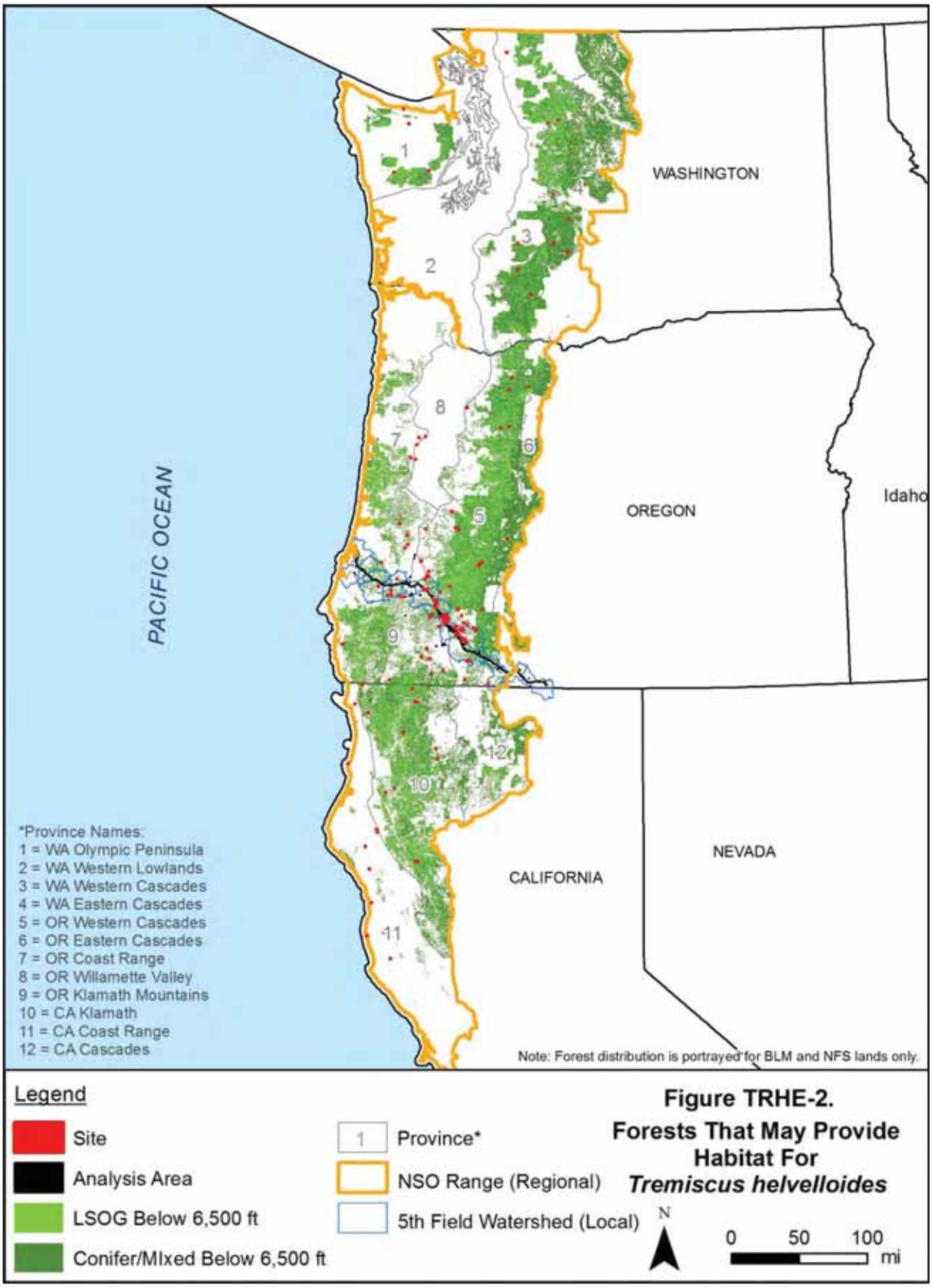


Figure TRHE-2.
Forests That May Provide Habitat For *Tremiscus helvelloides*

Regional Distribution

T. helvelloides is widely distributed across 10 physiographic provinces in Washington (Olympic Peninsula, and Western and Eastern Cascades), Oregon (Coast Range, Willamette Valley, Cascades East and West, and Klamath Mountain), and California (Coast and Klamath). Most sites are found along the Cascade Range and Klamath Mountains, where the sites tend to be clustered or relatively close to one another in groups in Oregon, and the species appears to be locally abundant in parts of southern Oregon. Sites are scattered in the Coast Range and other outlying areas. Although *T. helvelloides* appears to be widespread, its distribution is scattered across the region with few clusters of sites in the Cascade Range despite the widespread distribution of forests that may provide suitable habitat, and the species does not appear to be well distributed within its range in the NSO range.

Fourty of 206 sites are located on private, state, or other lands (at least partially); three sites are on NPS lands (Mount Rainier, Redwood, and Olympic National Parks); and 186 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include one site in the Klamath Falls Resource Area of the Lakeview District, four sites in the Coos Bay District, 84 sites in the Medford District (two sites are partially on the Umpqua National Forest and one site is partially on the Rogue River National Forest), and 34 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include four sites on the Rogue River National Forest (one site is partially in the Medford District) and 19 sites on the Umpqua National Forest (two sites are partially in the Medford District). The remaining 43 sites on BLM and NFS lands are in the Arcata and Salem Districts and on the Deschutes, Gifford Pinchot, Klamath, Mendocino, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 58 sites are located on reserve lands managed by BLM and the Forest Service, including 37 in LSRs, one in a Marbled Murrelet Area, nine in Known Owl Activity Centers, and 11 in Congressionally Reserved areas. This represents 31 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

T. helvelloides is more common in LSOG forests based on available data (159 of 206 total sites are in LSOG), but it is relatively common in non-LSOG forests and has also been found in younger forests along trail sides. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 6,300 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests below 6,500 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *T. helvelloides* and support additional sites. These forests encompass an estimated 18.8 million acres on BLM and NFS lands in the region, including an estimated 10.4 million acres in reserve land allocations (55 percent of the forests; Table TRHE-4). Of this acreage, an estimated 6 million acres are LSOG (see Figure TRHE-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,500 feet msl are widespread across the region, LSOG

forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE TRHE-4

Extent of Forests that Could Provide Habitat for *Tremiscus helvelloides* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 6,500 feet		LSOG Forests below 6,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,767,240	10,401,880	6,009,900	3,717,080
Local Area	576,260	196,340	183,520	80,410
Project Area	1,360	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

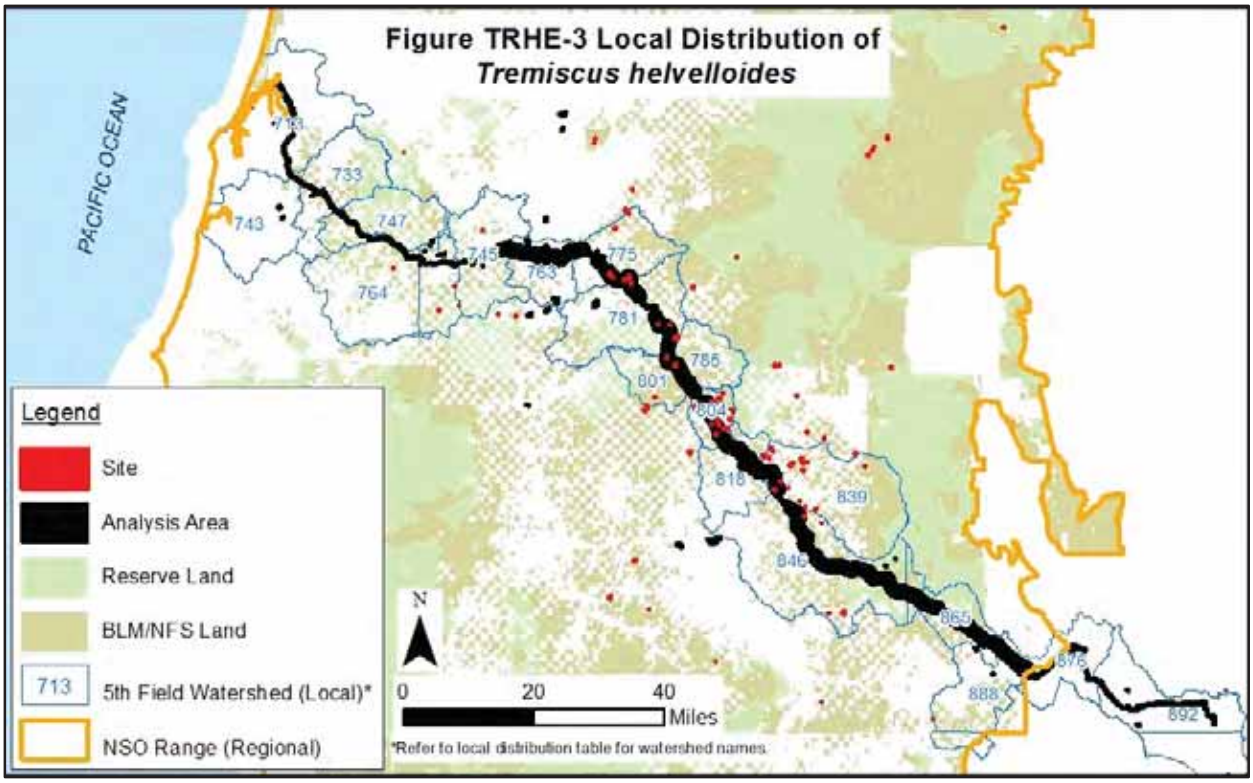
Within the local area, *T. helvelloides* is distributed across nine 5th field watersheds that overlap the project area (see Table TRHE-5 and Figure TRHE-3). Some sites appear more scattered than others, while multiple clusters of sites are found in the Myrtle Creek, South Umpqua River, Big Butte Creek, and Little Butte Creek watersheds. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 20 miles to the northeast in the Cascade Range, as well as to the north in the Coast Range and to the south in the Klamath Mountains.

TABLE TRHE-5

Distribution of *Tremiscus helvelloides* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	26	1
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	2*	1**
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	11	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	5	5
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	11***	2
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	2	2
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	12*.***	6
Spencer Creek (865)	-	-
Trail Creek (804)	27	1
Upper Cow Creek (801)	4	1**

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*One site is in Elk Creek-South Umpqua and South Umpqua River watersheds
**One site is in a reserve in Elk Creek-South Umpqua and Upper Cow Creek watersheds
***Two sites are in Myrtle Creek and South Umpqua River watersheds



All of the 96 sites in the local area are at least partially on BLM and NFS lands. These sites are primarily located on lands designated as Other (Matrix) and LSR. Fifteen sites are partially on private lands. Of the 96 sites in the local area, 17 sites are on reserve lands, representing 18 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table TRHE-5 and on Figure TRHE-3. The sites in reserves are distributed across most of the watersheds.

Coniferous and mixed hardwood-coniferous forests encompass approximately 576,260 acres on BLM and NFS lands in the local area, with 196,340 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 183,520 acres are LSOG, including 80,410 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures TRHE-2 and TRHE-3).

Analysis/Project Area Distribution

The analysis area contains 11 sites of *T. helvelloides*, and the project area contains 10 sites. The sites are found in five 5th field watersheds (Elk Creek-South Umpqua, Myrtle Creek, South Umpqua River, Trail Creek, and Upper Cow Creek). These sites are relatively close to one another in the Klamath Mountains in the central portion of the analysis area. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

The sites are on BLM- and Forest Service-managed lands (Roseburg District and Umpqua National Forest), with two sites partially on private lands. Nine sites are at least partially on land designated as Other (Matrix), and three sites (all in the project area) are at least partially in LSRs.

Surveys for the PCGP Project resulted in 40 total observations of the species in 20 locations in or near the project area during 2010–2011 (Siskiyou BioSurvey LLC 2012a). All of these recorded observations comprise the 12 sites in the analysis area. Within the project area, four sites are between MPs 82.8 and 86.8, and two sites are between MPs 102.6 and 105. One site is between MPs 95.6 and 95.7. Three sites are near a road to the east of MP 113.8.

Project Impacts

Analysis

The PCGP Project would affect 11 sites out of the 186 sites on BLM- and Forest Service-managed lands in the region, representing approximately 6 percent of the sites (or 11 out of 206 total sites on all lands in the NSO range). Table TRHE-6 presents an overview of the features of the PCGP Project that would affect the *T. helvelloides* sites. The construction corridor and associated work and storage areas would affect approximately 20 acres within 10 sites (about 32 percent of all sites in the analysis area); one site may be indirectly affected by nearby PCGP Project activities. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *T. helvelloides* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 7.5 acres of vegetation and soil within seven sites and could result in the removal of *T. helvelloides* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1.8 acres within six sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and woody debris and disturbance to soil could negatively affect *T. helvelloides* in adjacent areas by removing its habitat, disturbing soil or duff around trees, and affecting its association with woody debris, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 9.5 acres of understory habitat in four sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Road improvements and establishment would disturb approximately 1.2 acres within three sites and could remove habitat and extant populations or individuals of *T. helvelloides*.

TABLE TRHE-6

Impacts to *Tremiscus helvelloides* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	7	7.5 ac
Temporary Extra Work Area (TEWA)	6	1.8 ac
Uncleared Storage Area (UCSA)	4	9.5 ac
Roads (TMP)	3	1.2 ac
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,500 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *T. helvelloides*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,500 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 11 sites as a result of the PCGP Project, 47 sites of *T. helvelloides* would remain on BLM and NFS lands in the local area, including 14 in reserves, and 175 sites, including 55 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 55 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 31 percent of the remaining *T. helvelloides* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *T. helvelloides* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:

  - *T. helvelloides* has a wide distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (186 on BLM and NFS lands). The species has a scattered distribution across its range in the NSO range. The currently known number of sites on BLM and NFS lands is an increase of 100 sites on BLM and NFS lands since 2007, with many sites documented during the PCGP Project surveys.
  - An estimated 31 percent of the sites (58 sites) are in reserves, which is an increase of about 45 sites in reserves since 2006 per Molina (2008).

- Coniferous and mixed hardwood-coniferous forests below 6,500 feet msl (general habitat for the species) are widespread across the region and encompass approximately 18.8 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *T. helvelloides*.
- The PCGP Project would affect 11 of 186 BLM- and Forest Service-managed sites of *T. helvelloides*, representing approximately 6 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the 11 sites, a moderate-high number of sites (175) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. In addition, many sites (47 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across eight 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at three sites in LSRs, but the percentage of sites in reserves would be about the same (31 percent). Of the remaining sites, 44 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 11 are in Congressionally Reserved areas where management activities that may adversely affect *T. helvelloides* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,500 feet msl (less than 1 percent of the total regional acreage). An estimated 10.4 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *T. helvelloides*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.57.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *T. helvelloides* at 11 sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 175 sites would remain on BLM and NFS lands across the region, and 47 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *T. helvelloides* at 11 sites, these sites are part of the many sites in the northern Klamath Mountains and southern Cascade Range in Oregon where the species is locally abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *T. helvelloides* would persist in the region without considering the 11 sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed forests and 220 acres of LSOG forests below 6,500 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.4 million acres (55 percent) of coniferous and mixed hardwood-coniferous forests and 3.7 million acres (62 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *T. helvelloides* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 11 *T. helvelloides* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *T. helvelloides* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

3.0 LICHEN SPECIES

3.1 BRYORIA TORTUOSA

Bryoria tortuosa is a filamentous lichen in the Parmeliaceae family and is commonly known as horsehair lichen.

3.1.1 Regulatory Status and Ranking

The 2001 ROD identifies *B. tortuosa* as a Category A (rare) and Category D (uncommon) species. The ORBIC evaluated *B. tortuosa* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be widespread, abundant, and secure within its global range and in Oregon (G5, S5, respectively). The species is not currently on the ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

3.1.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

B. tortuosa is a filamentous, epiphytic lichen that tends to grow on shrubs and on large conifers (ORBIC 2004). *B. tortuosa* is also a forage lichen, meaning forest mammals use it as a winter food source (USDA and USDI 2007). The lichen can be locally abundant, where it tends to be the dominant epiphytic lichen (Lesher et al. 2003). *B. tortuosa* reproduces mainly through vegetative propagation; the thallus fragments and disperses over short distances (few hundred meters) (Derr et al. 2003). Sexual reproduction is rare because the lichen produces relatively few apothecia (spore producing structures). It has a moderate rate of growth and reproduction, so that reduced populations can recover through natural recolonization over a period of several years. Because it mainly relies on vegetative propagation over short distances, the lichen has a low dispersal rate (ORBIC 2004).

Range

B. tortuosa is widespread and has been found in western North America, British Columbia, Norway, and the Carpathian Mountains in Europe (ORBIC 2004). In North America, it occurs along the west coast from central California north to southern British Columbia. It also occurs east to western Montana. Within the range of the NSO, *B. tortuosa* occurs throughout northern California and along the eastern slopes of the Cascade Range, particularly in Oregon (Lesher et al. 2003). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across western North America and Europe. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *B. tortuosa* from more than 500 element occurrences worldwide. In the Pacific Northwest, Oregon had the highest number of occurrences at 170, with fewer in Washington (32) and California (10) (ORBIC 2004). Based on data available in 2004, many large populations were located in southern Oregon, while outside of Oregon the species was much less common. The species was found in two locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 766 sites on federal lands and 782 total sites on all lands in the NSO range.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, including *B. tortuosa*, and resulted in six observations of individuals or populations of *B. tortuosa*. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

B. tortuosa occupies trees and shrubs in well-lit, open forests at low to mid-elevation ranges. It tends to prefer drier habitats, especially the transition areas between the wet coastal forests and drier inland forests (Derr et al. 2003, ORBIC 2004). The most common host trees include ponderosa pine, lodgepole pine, Oregon white oak, and California black oak (Lesher et al. 2003). *B. tortuosa* appears to occur most often in areas that have frequent, low-intensity fires because the lichen appears to prefer open, well-lit stands (Lesher et al. 2003). However, it is also found in areas of fire suppression within thick patches of manzanita (ORBIC 2004) and in shady, dense lodgepole pine stands (Lesher et al. 2003). Mature or old-growth trees are almost always present where *B. tortuosa* has been documented, despite the variety in habitat types (Lesher et al. 2003). *B. tortuosa* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

As with other *Bryoria* species, threats to *B. tortuosa* are those actions that alter stand conditions and habitat integrity, such as damage to colonized bark or wood, injury to root systems, development that blocks dispersal to potential habitat, and air pollution. Other threats include logging, grazing, recreational activities, and change in fire regimes (Stein 2004). A major threat is repeated human disturbance and encroachment by development, resulting in habitat fragmentation. *B. tortuosa* occupies lower elevation transition zones where people tend to reside and recreate (ORBIC 2004).

B. tortuosa has a moderate rate of reproduction, meaning the species may be able to overcome some decreases in population through natural recolonization over a period of several years

(ORBIC 2004). Habitat fragmentation may be a greater threat, however, as *B. tortuosa* is slow to spread due to its low dispersal rate (see Life History discussion above).

Management Recommendations

As a Category A S&M species in the western part of the NSO range, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). As a Category D S&M species in the eastern part of the NSO range, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence. Management recommendations were developed for *B. tortuosa* in 2003 and differentiated by geographic region (Lesher et al. 2003). On the west side of the Cascade Range and in California, the guidance is to manage populations at known sites by maintaining the ecological conditions associated with *B. tortuosa*, including stand structure, substrate, and microclimate. On the east side of the Cascade Range, the guidance is to manage populations at the fifth field watershed level. In addition, when management activities are implemented near known sites east of the Cascade Range, populations should be monitored to confirm that ecological conditions associated with *B. tortuosa* have been maintained.

3.1.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *B. tortuosa* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table BRTO-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 1,363 observations from BLM and Forest Service geodatabases were converted into 610 sites in the NSO range (region). Table BRTO-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table BRTO-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure BRTO-1 displays the regional distribution of the species across BLM and NFS lands, and Figure BRTO-2 displays the species' regional distribution with the extent of coniferous, mixed hardwood-coniferous, and hardwood forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE BRTO-1

Number of *Bryoria tortuosa* Sites (2013)

Location*	Number of Sites
Regional Area	610
Local Area	171
Analysis Area (Project Area)	11 (10)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE BRTO-2

Distribution of *Bryoria tortuosa* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	476	170	11
Forest Service	107	-	-
NPS	-	-	-
Fish and Wildlife Service	1	-	-
Other (Private, State, etc.)	142	41	6

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE BRTO-3

Distribution of *Bryoria tortuosa* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	212	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	2	-	-
Congressionally Reserved (CR)	**1**	**-**	**-**
Late Successional Reserve (LSR)	**11**	**-**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**8**	**-**	**-**
Managed Late Successional Area (MLSA)	26	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	334	170	11
Riparian Reserve	**3**	**1**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

B. tortuosa has a wide distribution across 10 physiographic provinces in Washington (Western Lowlands, Eastern Cascades), Oregon (Coast Range, Willamette Valley, Cascades East and West, and Klamath Mountain), and California (Coast, Klamath, and Cascades). Most of the sites are found in southern Oregon in the Klamath Mountains and Cascade Range, where sites are clustered and relatively close to one another in groups. Several clusters of sites are also located in the eastern Cascade Range in Washington and Oregon. Other areas contain scattered sites. *B. tortuosa* appears to be well distributed in the Klamath Mountains and southern Cascade Range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of the species across forests that may provide suitable habitat in the mountain ranges.

Of the 610 sites in the region, 142 sites are located on private, state, or other lands (at least partially) and 579 sites are on BLM and NFS lands (at least partially). Sites managed by the BLM Districts that encompass the project area include 476 sites in the Medford District. Sites managed by the National Forests that encompass the project area include five sites on the Rogue River National Forest. The remaining 102 sites on NFS lands are on the Deschutes, Mt. Hood, and Wenatchee National Forests.

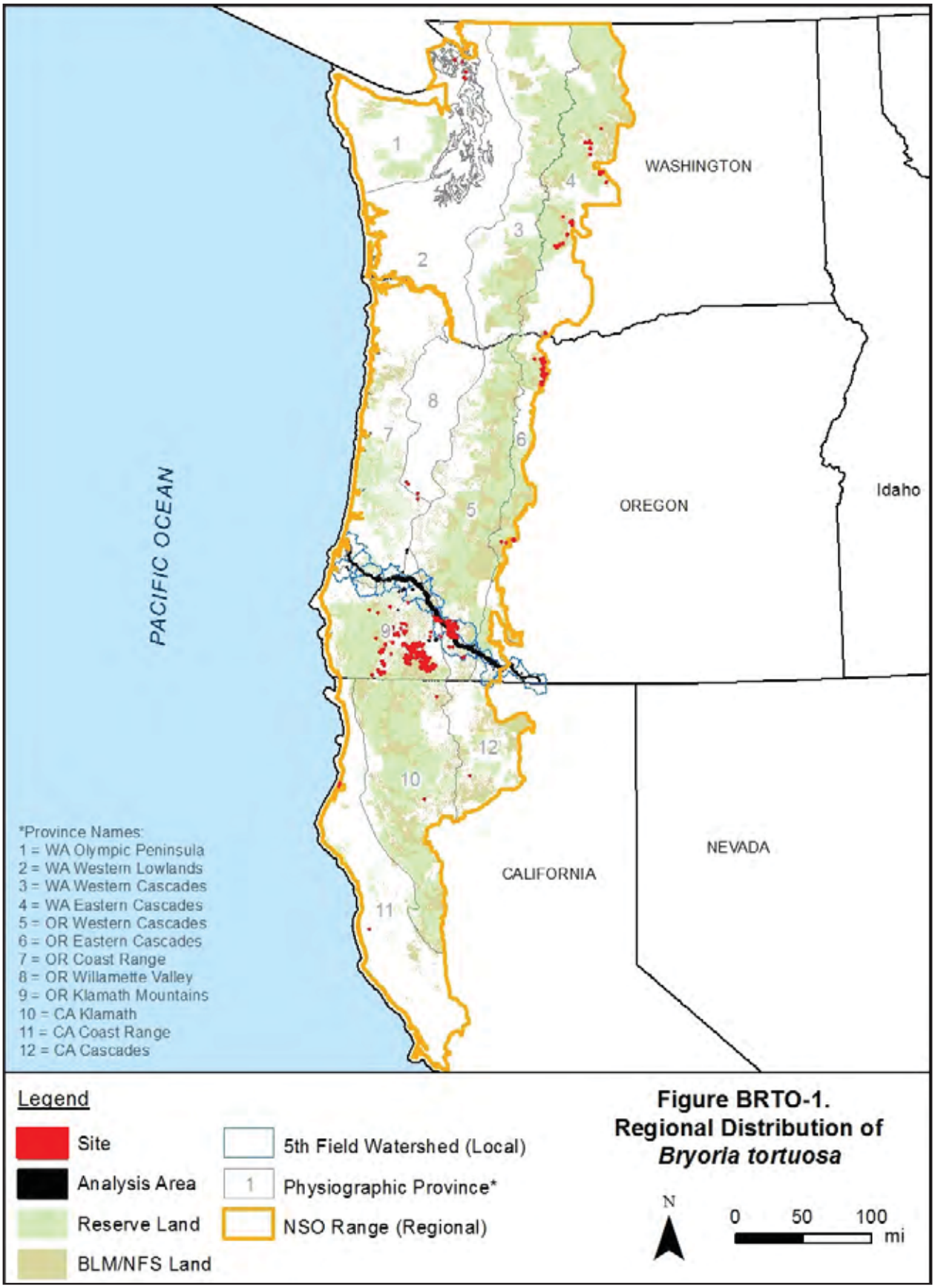


Figure BRTO-1. Regional Distribution of *Bryoria tortuosa*

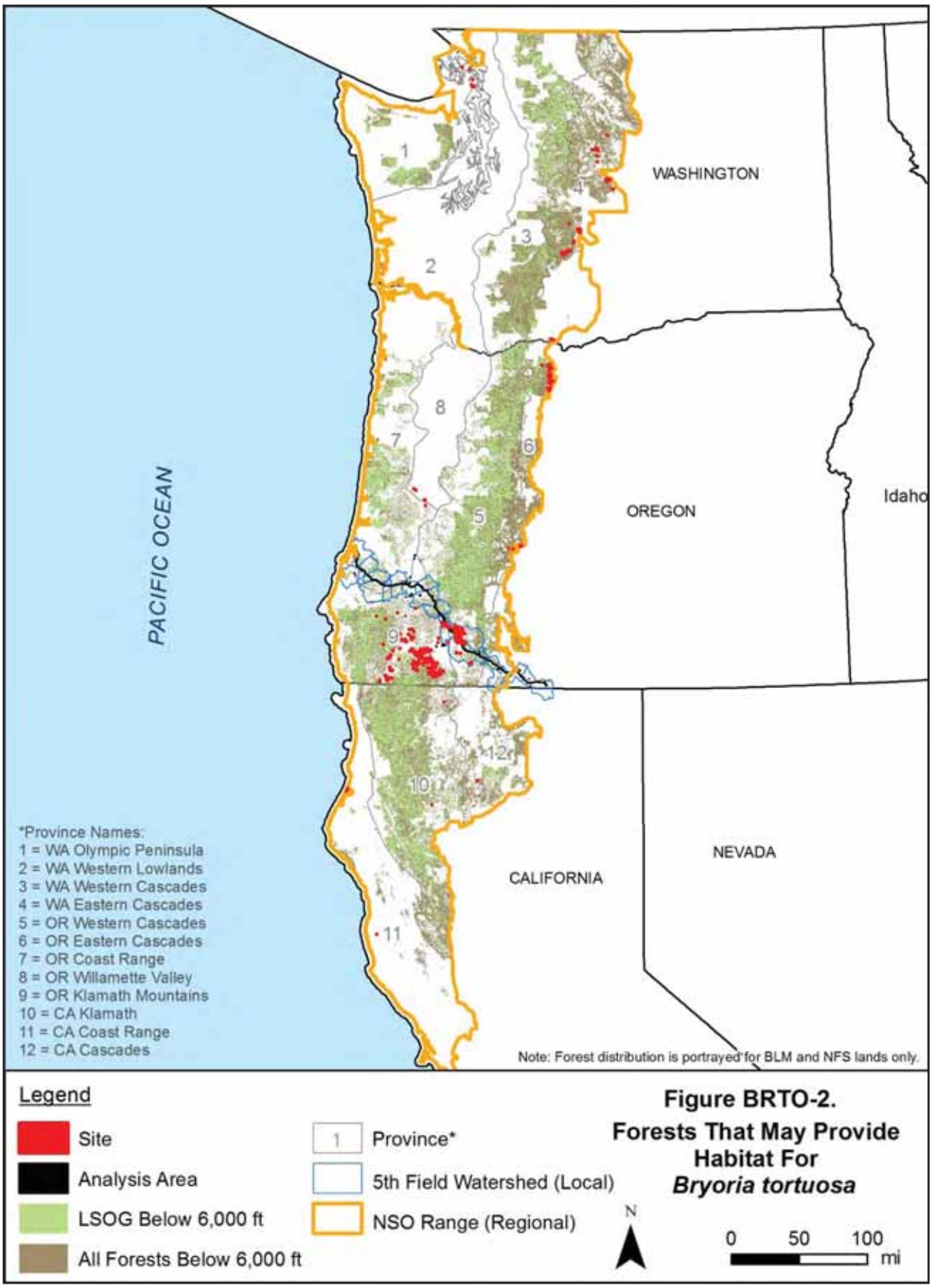


Figure BRTO-2.
Forests That May Provide Habitat For *Bryoria tortuosa*

Across the NSO range, 23 sites are located on reserve lands managed by BLM and the Forest Service, including 11 in LSRs, one in a Congressionally Reserved area, eight in Known Owl Activity Centers, and three in Riparian Reserves. This represents 4 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

B. tortuosa is not necessarily more commonly found in LSOG forests based on available data (246 of 610 total sites are in LSOG), and it is known to occur in well-lit and open forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in all forest types below about 5,300 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *B. tortuosa* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 10.4 million acres in reserve land allocations (54 percent of the forests; Table BRTO-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure BRTO-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although all forests types below 6,000 feet msl are widespread across the NSO range, LSOG forests are less common and primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE BRTO-4

Extent of Forests that Could Provide Habitat for *Bryoria tortuosa* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	19,194,850	10,381,240	6,092,570	3,750,320
Local Area	611,850	199,720	185,170	80,260
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *B. tortuosa* is found in five 5th field watersheds that overlap the project area (see Table BRTO-5 and Figure BRTO-3). The sites are clustered and near one another in the western Cascade Range and the eastern Klamath Mountains, with a single site located in the South Umpqua River watershed. These sites are part of the large group of sites in southern Oregon (see Regional Distribution discussion above). Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of all forest types, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located to the southwest in the Klamath Mountains.

Of the 171 sites in the local area, 170 are on BLM lands in the Medford District, and 41 sites are at least partially on private lands. Most of the local area sites are on land designated as Other (Matrix); one site is in a Riparian Reserve, representing less than 1 percent of the BLM-managed sites. The site in a Riparian Reserve is in the Big Butte Creek watershed (Table BRTO-5).

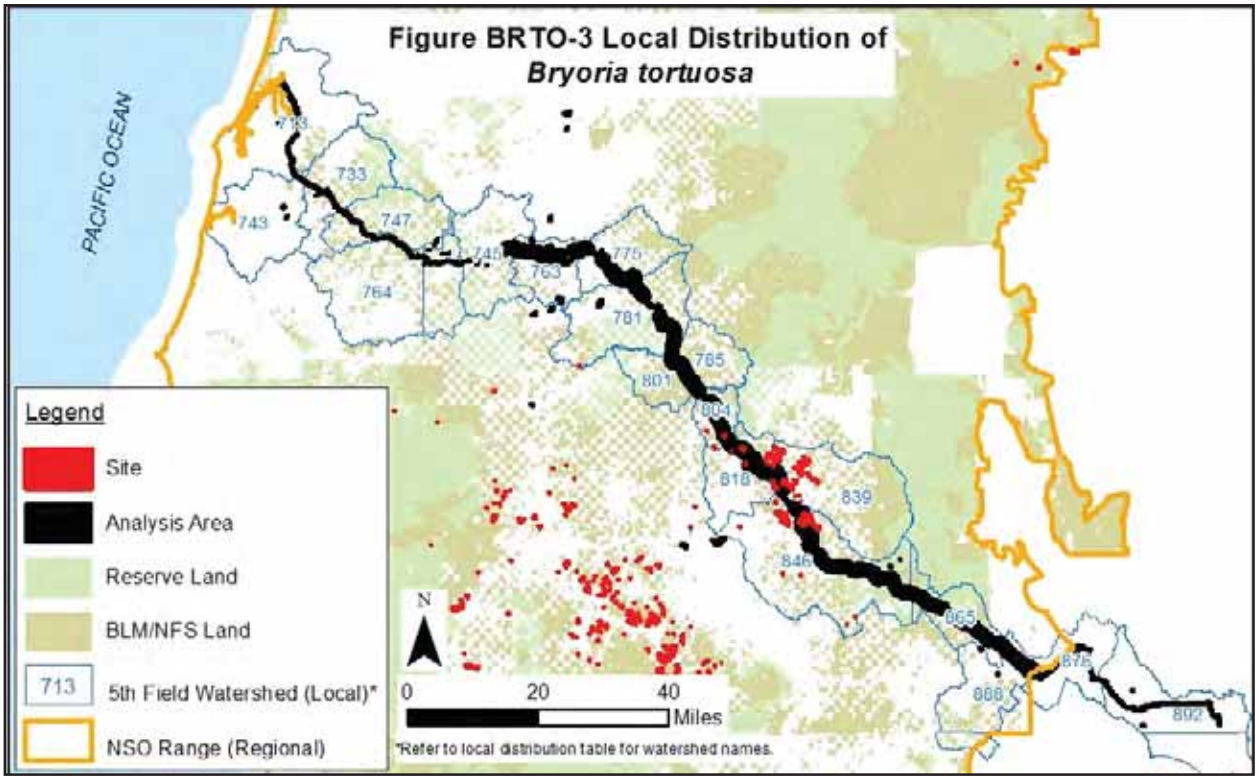
TABLE BRTO-5

Distribution of *Bryoria tortuosa* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	77*	1
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	85	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	6*	-
South Umpqua River (781)	1	-
Spencer Creek (865)	-	-
Trail Creek (804)	4	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011

*Note: Site counts are not additive because two sites occur in both watersheds and the counts overlap.



Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 611,850 acres on BLM and NFS lands in the local area, including 199,720 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 185,170 acres are LSOG, including 80,260 acres in reserve land allocations (43 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the

number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures BRTO-2 and BRTO-3).

Analysis/Project Area Distribution

The analysis area contains 11 sites of *B. tortuosa*, and the project area contains 10 sites. All 11 sites are at least partially on BLM-managed lands (Medford District), and six are partially on private land. The sites are on land designated as Other (Matrix). The sites are a part of a group of sites in the western Cascade Range and eastern Klamath Mountains, and several sites are located within the immediate vicinity of the sites (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in seven total observations of the species in six locations in or near the project area during 2007 (Siskiyou BioSurvey LLC 2008). These observations comprise six of the sites in the analysis area. An estimated 16 recorded observations from agency databases from 2001 and 2002 comprise the other five sites. Within the project area, four sites are between MPs 119.5 and 124.9, and four sites are between MPs 139.8 and 142.0. Two sites are along roads; one is west of MP 127.3 and another is east of MP 133.1.

Project Impacts

Analysis

The PCGP Project would affect 11 sites out of the 579 sites on BLM- and Forest Service-managed lands in the region, representing approximately 2 percent of the sites (or 11 out of 610 total sites on all lands in the NSO range). Table BRTO-6 presents an overview of the features of the PCGP Project that would affect the *B. tortuosa* sites. The construction corridor and associated work and storage areas would affect approximately 29 acres within 10 sites (about 12 percent of all sites in the analysis area). One site could be indirectly affected by road improvements, but would not be subject to direct effects. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *B. tortuosa* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 16.2 acres of vegetation and soil within nine sites and could result in the removal of *B. tortuosa* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 5.1 acres within seven sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees could negatively affect *B. tortuosa* in adjacent areas by removing its habitat and potential host trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species, although the species seems to prefer semi-open habitats and may be resilient to edge effects in some sites. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage

within UCSAs would disturb about 2.4 acres of understory habitat in five sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Road improvements and establishment would disturb approximately 5.2 acres within two sites and could remove habitat and extant populations or individuals of *B. tortuosa*. Hydrostatic testing would take place on less than 0.1 acre of one site and is not likely to affect individuals or populations of the species because it would be done after the pipeline is installed and ground disturbance would have already affected the site. Road improvements could also modify microclimate conditions near one site, potentially affecting site persistence even though the site would not be directly affected.

TABLE BRTO-6

Impacts to *Bryoria tortuosa* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	9	16.2 ac
Temporary Extra Work Area (TEWA)	7	5.1 ac
Uncleared Storage Area (UCSA)	5	2.4 ac
Roads (TMP)	2	5.2 ac
Other Minimal Disturbance Activities	1	0.04 ac

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *B. tortuosa*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 11 sites as a result of the PCGP Project, 159 sites of *B. tortuosa* would remain on BLM lands in the local area, with no sites in reserves, and 568 sites, including 23 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 23 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 4 percent of the remaining *B. tortuosa* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest

Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *B. tortuosa* is a Category A (rare) S&M species in the western Cascade Range in Oregon (where nine sites are in the analysis area) and a Category D (uncommon) S&M species in the Klamath Mountains in Oregon (where two sites are in the analysis area). Per the 2001 ROD, all known sites of Category A species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *B. tortuosa* has a wide distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (579 on BLM and NFS lands). The species appears to be well distributed in the Klamath Mountains and southern Cascade Range in Oregon. The currently known number of sites on BLM and NFS lands is actually a decrease of sites documented since 2007, but is still moderate-high. Several sites were documented during PCGP Project surveys.
    - An estimated 4 percent of the sites (23 sites) are in reserves.
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widespread across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 54 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous, mixed hardwood-coniferous, and hardwood forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *B. tortuosa*.
- The PCGP Project would affect 11 of 579 BLM- and Forest Service-managed sites of *B. tortuosa*, representing approximately 2 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the 11 sites, a moderate-high number of sites (568) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (159 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across five 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP project would not affect any sites in reserves, and the percentage of sites in reserves would remain about the same (4 percent). Of the remaining sites, 19 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and eight are at least partially in Congressionally Reserved areas where

management activities that may adversely affect *B. tortuosa* are unlikely. Three sites are in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.

- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.4 million acres (54 percent) of coniferous, mixed hardwood-coniferous, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *B. tortuosa*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category A and D species for which pre-disturbance surveys are not always practical and have not necessarily been extensively conducted; thus, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during surveys, including surveys associated with the PCGP Project.

3.1.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *B. tortuosa* at 11 sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 568 sites would remain on BLM and NFS lands across the region, and 159 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *B. tortuosa* at 11 sites, these sites are part of the many sites in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *B. tortuosa* would persist in the region without considering the 11 sites as part of the population.
- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.4 million acres (54 percent) of coniferous, mixed hardwood-coniferous, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2004.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *B. tortuosa* sites in the analysis area, although some individuals or populations within the sites may persist following project

implementation. Based on the above conclusions, avoidance of the 11 *B. tortuosa* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *B. tortuosa* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

3.2 CALICIUM GLAUCELLUM

Calicium glaucellum is an epiphytic pin lichen in the Caliciaceae family (formerly Parmeliaceae) and is commonly known as white-collar stubble.

3.2.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. glaucellum* as a Category F (uncommon) species. The ORBIC evaluated *C. glaucellum* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between not rare and apparently secure, but with cause for long-term concern, and widespread, abundant, and secure within its global range (G4G5). The species was considered to be not rare and apparently secure, but with cause for long-term concern in Oregon (S4). The species is not currently on the ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

3.2.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology and reproductive biology of *C. glaucellum*, which is thought to grow slowly, reproduce infrequently, and have such low fecundity that reduced populations recover very slowly (ORBIC 2004). *C. glaucellum* appears to be able to disperse and colonize suitable substrates once they become available, despite its slow growth rate. It may disperse by utilizing bird and insect vectors. Calicioid lichens, such as *C. glaucellum*, occur as colonies, covering only a few centimeters on a single tree within a stand. Calicioid lichens also have a crustose thallus and minute stalked fruiting bodies resembling the head of a pin, hence the common name of pin lichen for these types of lichens (Huff 2010a).

Range

C. glaucellum is widespread in cool temperate to temperate regions of the northern and southern hemispheres. Across the northern hemisphere, it has been found in North America, Europe, and

Asia (ORBIC 2004). Across the southern hemisphere, it has been found in Australasia and Central and South Americas. The currently known range of the species within the NSO range based on 2014 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across parts of North, Central, and South Americas; Europe; Asia; and Australasia. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. glaucellum* from more than 1,000 element occurrences worldwide. In the Pacific Northwest, Oregon had the highest number of occurrences at more than 30, with fewer in Washington (more than 12) and California (more than 5) (ORBIC 2004). Based on 2004 information, the species had experienced a population decline across its range since pre-industrial times, correlating to the reduction of old-growth forests. In 2004, *C. glaucellum* was considered to be highly vulnerable, primarily because of its slow reproductive process and growth, low dispersal rate, and presumed close association with old-growth forests. The species was found in 71 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 93 total sites in the NSO range, all on federal lands.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, but did not target *C. glaucellum*. Incidental observations of other species were recorded, and *C. glaucellum* was recorded in one location with several other lichens. The current estimated number of sites and distribution of the species based on 2014 data are presented below under the Species Distribution discussion.

Habitat

C. glaucellum has a broad global distribution with wide ecological amplitude and has been found in a variety of habitats and stand ages (USDA and USDI 2007). In the Pacific Northwest, it has primarily been found on conifer bark and wood in montane forests (Rikkinen 2003). The species is also found on exposed snags near the Pacific Coast, but is largely absent from closed low-elevation rainforests. *C. glaucellum* appears to prefer older trees in the Pacific Northwest, and most known occurrences are on conifers more than 200 years old, with occasional occurrences on younger trees (e.g., 100 years old) (ORBIC 2004). Like other calicioid lichens this species occupies sheltered areas, avoiding direct contact with water. Based on available information, *C. glaucellum* may prefer specific microclimate conditions of LSOG forests, but it is not likely restricted to these forests.

Threats

The loss of habitat through timber harvest and stand replacement fire is the principle threat to other pin lichens and is likely a primary threat to *C. glaucellum* as well (Huff 2010a). Like other calicioid lichens, the removal of old-growth forests, particularly from logging practices, has been the principal cause for the species' decline worldwide and in the Pacific Northwest (ORBIC

2004). Removal of old-growth forests has undoubtedly had severe impacts on the number and sizes of populations and on the average dispersal distance necessary to colonize new substrates. Because of its relationship to older forests and its life history, populations can require several years to recover from disturbance.

With the establishment of LSRs and the reduction of logging in old-growth forests in the Pacific Northwest, *C. glaucellum* has the potential to recover in the region due to its ability to disperse to appropriate substrates once they are available, even when those substrates are rather isolated. Although little is known about the reproductive and dispersal biology of the species, it may be able to overcome some habitat fragmentation, presuming habitat is available, and populations may increase as LSRs continue to function and LSOG forests are maintained and enhanced across the Pacific Northwest (ORBIC 2004).

Management Recommendations

As a Category F S&M species, the 2001 ROD indicates that management of known sites is not necessary, but a determination needs to be made regarding which S&M category, if any, the species should be assigned to (USDA and USDI 2001). No management recommendations have been developed for *C. glaucellum.*

3.2.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. glaucellum* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CAGL-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 96 observations from BLM and Forest Service geodatabases were converted into 89 sites in the NSO range (region). Table CAGL-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CAGL-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CAGL-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CAGL-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE CAGL-1

Number of *Calicium glaucellum* Sites (2014)

Location*	Number of Sites
Regional Area	89
Local Area	5
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, April 7, 2014
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CAGL-2

Distribution of *Calicium glaucellum* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	11	4	1
Forest Service	77	1	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	4	1	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CAGL-3

Distribution of *Calicium glaucellum* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	8	-	-
Congressionally Reserved (CR)	**17**	**-**	**-**
Late Successional Reserve (LSR)	**41**	**3**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	21	2	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

C. glaucellum has a wide distribution across eight physiographic provinces in Washington (Olympic Peninsula and Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Klamath). Sites are primarily found in the Cascade Range in Oregon and Washington and Klamath Mountains in Oregon and California. Several clusters of sites are found in the Cascade Range in Oregon and Washington. Sites are more scattered in the Klamath Mountains and other outlying areas. *C. glaucellum* appears to be well distributed in the Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.



Figure CAGL-1.
Regional Distribution of *Calicium glaucellum*

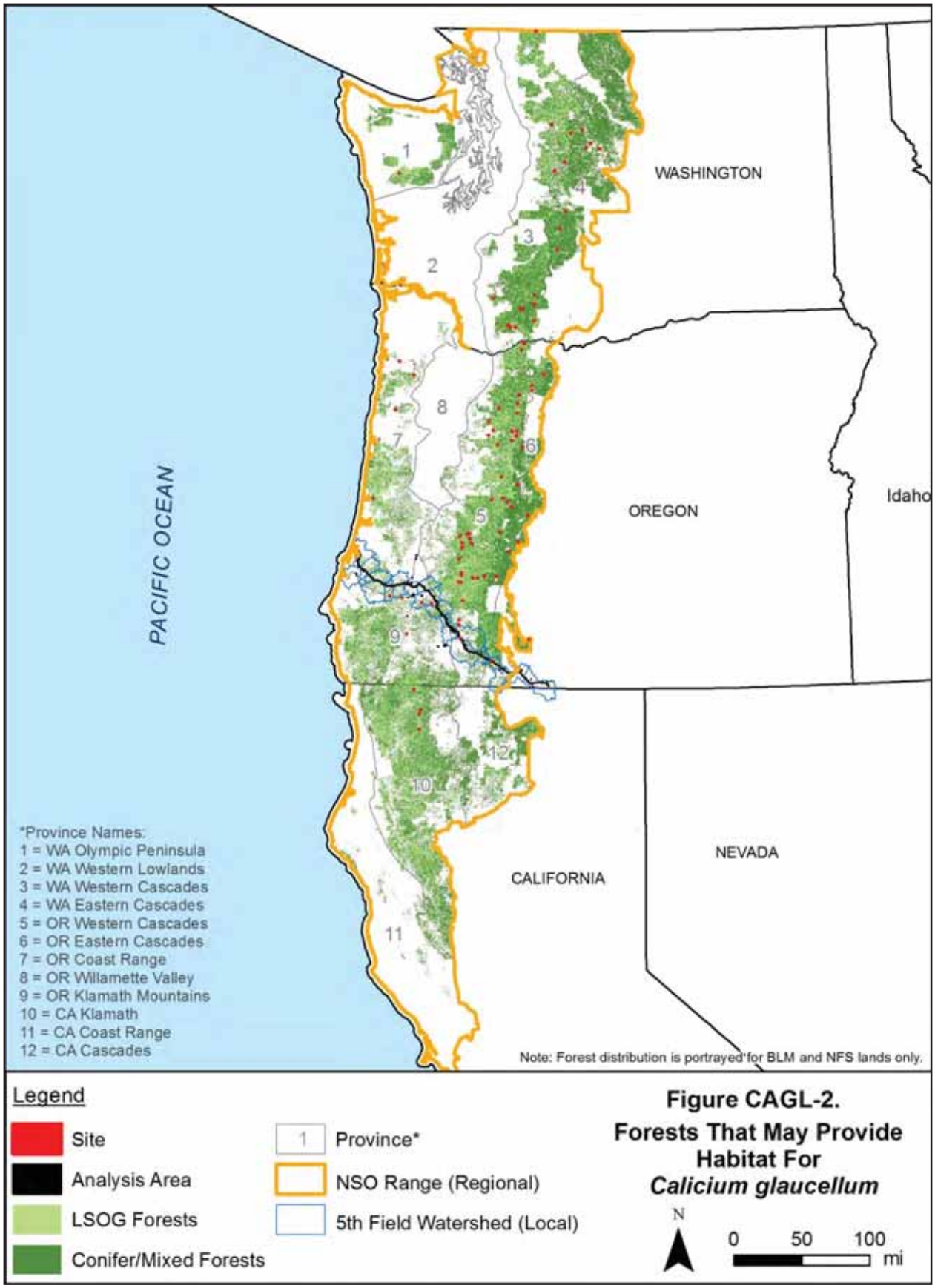


Figure CAGL-2.
Forests That May Provide Habitat For *Calicium glaucellum*

Four of 89 sites are located on private lands (at least partially), and 88 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include four sites in the Medford District and four sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest, 16 sites on the Umpqua National Forest, and two sites on the Winema National Forest. The remaining 61 sites on BLM and NFS lands are in the Salem District and on the Deschutes, Gifford-Pinchot, Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Shasta-Trinity, Siuslaw, Wenatchee, and Willamette National Forests.

Across the NSO range, 60 sites are located on reserve lands managed by BLM and the Forest Service, including 41 in LSRs, 17 in Congressionally Reserved areas, and two in Known Owl Activity Centers. This represents 68 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

C. glaucellum is more commonly found in LSOG forests based on available data (66 of 89 total sites are in LSOG), but it is also found in younger forests and may not be restricted to LSOG forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. glaucellum* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table CAGL-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure CAGL-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CAGL-4

Extent of Forests that Could Provide Habitat for *Calicium glaucellum* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	290	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. glaucellum* is found in four 5th field watersheds that overlap the project area (see Table CAGL-5 and Figure CAGL-3). The sites are scattered across the watersheds in the central and eastern portions of the local area. Across the watersheds, some level of connectivity appears to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to other sites in the Cascade Range and Klamath Mountains. Several regional sites occur to the

north in the Cascade Range, and a few regional sites occur to the south in the Klamath Mountains.

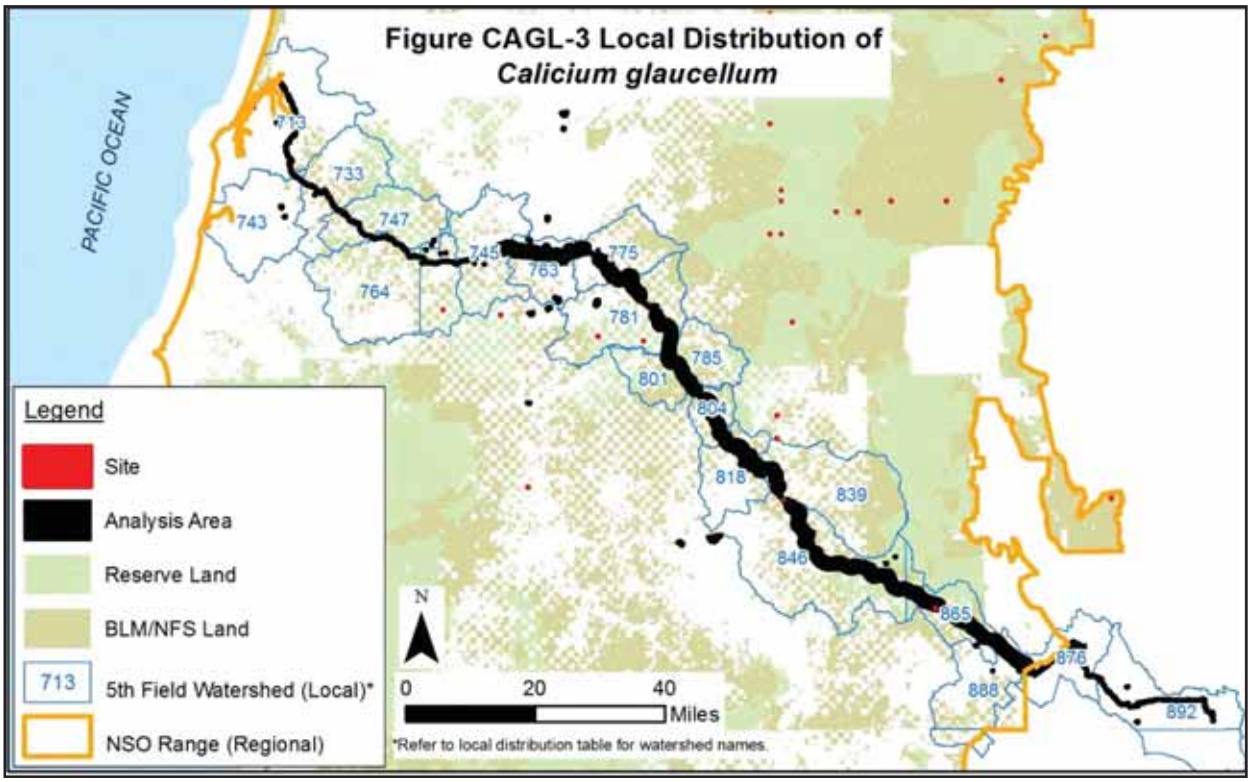
All five sites in the local area are at least partially on BLM or NFS lands (Roseburg and Medford Districts and Winema National Forest), with one site partially on private land. Two of the local sites are on land designated as Other (Matrix), and the other three sites are in LSRs. The number of sites in reserves represents 60 percent of the sites in the local area. Sites on reserve lands are in the Middle Fork Coquille River and South Umpqua River watersheds (Table CAGL-5).

TABLE CAGL-5

Distribution of *Calicium glaucellum* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	1	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	1	1
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	2	2
Spencer Creek (865)	1	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, April 7, 2014; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous encompass approximately 1.3 million acres on BLM and NFS lands in the local area, with 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserves (44 percent of the forests). Other sites may also exist in the local area, particularly in the Cascade Range and Klamath Mountains, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures CAGL-2 and CAGL-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *C. glaucellum*. This site is on BLM-managed land in the Medford District. It is on land designated as Other (Matrix) in the Little Butte Creek watershed. This site is one of the southernmost sites in the Cascade Range, and several sites are located to the north and southeast of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in one incidental observation of the species with several other lichens (Siskiyou BioSurvey LLC 2011a). This observation comprises the site in the analysis area, which is located just east of MP 136.9.

Project Impacts

Analysis

The PCGP Project could affect one site out of the 88 sites on BLM- and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or one out of 89 total sites on all lands in the NSO range). Table CAGL-6 presents an overview of the features of the PCGP Project that would affect the *C. glaucellum* site. The construction corridor and associated work and storage areas would not directly affect the site, but road improvements would result in direct effects on the site. Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. glaucellum* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

TABLE CAGL -6

Impacts to *Calicium glaucellum* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	-	-
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	1	0.9 ac
Other Minimal Disturbance Activity	-	-

ac = acres

Road improvements and establishment would disturb approximately 0.9 acre within one site and could remove habitat and extant populations or individuals of *C. glaucellum*. The *C. glaucellum* site could also be indirectly affected by activities within the corridor and TEWAs. The establishment of the corridor could modify microclimate conditions near populations or individuals of *C. glaucellum* in the site. The removal of forests and host trees could negatively affect *C. glaucellum* in nearby areas by removing its habitat and reducing opportunities for dispersal, potentially affecting site persistence even though the site is not disturbed. In addition, modification of habitat conditions as a result of the corridor and TEWAs could make habitat

within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG coniferous and mixed hardwood-coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. glaucellum*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the effects of the PCGP Project, four sites of *C. glaucellum* would remain on BLM and NFS lands in the local area, including three in reserves, and 87 sites, including 60 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 60 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 69 percent of the remaining *C. glaucellum* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. glaucellum* is a Category F (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, information on Category F species is insufficient to determine what level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:

  - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
  - *C. glaucellum* has a wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (88 on BLM and NFS lands). The species appears to be well distributed in the Cascade Range in Oregon and Washington. The currently known number of sites on BLM and NFS lands is about the same number of sites documented in 2007. One site was documented during the PCGP Project surveys.
  - An estimated 68 percent of the sites (60 sites) are in reserves.

- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range, Klamath Mountains, and Coast Range, where most sites are documented. A subcomponent of these forests likely provides habitat for *C. glaucellum*.
- The PCGP Project would affect one of 88 BLM- and Forest Service-managed sites of *C. glaucellum*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (87) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Few sites (four sites) would remain in the local vicinity of the analysis area with several other sites in the nearby Cascade Range. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would remain about same (69 percent). Of the remaining sites, 43 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 17 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. glaucellum* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. glaucellum*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category F species for which pre-disturbance surveys are not applicable and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

3.2.4 Conclusions

If implemented as proposed, the PCGP Project would affect site persistence of *C. glaucellum* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 87 sites would remain on BLM and NFS lands across the region, and four sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. glaucellum* at one site, this site is part of the many sites in the Cascade Range in Oregon, where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. glaucellum* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2004.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *C. glaucellum* site in the analysis area, although some individuals or populations within the site may persist following project implementation. Based on the above conclusions, avoidance of the *C. glaucellum* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

3.3 CALICIUM VIRIDE

Calicium viride is an epiphytic pin lichen in the Caliciaceae family (formerly Parmeliaceae) and does not have a common name.

3.3.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. viride* as a Category F (uncommon) species. The ORBIC evaluated *C. viride* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between not rare and apparently secure, but with cause for long-term concern, and widespread,

abundant, and secure within its global range (G4G5). The species was considered to be not rare and apparently secure, but with cause for long-term concern in Oregon (S4). The species is not currently on the ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

3.3.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology and reproductive biology of *C. viride*, which is thought to grow slowly, reproduce infrequently, and have such low fecundity that reduced populations recover very slowly (ORBIC 2004). *C. viride* appears to be able to disperse and colonize suitable substrates once they become available, despite its slow growth rate. It may disperse by utilizing bird and insect vectors. Calicioid lichens, such as *C. viride*, occur as colonies, covering only a few centimeters on a single tree within a stand. Calicioid lichens also have a crustose thallus and minute stalked fruiting bodies resembling the head of a pin, hence the common name of pin lichen for these types of lichens (Huff 2010a).

Range

C. viride is widespread in cool to temperate regions of the northern hemisphere and southern South America. Across the northern hemisphere, it has been found in North America, Finland, Norway, and Sweden (ORBIC 2004). In the Pacific Northwest, the species is widespread in temperate to boreal regions (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across parts of North and South Americas and Europe. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. viride* from more than 1,000 element occurrences worldwide, which included many historic occurrences. Approximately 300 element occurrences were recorded in North America in 2004. In the Pacific Northwest, British Columbia had the highest number of occurrences at more than 67. Oregon had more than 29 occurrences, Washington had more than eight, and California had more than six (ORBIC 2004). Based on 2004 information, the species had experienced a population decline across its range since pre-industrial times, correlating to the reduction of old-growth forests. In 2004, *C. viride* was considered to be highly vulnerable, primarily because of its slow reproductive process and growth, low dispersal rate,

and presumed close association with old-growth forests. The species was found in 45 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported a total of 276 sites, all on federal lands.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, but did not target *C. viride*. Incidental observations of other species were recorded, and *C. viride* was recorded in one location. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. viride is primarily found on conifer bark and wood in old-growth forests (Rikkinen 2003). The species appears to be restricted to older trees; in the Pacific Northwest, most known occurrences are on conifers more than 200 years old, with an occasional occurrence on slightly younger trees (e.g., 150 years old) (ORBIC 2004). *C. viride* prefers seasonally dry forests and occupies sheltered areas on tree trunks, avoiding direct contact with water (Peterson 2008, Rikkinen 2003). It is most often found in colonies on the basal trunks of trees and the underside of slanting trunks and branches (ORBIC 2004, Rikkinen 2003). This lichen has a broad global distribution with wide ecological amplitude and has been found in a variety of habitats and stand ages (USDA and USDI 2007). Based on available information, *C. viride* may prefer specific microclimate conditions of LSOG forests, but it is not likely restricted to these forests.

Threats

The loss of habitat through timber harvest and stand replacement fire is the principle threat to other pin lichens and is likely a primary threat to *C. viride* as well (Huff 2010a). Like other calicioid lichens, the removal of old-growth forests, particularly from logging practices, has been the principal cause for the species' decline worldwide and in the Pacific Northwest (ORBIC 2004). Removal of old-growth forests has undoubtedly had severe impacts on the number and sizes of populations and on the average dispersal distance necessary to colonize new substrates. Because of its relationship to older forests and its life history, populations can require several years to recover from disturbance.

With the establishment of LSRs and the reduction of logging in old-growth forests in the Pacific Northwest, *C. viride* has the potential to recover in the region due to its ability to disperse to appropriate substrates once they are available, even when those substrates are rather isolated. Although little is known about the reproductive and dispersal biology of the species, it may be able to overcome some habitat fragmentation, presuming habitat is available, and populations may increase as LSRs continue to function and LSOG forests are maintained and enhanced across the Pacific Northwest (ORBIC 2004).

Management Recommendations

As a Category F S&M species, the 2001 ROD indicates that management of known sites is not necessary, but a determination needs to be made regarding which S&M category, if any, the

species should be assigned to (USDA and USDI 2001). No management recommendations have been developed for *C. viride* because it was removed from the S&M list after 2001.

3.3.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. viride* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CAVI-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 267 observations from BLM and Forest Service geodatabases were converted into 147 sites in the NSO range (region). Table CAVI-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CAVI-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CAVI-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CAVI-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE CAVI-1

Number of *Calicium viride* Sites (2013)

Location*	Number of Sites
Regional Area	147
Local Area	49
Analysis Area (Project Area)	1 (0)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CAVI-2

Distribution of *Calicium viride* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	96	49	1
Forest Service	49	-	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	19	12	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CAVI-3

Distribution of *Calicium viride* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	1	-	-
Adaptive Management Reserves (AMR)	4	-	-
Administratively Withdrawn (AW)	20	-	-
Congressionally Reserved (CR)	**14**	**-**	**-**
Late Successional Reserve (LSR)	**40**	**12**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**4**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	63	37	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

C. viride has a wide distribution across nine physiographic provinces in Washington (Western Lowlands and Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, Willamette Valley, and Klamath Mountain), and California (Klamath). Sites are scattered across the Cascade Range in Oregon and Washington, Klamath Mountains in California, and Coast Range in Oregon. Large clusters of sites are found in the southern Cascade Range in Oregon, and several smaller clusters are found throughout the Coast Range, Klamath Mountains, and other parts of the Cascade Range. *C. viride* appears to be well distributed throughout its range within the NSO range based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Nineteen of 147 sites are located on private lands (at least partially), and 145 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 71 sites in the Medford District and 16 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include two sites on the Rogue River National Forest, 11 sites on the Umpqua National Forest, and three sites on the Winema National Forest. The remaining 41 sites on BLM and NFS lands are in the Salem and Eugene Districts and on the Gifford-Pinchot, Klamath, Mendocino, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Shasta-Trinity, Siuslaw, and Wenatchee National Forests.

Across the NSO range, 58 sites are located on reserve lands managed by BLM and the Forest Service, including 40 in LSRs, 14 in Congressionally Reserved areas, and four in Known Owl Activity Centers. This represents 40 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.



Figure CAVI-1. Regional Distribution of *Calicium viride*

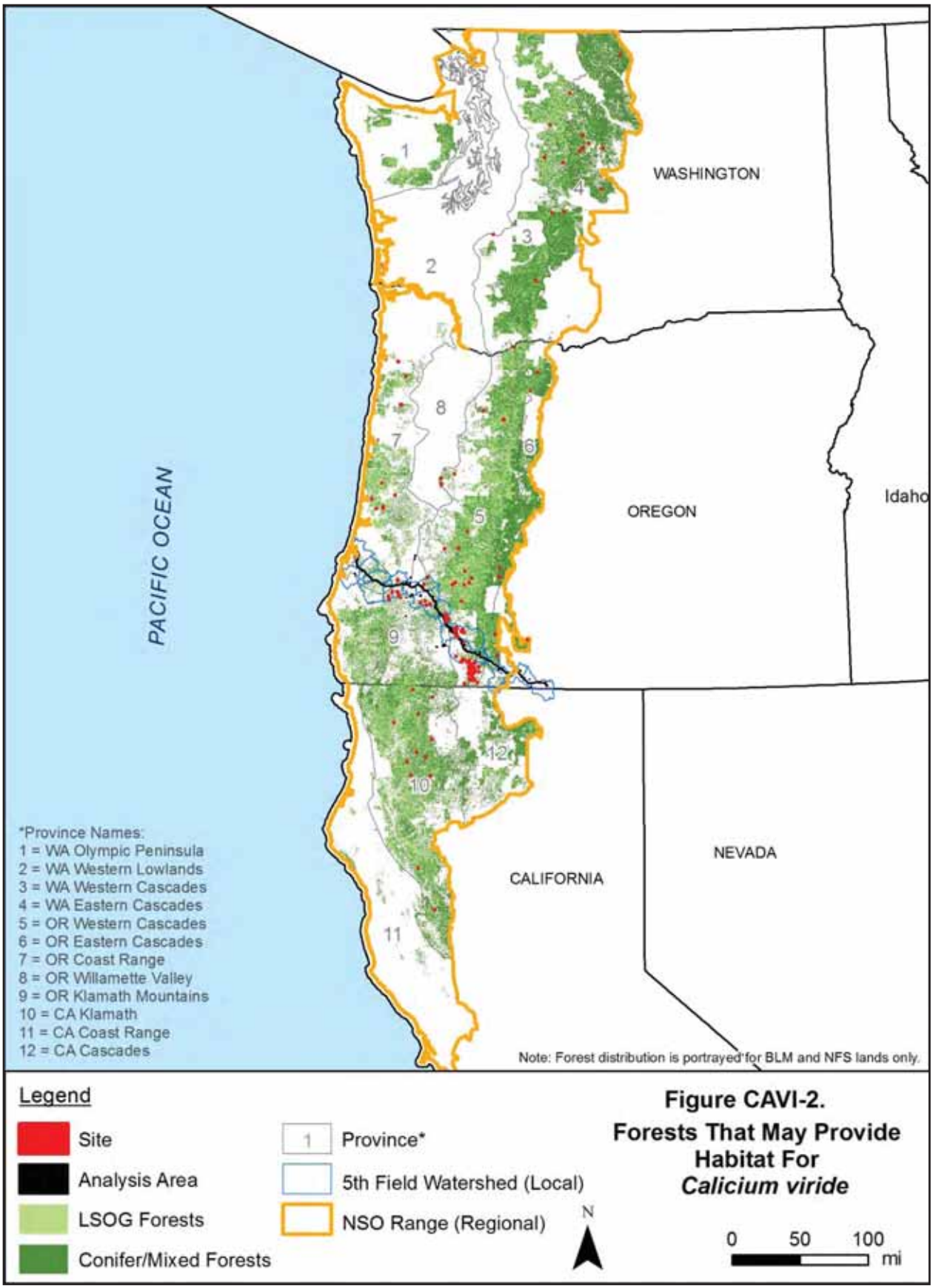


Figure CAVI-2.
Forests That May Provide Habitat For *Calicium viride*

C. viride is more commonly found in LSOG forests based on available data (118 of 147 total sites are in LSOG), but it is also found in a variety of habitat types and may not be restricted to LSOG forests. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. viride* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table CAVI-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure CAVI-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CAVI-4

Extent of Forests that Could Provide Habitat for *Calicium viride* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	290	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. viride* is found in nine 5th field watersheds that overlap the project area (see Table CAVI-5 and Figure CAVI-3). The sites are clustered and near one another in the Cascade Range and Klamath Mountains and are a part of the large clusters of sites found in southern Oregon (see Regional Distribution discussion above). The sites tend to be more tightly clustered in the Cascade Range than in the Klamath Mountains. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to other sites in the Cascade Range. Many regional sites occur to the south and north in the Cascade Range.

All of the 49 sites in the local area are at least partially on BLM lands (Roseburg and Medford Districts), with 12 sites partially on private land. Most of the local sites are on land designated as Other (Matrix), and 13 sites are on reserve lands, including 12 sites in LSRs and one site in a Known Owl Activity Center. The number of sites in reserves represents 27 percent of the sites in the local area. Sites on reserve lands are in the Big Butte Creek, Middle Fork Coquille River, Olalla Creek-Lookingglass Creek, and South Umpqua River watersheds (Table CAVI-5).

Coniferous and mixed hardwood-coniferous encompass approximately 1.3 million acres on BLM and NFS lands in the local area, with 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserves (44 percent of the forests). Other sites may also exist in the local area, particularly in the Cascade Range and Klamath Mountains, where surveys have not been completed, based on

the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures CAVI-2 and CAVI-3).

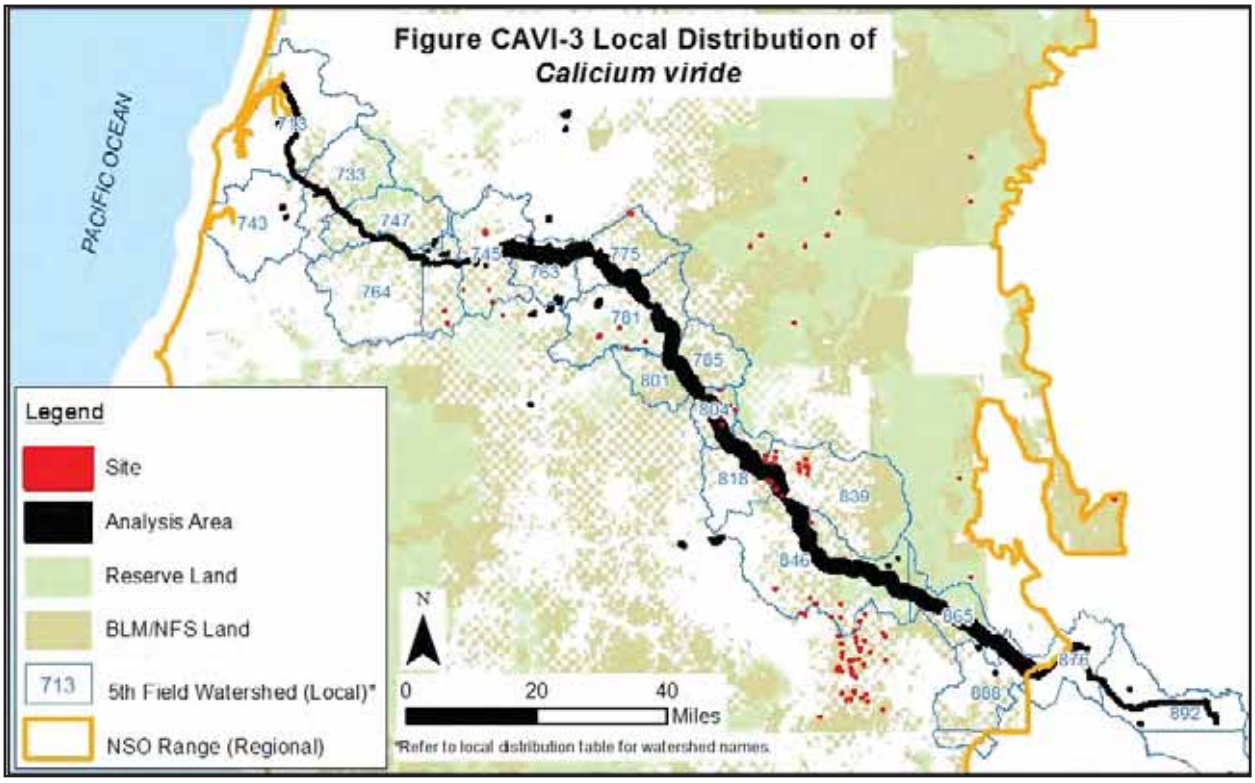
TABLE CAVI-5

Distribution of *Calicium viride* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	19*	1
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	1	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	10	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	2	2
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	2	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	5	5
Rogue River-Shady Cove (818)	1*	-
South Umpqua River (781)	5	5
Spencer Creek (865)	-	-
Trail Creek (804)	5	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011

*Note: Site counts are not additive because one site occurs in both watersheds and the counts overlap.



Analysis/Project Area Distribution

The analysis and project areas contain one site of *C. viride*. This site is partially on BLM-managed land in the Medford District and partially on private land. It is on land designated as

Other (Matrix) in the Little Butte Creek watershed. This site is part of a group of sites in the western Cascade Range, and several sites are located within the immediate vicinity of the site (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in one incidental observation of the species, which was located outside the analysis area (Siskiyou BioSurvey LLC 2011a). A recorded observation in agency databases from 2002 comprises the site in the analysis area. Within the project area, the site is located at MP 135.9.

Project Impacts

Analysis

The PCGP Project could affect one site out of the 145 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent of the sites (or one out of 147 total sites on all lands in the NSO range). The PCGP Project would not result in direct impacts on the portion of the site on BLM land; however, road improvements would occur on a portion of the site on private land. This analysis focuses on the potential effects on BLM lands; therefore, only potential indirect effects are discussed. Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. viride* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Road improvements on private land in the site could remove habitat in and adjacent to the site, but individuals of *C. viride* and its habitat on BLM land are not expected to be affected. Activities in the corridor and associated work and storage areas would take place more than 700 feet southwest of the site and would not affect site persistence. Based on the minimal disturbance and nature of activities associated with the PCGP Project within the site, the lichen is expected to persist at the site following project implementation.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG coniferous and mixed hardwood-coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. viride*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the NSO range.

Discussion

Assuming site persistence is maintained at the site despite impacts associated with the PCGP Project, 49 sites of *C. viride* would remain on BLM lands in the local area, including 13 in reserves, and 145 sites, including 58 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 58 sites in reserves

are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 40 percent of the *C. viride* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. viride* is a Category F (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, information on Category F species is insufficient to determine what level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *C. viride* has a wide distribution across nine physiographic provinces and three states in the region and a moderate-high number of overall sites (145 on BLM and NFS lands). The species appears to be well distributed throughout its range within the NSO range. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites documented since 2007, but is still moderate-high. One site was documented during the PCGP Project surveys.
    - An estimated 40 percent of the sites (58 sites) are in reserves.
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range, Klamath Mountains, and Coast Range, where most sites are documented. A subcomponent of these forests likely provides habitat for *C. viride*.
- The PCGP Project would affect one of 145 BLM- and Forest Service-managed sites of *C. viride*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. However, the species is expected to persist at the site based on the analysis. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be the same as the currently documented distribution and range.
- The PCGP Project would not affect sites in reserves, and the percentage of sites in reserves would remain the same (40 percent). Of the total sites, 44 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG

forests, and 14 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. viride* are unlikely.

- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. viride*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category F species for which pre-disturbance surveys are not applicable and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

3.3.4 Conclusions

If implemented as proposed, the PCGP Project could affect *C. viride* at one site, but *C. viride* is expected to persist at the site, and the PCGP Project would not modify the distribution of the species in the NSO range. The remaining sites would continue to provide a reasonable assurance of species persistence because:

- With project implementation, the number of sites on BLM and NFS lands across the region (145 sites) and on BLM lands in the local area (49 sites) would not change. Although the PCGP Project could affect individuals of *C. viride* at one site, site persistence is not expected to be affected. The species' distribution and range within the NSO range would be the same as its currently known distribution and range.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of coniferous and mixed hardwood-coniferous forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2004.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *C. viride* site in the analysis area, but individuals within the site are expected to persist following project implementation. Based on the above conclusions, avoidance of the *C. viride* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *C. viride* site affected by the PCGP

Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

3.4 CHAENOTHECA CHRYSOCEPHALA

Chaenotheca chrysocephala is an epiphytic pin lichen in the Coniocybaceae family and is commonly known as yellow-headed pin lichen or canary whiskers.

3.4.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. chrysocephala* as a Category B (rare) species. The ORBIC evaluated *C. chrysocephala* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between not rare and apparently secure, but with cause for long-term concern, and widespread, abundant, and secure within its global range (G4G5). In Oregon, it was not rare and apparently secure, but with cause for long-term concern (S4). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

3.4.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the reproductive and dispersal biology of *C. chrysocephala*, which is thought to grow slowly, reproduce infrequently, and have such low fecundity that reduced populations recover very slowly (ORBIC 2004). *C. chrysocephala* appears to be able to disperse and colonize suitable substrates once they become available, despite its slow growth rate, which may be through the use of bird and insect vectors for dispersal. The stalked apothecia may facilitate spore dispersal by wind or contact with passing arthropods and birds (Stone 2012a). Calicioid lichens, such as *C. chrysocephala*, have a crustose thallus and minute stalked fruiting bodies resembling the head of a pin, hence the common name of pin lichen.

Range

C. chrysocephala has a wide range in cool temperate to temperate areas of both hemispheres (Eurasia, North America, Africa, Australasia, and Central and South Americas) (Stone 2012a). In North America, it is known from New England west to British Columbia, Washington, Oregon, California, Arizona, and Mexico (ORBIC 2004). The species' range in Oregon coincides with the NSO range. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across the world. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. chrysocephala* from more than 1,000 element occurrences worldwide and more than 300 element occurrences in North America in 2004. In the Pacific Northwest, Oregon and British Columbia had the highest number of occurrences at more than 20 each, and California and Washington had less than 10 occurrences each in 2004 (ORBIC 2004). Based on 2004 information, the species had experienced a population decline of an estimated 10–30 percent across its range in more recent years and 50–75 percent based on historic estimates. In 2004, *C. chrysocephala* was considered to be highly vulnerable, primarily because of its slow reproductive process; however, it was considered secure from extirpation or extinction, particularly in Oregon, based on available population data. The species was found in 15 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 25 sites on federal lands and 26 total sites on all lands in the NSO range.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, including *C. chrysocephala* (during 2010 surveys only), and resulted in nine observations of *C. chrysocephala*. Based on available information in early 2012, the species was reported as being widespread and apparently common in the Pacific Northwest (Stone 2012a). The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. chrysocephala is found on the bark and wood of old conifers, including *Abies* spp., *Picea* spp., Douglas-fir, western redcedar (*Thuja plicata*), and decorticated snags (Stone 2012a). The lichen seems to prefer semi-open forests at relatively low elevations (260–3,770 feet msl) and has been found in greatest abundance on conifer trunks in mixed forests and in edge habitats. It is also found in relatively young stands and in edge habitats. The species is not typically found in closed low-elevation rainforests. *C. chrysocephala* often grows in colonies covering a small patch on a single tree trunk in one location and on another several hundred meters away (ORBIC 2004). *C. chrysocephala* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

The removal of LSOG forests, particularly from logging practices, albeit at a slower rate in recent years, has been the principal cause for the species' decline worldwide and in the Pacific Northwest (ORBIC 2004). Removal of old forests has undoubtedly had severe impacts on the number and sizes of populations and on the average dispersal distance necessary to colonize new substrates. Altered fire frequency and intensity resulting from fire suppression and fuel buildup

may threaten remaining populations (Stone 2012a). Because of its relationship to forests 100 to 200 years old and its apparent life history of slow maturation, infrequent reproduction, and low fecundity, populations may require several years (more than 20) to recover from localized disturbance (ORBIC 2004).

With the establishment of LSRs and reduction of logging in old-growth forests, *C. chrysocephala* has the potential to be one of the first calicioid lichen to show significant recovery in the region because of its ability to colonize in younger LSOG conifer stands (ORBIC 2004). Although little is known about the reproductive and dispersal biology of the species, the species may be able to overcome some habitat fragmentation, presuming habitat is available, and populations may increase as LSRs and LSOG forests are maintained and enhanced across the Pacific Northwest.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *C. chrysocephala*.

3.4.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. chrysocephala* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CHCH-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 361 observations from BLM and Forest Service geodatabases were converted into 125 sites in the NSO range (region). Table CHCH-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CHCH-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CHCH-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CHCH-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE CHCH-1

Number of *Chaenotheca chrysocephala* Sites (2013)

Location*	Number of Sites
Regional Area	125
Local Area	41
Analysis Area (Project Area)	12 (12)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CHCH-2

Distribution of *Chaenotheca chrysocephala* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	82	41	12
Forest Service	42	-	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	26	9	4

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CHCH-3

Distribution of *Chaenotheca chrysocephala* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	16	-	-
Adaptive Management Reserves (AMR)	5	-	-
Administratively Withdrawn (AW)	5	-	-
Congressionally Reserved (CR)	**4**	**-**	**-**
Late Successional Reserve (LSR)	**28**	**9**	**2**
Marbled Murrelet Area (LSR3)	**4**	**4**	**3**
Northern Spotted Owl Activity Center (LSR4)*	**1**	**1**	**1**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	67	31	10
Riparian Reserve**	**1**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

C. chrysocephala is somewhat widely distributed across six physiographic provinces in Washington (Western Cascades), Oregon (Coast Range, Cascades West and East, and Klamath Mountains), and California (Klamath) (see Figure CHCH-1). Most sites are found along the Klamath Mountains and western Cascade Range in Oregon, where many sites are clustered and near other sites. Sites are scattered in the Coast Range and eastern Cascade Range, with a few apparently isolated sites in California and Washington and a small cluster of sites in the southern Coast Range in Oregon. Many opportunities for dispersal between sites in the Cascade Range and Klamath Mountains appear to exist based on the proximity of sites to one another and the extent of LSOG forests. *C. chrysocephala* appears to be well distributed in its range in Oregon based on the abundance of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.



Figure CHCH-1.
Regional Distribution of
Chaenotheca chrysocephala

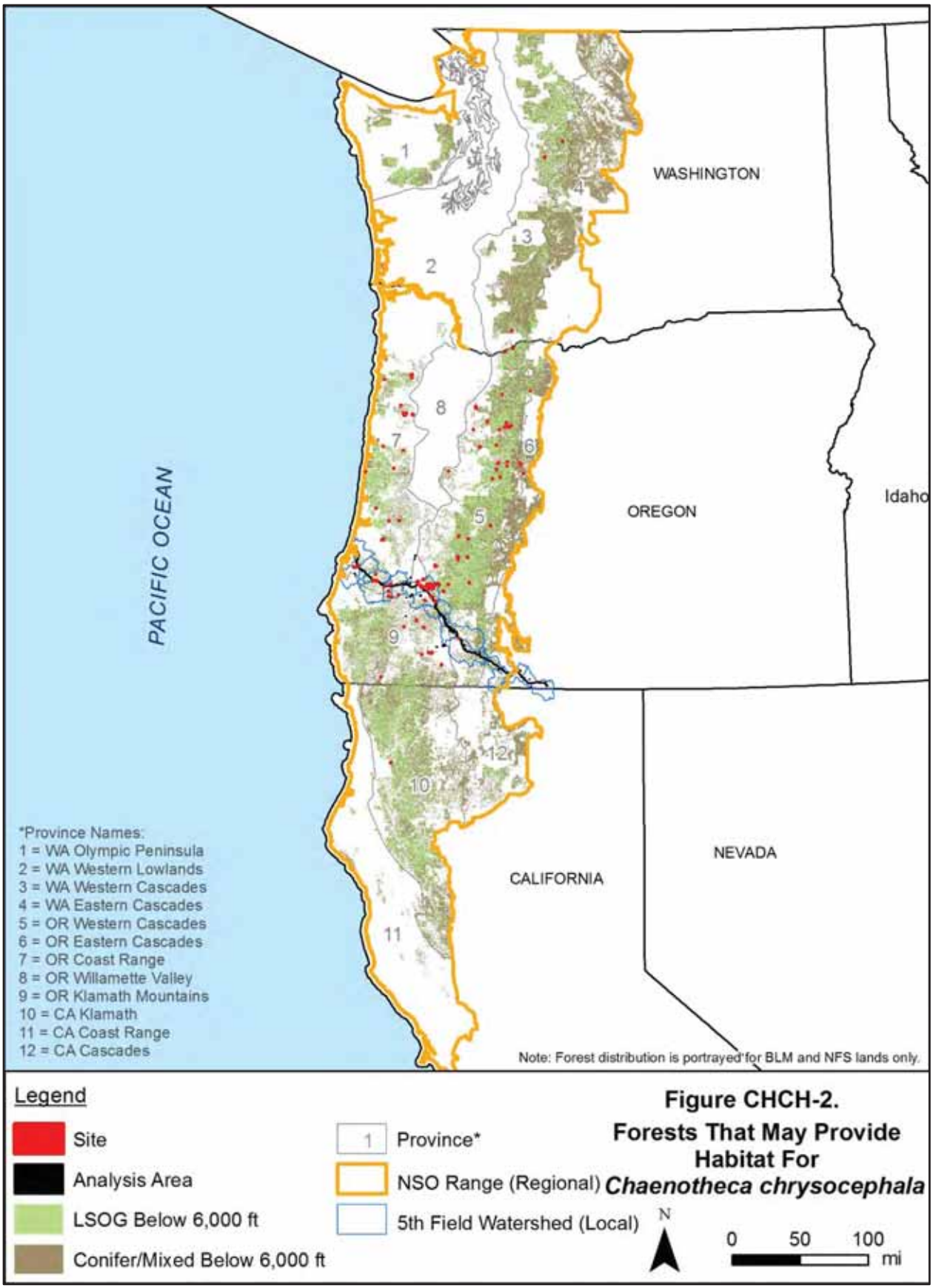


Figure CHCH-2.
Forests That May Provide Habitat For *Chaenotheca chrysocephala*

Twenty-six of 125 sites are located on private lands (at least partially), and 123 sites are at least partially on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include 13 sites in the Coos Bay District, nine sites in the Medford District, and 41 sites in the Roseburg District (one site is partially on the Umpqua National Forest). Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest and eight sites on the Umpqua National Forest (one site is partially in the Roseburg District). The remaining 51 sites on BLM and NFS lands are in the Eugene and Salem Districts and on the Deschutes, Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Siskiyou, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 37 sites are located on reserve lands managed by BLM and the Forest Service, including 28 in LSRs (at least partially), four in Marbled Murrelet Area, one in a Known Owl Activity Center, four in Congressionally Reserved areas (at least partially), and one in a Riparian Reserve. This represents approximately 30 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

C. chrysocephala is more commonly found in LSOG forests based on available data (108 of 125 total sites are in LSOG), but it is also found in non-LSOG forests and has been documented in young stands and edge habitats. Based on current site locations, the species is found in coniferous and mixed-hardwood coniferous forests below about 5,300 feet msl and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *C. chrysocephala* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the region, including an estimated 9.9 million acres in reserve land allocations (55 percent of the forests; Table CHCH-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure CHCH-2), including 3.7 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE CHCH-4

Extent of Forests that Could Provide Habitat for *Chaenotheca chrysocephala* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. chrysocephala* is distributed across eight 5th field watersheds that overlap the project area (see Table CHCH-5 and Figure CHCH-3). The sites in the Myrtle Creek watersheds are more clustered than sites in the other watersheds. The other sites are in four

groups: Coos Bay Frontal and Lower Coquille River watersheds, East and Middle Fork Coquille River and Olalla Creek-Lookingglass Creek watersheds, South Umpqua River watershed, and Little Butte Creek watershed. Most of the sites appear to have some level of connectivity between them and others in the regional area, with multiple opportunities for dispersal, based on the extent of coniferous and mixed hardwood-coniferous forests in the watersheds and region. The site in the Little Butte Creek watershed appears to be isolated from other sites in the local area, and the nearest site in the region is more than 30 miles southwest in the Klamath Mountains.

All of the 41 sites in the local area are at least partially on BLM lands (none are on NFS lands), and nine sites are partially on private lands. The sites on BLM lands are located on lands designated as LSR, LSR3, and LSR4, and Other (Matrix). Of the 41 sites in the local area, 14 sites are on reserve lands, representing 34 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table CHCH-5 and on Figure CHCH-3. These sites are in LSRs and are distributed across five of the watersheds.

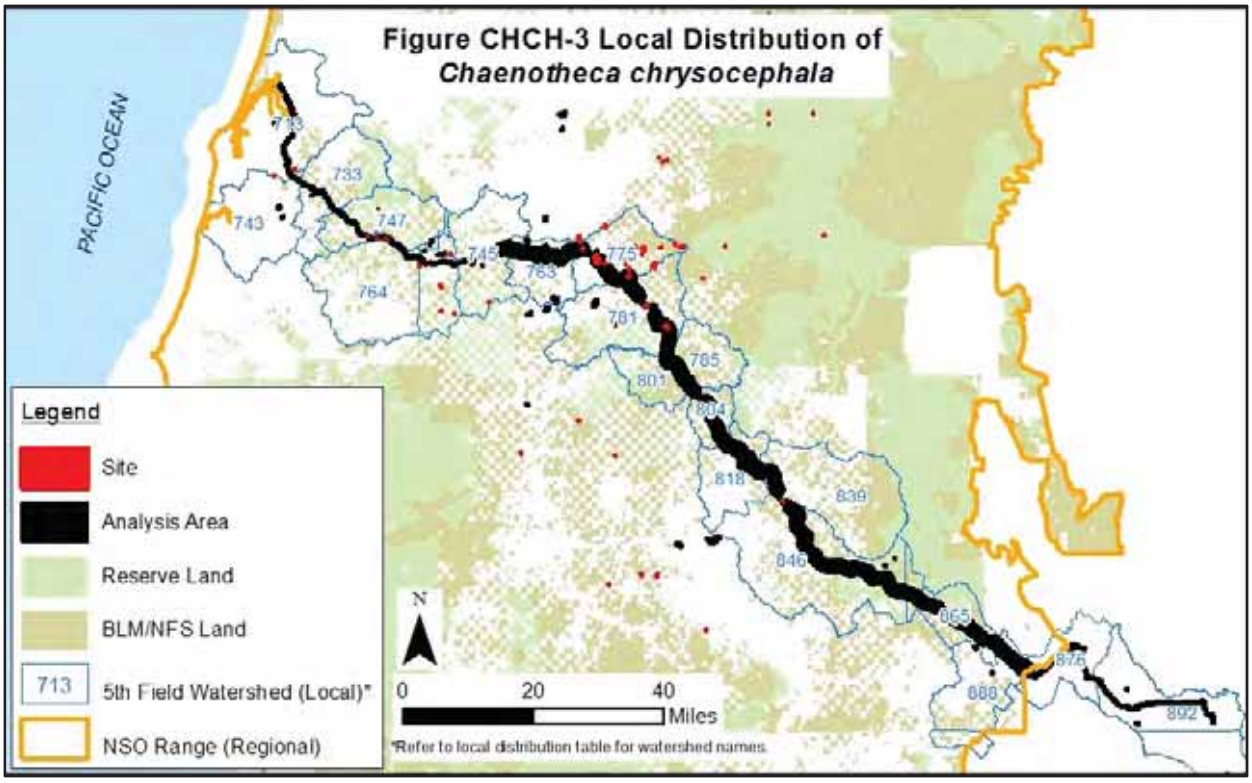
Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 570,840 acres on BLM and NFS lands in the local area, with 192,010 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number and distribution of sites in the regional and local areas and the extent of forests that may provide suitable habitat (see Figures CHCH-2 and CHCH-3).

TABLE CHCH-5

Distribution of *Chaenotheca chrysocephala* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	2	-
East Fork Coquille River (747)	3*	3
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	1	-
Lower Coquille River (743)	1	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	10*	7
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	18**	1
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	7**	4
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*One site is in the East Fork Coquille River and Middle Fork Coquille River watersheds.
**One site is in the Myrtle Creek and South Umpqua River watersheds.



Analysis/Project Area Distribution

The analysis and project areas contain 12 sites of *C. chrysocephala*, all of which are at least partially on BLM lands. Four sites are partially on private lands. The analysis area sites are in five watersheds: Myrtle Creek and South Umpqua River watersheds in the Roseburg District, Little Butte Creek watershed in the Medford District, and East Fork and Middle Fork Coquille River watersheds in the Coos Bay District. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

Ten sites on BLM lands are at least partially located on lands designated as Other (Matrix), and six sites are at least partially within LSRs.

Surveys for the PCGP Project resulted in multiple observations of the species in about 31 locations (Edge Environmental 2013). These recorded observations comprise the 12 sites in the analysis area. Within the project area, three sites are located between MPs 35.3 and 38.9, eight sites are located between MPs 75.6 and 97.8, and one site is located near MP 137.

Project Impacts

Analysis

The PCGP Project would affect 12 sites out of the 123 sites on BLM- and Forest Service-managed lands in the region, representing approximately 10 percent of the sites (or 12 out of 125 total sites on all lands in the NSO range). Table CHCH-6 presents an overview of the features of the PCGP Project that would affect the *C. chrysocephala* sites. The construction corridor and associated work and storage areas would affect approximately 39.4 acres within the sites (about 12 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize

vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. chrysocephala* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 17.6 acres of vegetation and soils within 10 sites and could result in the removal of *C. chrysocephala* populations or individuals on trees that are removed. Disturbance in the TEWAs would result in similar impacts on about 6.2 acres within nine sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees could negatively affect *C. chrysocephala* in adjacent areas by removing its habitat and potential host trees, potentially affecting site persistence even if the entire site is not disturbed, although the species may be resilient to edge effects at some sites. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 9 acres of understory habitat in six sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat unsuitable for the species, but individuals on trees are not likely to be removed or disturbed. Road improvements and establishment would disturb approximately 0.9 acre within one site and could remove habitat and extant populations or individuals of *C. chrysocephala*. Hydrostatic testing would take place on less than 0.1 acre of one site and is not likely to affect individuals or populations of the species because it would be done after the pipeline is installed and would not affect trees. Two sites may be affected by activities associated with rock source or disposal on about 1.3 acres.

TABLE CHCH-6

Impacts to *Chaenotheca chrysocephala* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	10	17.6 ac
Temporary Extra Work Area (TEWA)	9	6.2 ac
Uncleared Storage Area (UCSA)	6	14.8 ac
Roads (TMP)	1	0.9 ac
Other Minimal Disturbance Activity	3	1.4 ac

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *C. chrysocephala*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 12 sites as a result of the PCGP Project, 29 sites of *C. chrysocephala* would remain on BLM lands in the local area, including eight in reserves, and 111 sites, including 31 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 31 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 28 percent of the remaining *C. chrysocephala* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. chrysocephala* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *C. chrysocephala* has a somewhat wide distribution across six physiographic provinces and three states in the region and a moderate-high number of overall sites (123 on BLM and NFS lands). The species appears to be well distributed in its range in Oregon, but has a spotty distribution in California and Washington. The currently known number of sites on BLM and NFS lands is an increase of about 97 sites on BLM and NFS lands since 2007, with many sites documented during the PCGP Project surveys.
    - An estimated 30 percent of the sites (37 sites) are in reserves.
- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, but fewer sites are documented in these areas. A subcomponent of these forests likely provides habitat for *C. chrysocephala*.
- The PCGP Project would affect 12 of 123 BLM- and Forest Service-managed sites of *C. chrysocephala*, representing approximately 10 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the 12 sites, a moderate-high number of sites (111) would continue to be documented on BLM and NFS

lands in the region with a somewhat wide distribution across Oregon and a lower abundance in Washington and California. Many sites (29 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Klamath Mountains. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would affect site persistence at six sites in LSRs, but the proportion of sites in reserves would remain about the same (28 percent). Of the remaining sites, 27 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and four are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. chrysocephala* are unlikely. One site is at least partially in Riparian Reserves, where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (55 percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. chrysocephala*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

3.4.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. chrysocephala* at 12 sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 111 sites would remain on BLM and NFS lands across the region, and 29 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *C. chrysocephala* at 12 sites, these sites are part of several sites in the Klamath Mountains and Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. chrysocephala* would persist in the region without considering the 12 sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 9.9 million acres (55

percent) of coniferous and mixed forests and 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2007.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is somewhat widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. chrysocephala* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 12 *C. chrysocephala* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *C. chrysocephala* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

3.5 CHAENOTHECA FERRUGINEA

Chaenotheca ferruginea is an epiphytic pin lichen in the Coniocybaceae family and is commonly known as rust-stained pin lichen or blood whiskers.

3.5.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. ferruginea* as a Category B (rare) species. The ORBIC evaluated *C. ferruginea* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between not rare and apparently secure, but with cause for long-term concern, and widespread, abundant, and secure within its global range (G4G5). In Oregon, it was rare, uncommon, or threatened, but not immediately imperiled (S3). The species is on the ORBIC List 4. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

3.5.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the reproductive and dispersal biology of *C. ferruginea*, which is thought to grow slowly, reproduce infrequently, and have such low fecundity that reduced populations

recover very slowly (ORBIC 2004). *C. ferruginea* appears to be able to disperse and colonize suitable substrates once they become available, despite its slow growth rate, which may be through the use of bird and insect vectors for dispersal. The stalked apothecia may facilitate spore dispersal by wind or contact with passing arthropods and birds (Stone 2012b). Calicioid lichens, such as *C. ferruginea*, have a crustose thallus and minute stalked fruiting bodies resembling the head of a pin, hence the common name of pin lichen.

Range

C. ferruginea is widespread in temperate to cool temperate areas of both hemispheres (Europe, North America, Asia, Australasia, and South America) (ORBIC 2004). It is common in temperate and boreal regions of North America and northern Europe, including southern Norway, Sweden, and southern and central Finland. In the Pacific Northwest, the species is known from British Columbia, Oregon, Washington, and California (Stone 2012b). It is common at low to mid elevations on the west side of the Cascade Mountains and is less common east of the Cascades. The species' range in Oregon coincides with the NSO range. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across the world. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. ferruginea* from more than 500 element occurrences worldwide and approximately 300 element occurrences in North America in 2004. In the Pacific Northwest, British Columbia and Oregon had the highest number of occurrences at more than 14 each, and California and Washington had less than 10 occurrences each in 2004 (ORBIC 2004). Based on 2004 information, the species had experienced a population decline of an estimated 10–30 percent across its range in more recent years and 50–75 percent based on historic estimates. In 2004, *C. ferruginea* was considered to be highly vulnerable, primarily because of its slow reproductive process and close association with old-growth forests. It was, however, considered to be secure from extirpation or extinction, based on available population data. The species was found in three locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 105 sites on federal lands and 106 total sites on all lands in the NSO range.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, including *C. ferruginea*, and resulted in five observations of individuals or populations of *C. ferruginea*. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. ferruginea is found on the bark and wood of conifers in semi-open montane forests and foothills, as well as on conifer boles in rainforests (Stone 2012b). It often grows in colonies covering a small patch on a single tree trunk in one location and on another several hundred meters away (ORBIC 2004). In the Pacific Northwest, *C. ferruginea* is mostly found on the bark of oak and coniferous trees more than 200 years old in open habitats, with occasional occurrences on slightly younger trees. Although it is commonly found on Douglas-fir in the Pacific Northwest, it is also frequently found on western redcedar and incense cedar (*Calocedrus decurrens*) in riparian areas, especially in southern Oregon (Stone 2012b). *C. ferruginea* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Like *C. chrysocephala*, the removal of LSOG forests, particularly from logging practices, albeit at a slower rate in recent years, has been the principal cause for the species' decline worldwide and in the Pacific Northwest (ORBIC 2004). Removal of old forests has undoubtedly had severe impacts on the number and sizes of populations and on the average dispersal distance necessary to colonize new substrates. Altered fire frequency and intensity resulting from fire suppression and fuel buildup may threaten remaining populations (Stone 2012b). Because of its relationship to forests more than 200 years old and its apparent life history, populations may require several years to recover from localized disturbance (ORBIC 2004).

With the establishment of LSRs and reduction of logging in old-growth forests in the Pacific Northwest, *C. ferruginea* has the potential to recover in the region because of its remarkable ability to disperse to appropriate substrates once they are available, even when those substrates are rather isolated (ORBIC 2004). Although little is known about the reproductive and dispersal biology of the species, the species may be able to overcome some habitat fragmentation, presuming habitat is available, and populations may increase as LSRs and LSOG forests are maintained and enhanced across the Pacific Northwest.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *C. ferruginea*.

3.5.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. ferruginea* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and

converted into sites according to the methodology described in Chapter 1. Table CHFE-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 878 observations from BLM and Forest Service geodatabases were converted into 365 sites in the NSO range (region). Table CHFE-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CHFE-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CHFE-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CHFE-2 displays the species' regional distribution with the extent of coniferous, mixed hardwood-coniferous, and hardwood forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE CHFE-1

Number of *Chaenotheca ferruginea* Sites (2013)

Location*	Number of Sites
Regional Area	365
Local Area	33
Analysis Area (Project Area)	8 (8)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CHFE-2

Distribution of *Chaenotheca ferruginea* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	341	33	8
Forest Service	24	-	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	74	10	2

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CHFE-3

Distribution of *Chaenotheca ferruginea* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	28	-	-
Adaptive Management Reserves (AMR)	9	-	-
Administratively Withdrawn (AW)	6	-	-
Congressionally Reserved (CR)	**3**	**-**	**-**
Late Successional Reserve (LSR)	**23**	**6**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**34**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	285	27	8
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

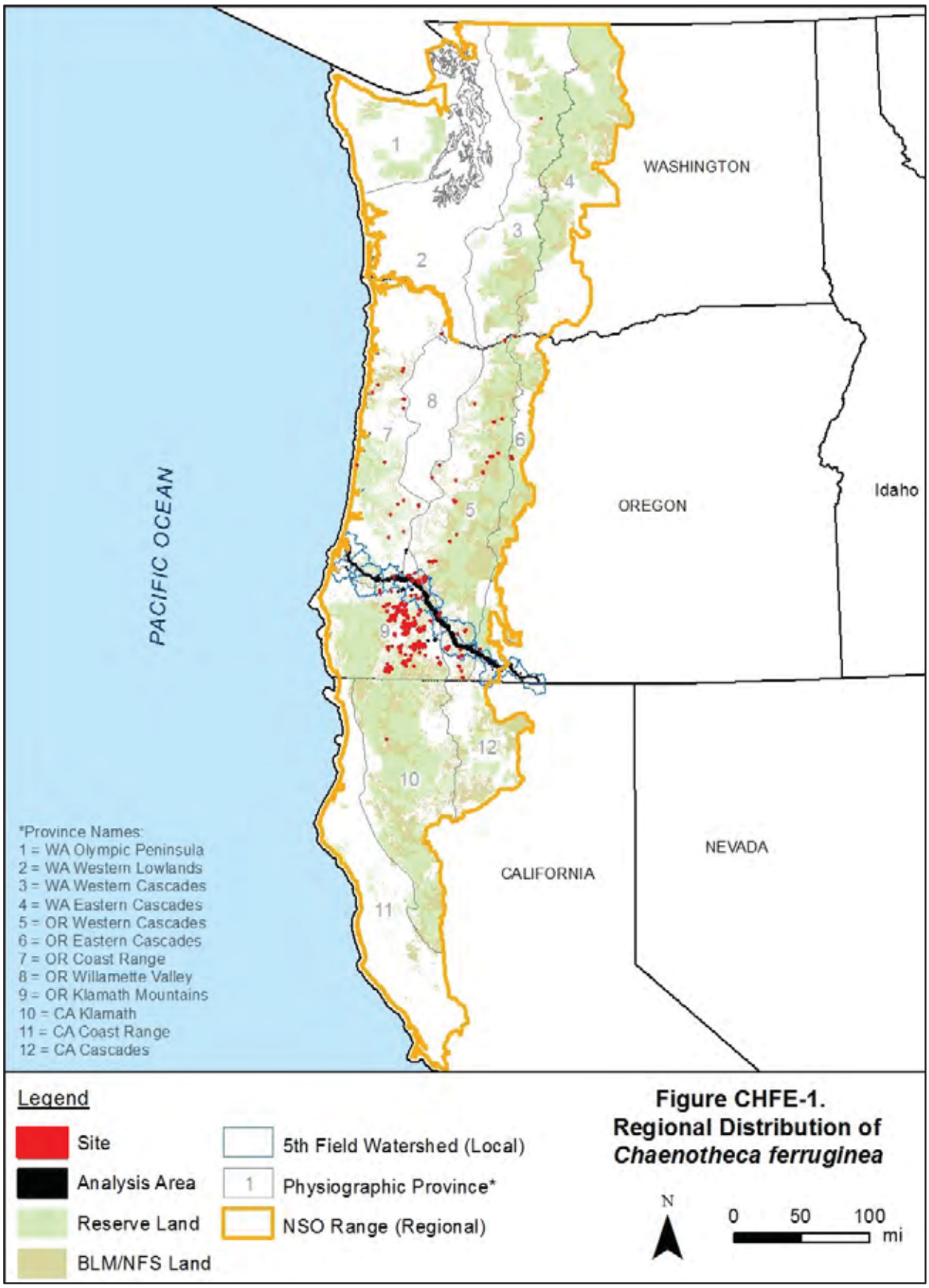


Figure CHFE-1. Regional Distribution of *Chaenotheca ferruginea*

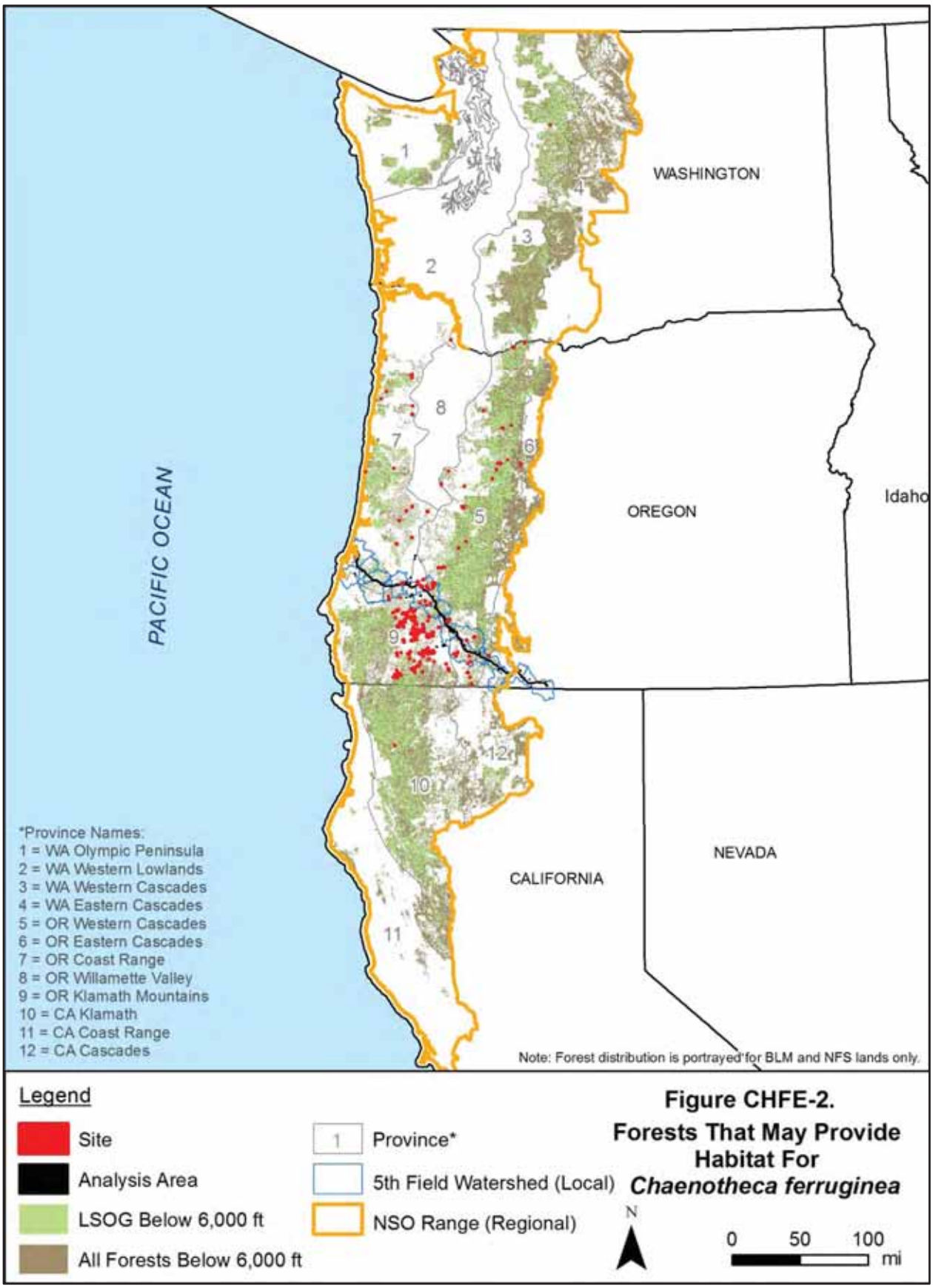


Figure CHFE-2.
Forests That May Provide Habitat For *Chaenotheca ferruginea*

Regional Distribution

C. ferruginea is somewhat widely distributed across six physiographic provinces in Washington (Western Cascades), Oregon (Coast Range, Cascades West and East, and Klamath Mountains), and California (Klamath) (see Figure CHFE-1). The majority of the sites are found along the Klamath Mountains, where sites are clustered and near other sites. Sites are scattered across the rest of the species' range in the region, with apparently isolated sites in California and Washington. *C. ferruginea* seems to be relatively common, based on the abundance and distribution of sites. Many opportunities for dispersal between sites in the Klamath Mountains and nearby area appear to exist based on the high abundance of sites in the mountain range and the extent of coniferous, mixed, and hardwood forests. The species appears to be well distributed in the Klamath Mountains in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Seventy-four of 365 sites are located on private lands (at least partially), and 362 sites are at least partially on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include 286 sites in the Medford District (one site is partially on the Siskiyou National Forest and one site is partially on the Umpqua National Forest) and 34 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest, one site on the Winema National Forest, and three sites on the Umpqua National Forest (one site is partially in the Medford District). The remaining 37 sites on BLM and NFS lands are in the Eugene and Salem Districts and on the Deschutes, Mt. Baker-Snoqualmie, Mt. Hood, Siskiyou, Siuslaw, Six Rivers, and Willamette National Forests (one site is partially in the Eugene District and partially on the Willamette National Forest).

Across the NSO range, 60 sites are located on reserve lands managed by BLM and the Forest Service, including 23 in LSRs, 34 in Known Owl Activity Centers, and three in Congressionally Reserved areas. This represents 17 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

C. ferruginea is more commonly found in LSOG forests based on available data (329 of 365 total sites are in LSOG), but it is also found in non-LSOG forests and has been documented in younger stands. Based on current site locations, the species is found in coniferous, mixed-hardwood coniferous, and hardwood forests below about 5,300 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *C. ferruginea* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 10.4 million acres in reserve land allocations (54 percent of the forests; Table CHFE-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure CHFE-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl are widespread, LSOG forests are less common and are primarily found along the Cascade Range and Klamath Mountains.

TABLE CHFE-4

Extent of Forests that Could Provide Habitat for *Chaenotheca ferruginea* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	19,194,850	10,381,240	6,092,570	3,750,320
Local Area	611,850	199,720	185,170	80,260
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. ferruginea* is distributed across eight 5th field watersheds that overlap the project area (see Table CHFE-5 and Figure CHFE-3). Sites appear to be scattered across the eight watersheds, with clusters of sites in the South Umpqua River, Myrtle Creek, and Little Butte Creek watersheds. All of the sites appear to have some level of connectivity between them and others in the regional area, with multiple opportunities for dispersal, based on the extent of coniferous, mixed, and hardwood forests in the watersheds and region.

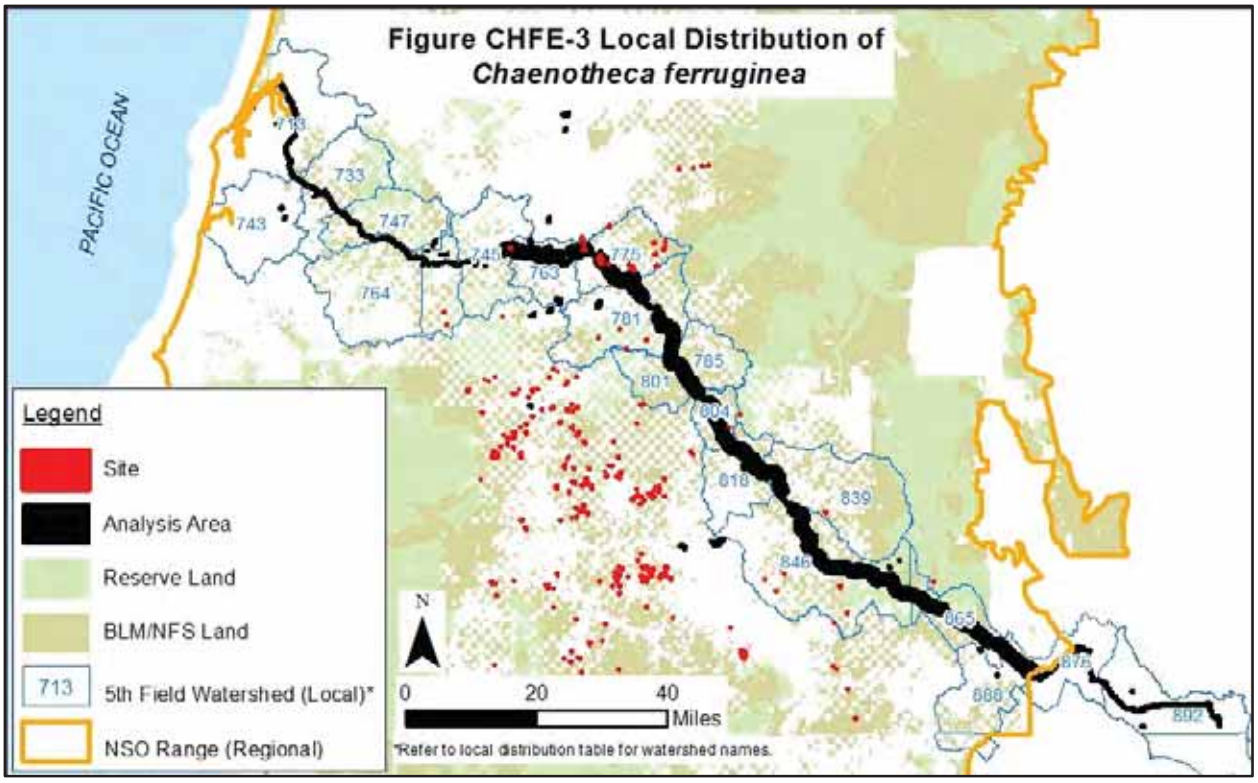
All of the 33 sites in the local area are on BLM lands (none are on NFS lands), and 10 are partially on private lands. The sites are located on lands designated as Other (Matrix) and LSR. Of the 33 sites in the local area, six sites are on reserve lands, representing 18 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table CHFE-5 and on Figure CHFE-3. These sites are in LSRs in the Middle Fork Coquille River and South Umpqua River watersheds.

TABLE CHFE-5

Distribution of *Chaenotheca ferruginea* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	3	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	7	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	2	2
Middle South Umpqua River (763)	2*	-
Myrtle Creek (775)	12	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	3*	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	4	4
Spencer Creek (865)	-	-
Trail Creek (804)	1	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
*Note: Site counts are not additive because one site occurs in both watersheds and the counts overlap.



Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 611,850 acres on BLM and NFS lands in the local area, including 199,720 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 185,170 acres are LSOG, including 80,260 acres in reserve land allocations (43 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the distribution of sites in the local and regional areas and the extent of forests that may provide suitable habitat (see Figures CHFE-2 and CHFE-3).

Project Area Distribution

The analysis and project areas contain eight sites of *C. ferruginea*, all of which are at least partially on BLM lands in the Roseburg District. Two sites are partially on private lands. The analysis area sites are in three watersheds: Olalla Creek-Lookingglass Creek, Middle South Umpqua River, and Myrtle Creek. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

All eight sites in the analysis area are located on lands designated as Other (Matrix) and are not within regionally mapped reserves.

Surveys for the PCGP Project resulted in 18 observations of the species in five locations (Siskiyou BioSurvey LLC 2008). An estimated 16 of these recorded observations comprise the eight sites in the analysis area; the remaining observations are in sites outside the analysis area. Within the project area, four sites are located between MPs 60.9 and 61.6, one site is between MP 75.5 and 75.9, and three sites are located between MPs 78.1 and 80.6.

Project Impacts

Analysis

The PCGP Project would affect eight sites out of the 362 sites on BLM- and Forest Service-managed lands in the region, representing approximately 2 percent of the sites (or eight out of 365 total sites on all lands in the NSO range). Table CHFE-6 presents an overview of the features of the PCGP Project that would affect the *C. ferruginea* sites. The construction corridor and associated work and storage areas would affect approximately 31.4 acres within the sites (about 11 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. ferruginea* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 13.8 acres of vegetation and soils within eight sites and could result in the removal of *C. ferruginea* populations or individuals on trees that are removed. Disturbance in the TEWAs would result in similar impacts on about 3.8 acres within eight sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees could negatively affect *C. ferruginea* in adjacent areas by removing its habitat and potential host trees, potentially affecting site persistence even if the entire site is not disturbed, although the species seems to prefer semi-open habitats and may be resilient to edge effects in some sites. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 13.8 acres of understory habitat in eight sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat unsuitable for the species, but individuals on trees are not likely to be removed or disturbed. Hydrostatic testing would take place on less than 0.1 acre of one site and is not likely to affect individuals or populations of the species because it would be done after the pipeline is installed and would not affect trees.

TABLE CHFE-6

Impacts to *Chaenotheca ferruginea* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	8	13.8 ac
Temporary Extra Work Area (TEWA)	8	3.8 ac
Uncleared Storage Area (UCSA)	8	13.8 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	1	0.06 ac

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *C. ferruginea*. Within this impact area, about 770 acres (about 66 percent) of the forests would be

restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the eight sites as a result of the PCGP Project, 25 sites of *C. ferruginea* would remain on BLM lands in the local area, including six in reserves, and 354 sites, including 60 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 60 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 17 percent of the remaining *C. ferruginea* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. ferruginea* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *C. ferruginea* has a somewhat wide distribution across six physiographic provinces and three states in the region and a moderate-high number of overall sites (362 on BLM and NFS lands). The species appears to be well distributed in the Klamath Mountains in Oregon, but has a scattered distribution outside the mountain range. The currently known number of sites on BLM and NFS lands is an increase of about 257 sites on BLM and NFS lands since 2007, with several sites documented during the PCGP Project surveys.
    - An estimated 17 percent of the sites (60 sites) are in reserves.
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 54 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains,

where most sites are documented. The Coast Range and other areas also contain coniferous, mixed hardwood-coniferous, and hardwood forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *C. ferruginea*.

- The PCGP Project would affect eight of 362 BLM- and Forest Service-managed sites of *C. ferruginea*, representing approximately 2 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the eight sites, a moderate-high number of sites (354) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Oregon and a lower abundance in Washington and California. Many sites (25 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Klamath Mountains. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be about the same (17 percent). Of the remaining sites, 57 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are in Congressionally Reserved areas where management activities that may adversely affect *C. ferruginea* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. ferruginea*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

3.5.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. ferruginea* at eight sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 354 sites would remain on BLM and NFS lands across the region, and 25 sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *C. ferruginea* at eight sites, these sites are part of a large group of sites in the Klamath Mountains and Cascade Range in Oregon where the species appears to be locally abundant and well distributed (in the Klamath Mountains). The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C.*

ferruginea would persist in the region without considering the eight sites as part of the population.

- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2007.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is somewhat widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. ferruginea* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the eight *C. ferruginea* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *C. ferruginea* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

3.6 CHAENOTHECA FURFURACEA

Chaenotheca furfuracea is a crustose pin lichen in the Coniocybaceae family and is commonly known as sulphur pin lichen or sulfur whiskers.

3.6.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. furfuracea* as a Category F (uncommon) species. The ORBIC evaluated *C. furfuracea* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between not rare and apparently secure, but with cause for long-term concern, and widespread, abundant, and secure within its global range (G4G5). In Oregon, it was rare, uncommon, or threatened, but not immediately imperiled (S3). The species is on the ORBIC List 3. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

3.6.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are

presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the reproductive and dispersal biology of *C. furfuracea*, which is thought to grow slowly, reproduce infrequently, and have such low fecundity that reduced populations recover very slowly (ORBIC 2004). *C. furfuracea* appears to be able to disperse and colonize suitable substrates, including isolated locations, once they become available, despite its slow growth rate, which may be through the use of bird and insect vectors for dispersal. The stalked apothecia may facilitate spore dispersal by wind or contact with passing arthropods and birds (Stone 2012c). Calicioid lichens, such as *C. furfuracea*, have a crustose thallus and minute stalked fruiting bodies resembling the head of a pin, hence the common name of pin lichen.

Range

C. furfuracea is widespread in cool temperate to temperate areas of the northern hemisphere (Eurasia and North America) (ORBIC 2004). It is common in temperate and boreal regions of North America and northern Europe, including Norway, Sweden, and Finland. In the Pacific Northwest, the species is known from all states and provinces (Stone 2012c). It is common west of the Cascades Range and has been found on the eastern slopes of the Cascade Range in Washington and Oregon. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across North America and northern Europe and Asia. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. furfuracea* from more than 500 element occurrences worldwide and more than 300 element occurrences in North America in 2004. In the Pacific Northwest, British Columbia and Oregon had the highest number of occurrences at more than 25 each, and California and Washington had less than 10 occurrences each in 2004 (ORBIC 2004). Based on 2004 information, the species had experienced a population decline of an estimated 10–30 percent across its range in more recent years and 50–75 percent based on historic estimates. In 2004, *C. furfuracea* was considered to be highly vulnerable, primarily because of its slow reproductive process and close association with old-growth forests; however, it was considered to be secure from extirpation or extinction, based on available population data. The species was found in 28 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported a total of 334 sites, all on federal lands.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, including *C. furfuracea*, and resulted in four observations of *C. furfuracea*.

The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. furfuracea is found on soils influenced by coniferous bark and in dark areas under tree roots, tipped over stumps, and under rock overhangs, where air may be moist but no direct rainfall hits (Stone 2012c, ORBIC 2004). It is generally found in sheltered coves under the bole of an old-growth tree, but occasionally within other overhangs with exposed roots (ORBIC 2004). The lichen covers surfaces of soil, rock, roots, rootlets, and even leaf litter with its yellow-green powdery thallus (Stone 2012c). The species is found in small patch colonies on a very specialized substrate, each colony covering only a few square centimeters or decimeters within a stand and then occurring again several hundred meters away (ORBIC 2004). In the Pacific Northwest, *C. furfuracea* is mostly associated with trees more than 200 years old. Based on available information, this species is presumed to be restricted to specific microclimate conditions of LSOG coniferous and mixed hardwood-coniferous forests across a wide elevation range.

Threats

Like *C. chrysocephala*, the removal of LSOG forests, particularly from logging practices, albeit at a slower rate in recent years, has been the principal cause for the species' decline worldwide and in the Pacific Northwest (ORBIC 2004). Removal of old forests has undoubtedly had severe impacts on the number and sizes of populations and on the average dispersal distance necessary to colonize new substrates. Altered fire frequency and intensity resulting from fire suppression and fuel buildup may threaten remaining populations (Stone 2012c). Because of its relationship to forests more than 200 years old and its apparent life history of slow maturation, infrequent reproduction, and low fecundity, populations require several years (more than 20) to recover from localized disturbance (ORBIC 2004).

With the establishment of LSRs and the reduction of logging in old-growth forests in the Pacific Northwest, *C. furfuracea* has the potential to recover in the region because of its ability to disperse to appropriate substrates once they are available, even when those substrates are rather isolated (ORBIC 2004). Although little is known about the reproductive and dispersal biology of the species, the species may be able to overcome some habitat fragmentation, presuming habitat is available, and populations may increase as LSRs continue to function and LSOG forests are maintained and enhanced across the Pacific Northwest.

Management Recommendations

As a Category F S&M species, the 2001 ROD indicates that management of known sites is not necessary, but a determination needs to be made regarding which S&M category, if any, the species should be assigned to (USDA and USDI 2001). No management recommendations have been developed for *C. furfuracea*.

3.6.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites

remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. furfuracea* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CHFU-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 675 observations from BLM and Forest Service geodatabases were converted into 363 sites in the NSO range (region). Table CHFU-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CHFU-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CHFU-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CHFU-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,500 feet msl on BLM and NFS lands.

TABLE CHFU-1

Number of *Chaenotheca furfuracea* Sites (2013)

Location*	Number of Sites
Regional Area	363
Local Area	16
Analysis Area (Project Area)	4 (4)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CHFU-2

Distribution of *Chaenotheca furfuracea* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	253	16	4
Forest Service	107	1	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	59	1	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

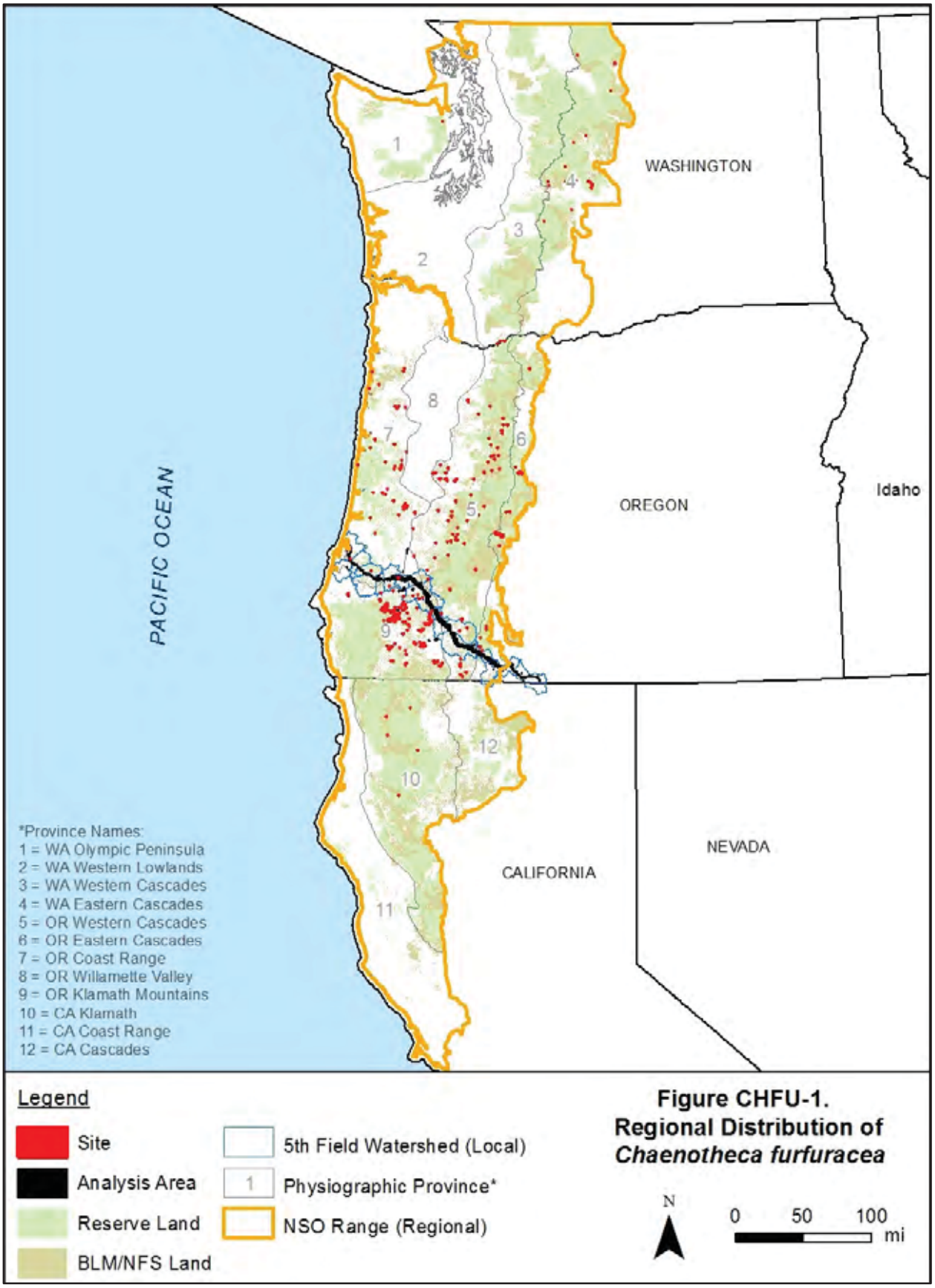


Figure CHFU-1.
Regional Distribution of *Chaenotheca furfuracea*

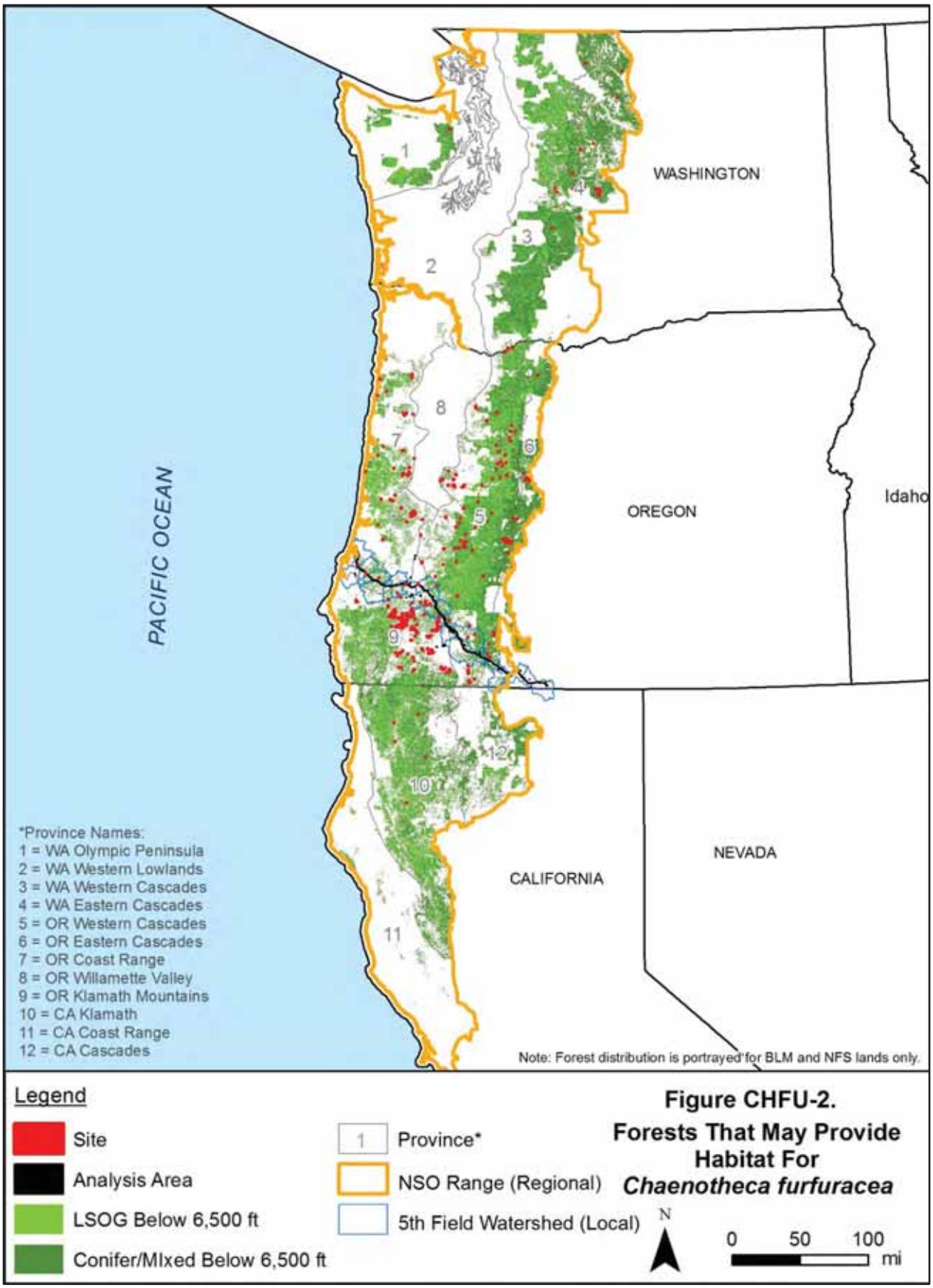


Figure CHFU-2.
Forests That May Provide Habitat For *Chaenotheca furfuracea*

TABLE CHFU-3

Distribution of *Chaenotheca furfuracea* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	20	-	-
Adaptive Management Reserves (AMR)	8	-	-
Administratively Withdrawn (AW)	25	-	-
Congressionally Reserved (CR)	**10**	**-**	**-**
Late Successional Reserve (LSR)	**87**	**6**	**-**
Marbled Murrelet Area (LSR3)	**1**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**21**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	207	10	4
Riparian Reserve**	**2**	**1**	**1**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

C. furfuracea is widely distributed across eight physiographic provinces in Washington (Western and Eastern Cascades, and Olympic Peninsula), Oregon (Coast Range, Cascades West and East, and Klamath Mountains), and California (Klamath) (see Figure CHFU-1). Most sites are found in the Klamath Mountains, where sites tend to be clustered or found in small groups. Sites are scattered across the Cascade Range in Oregon and Washington, the Klamath Mountains in California, and the Coast Range in Oregon. An apparently isolated site is found in the Olympic Peninsula in Washington. Many opportunities for dispersal between sites appear to exist, particularly in the Klamath Mountains and Cascade Range, based on the proximity of sites to one another and the extent of LSOG coniferous and mixed hardwood-coniferous forests in those mountain ranges. The species appears to be well distributed in its range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges of the state.

Fifty-nine of 363 sites are at least partially on private lands, and 359 sites are at least partially on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include seven sites in the Coos Bay District, 183 sites in the Medford District (one site is partially on the Umpqua National Forest), and 19 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include six sites on the Winema National Forests and 16 sites on the Umpqua National Forest (one site is partially in the Medford District). The remaining 128 sites on BLM and NFS lands are in the Eugene District and on the Deschutes, Klamath, Mt. Hood, Okanogan, Shasta-Trinity, Siuslaw, Wenatchee, Willamette, and Winema National Forests.

Across the NSO range, 120 sites are located on reserve lands managed by BLM and the Forest Service, including 87 in LSRs, one in a Marbled Murrelet Area, 21 in Known Owl Activity Centers, 10 in Congressionally Reserved areas, and two in Riparian Reserves. This represents 33 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

C. furfuracea is more commonly found in LSOG forests based on available data (317 of 363 total sites are in LSOG), and the lichen is presumed to be restricted to certain subcomponents of LSOG forests based on available life history and habitat information. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 6,300 feet msl and has been documented in most of the NSO range. LSOG coniferous and mixed hardwood-coniferous forests below 6,500 feet msl across the NSO range could provide habitat for *C. furfuracea* and support additional sites. These forests encompass an estimated 6 million acres (see Figure CHFU-2 and Table CHFU-4), including 3.7 million acres in reserve land allocations (62 percent of the forests). LSOG coniferous and mixed hardwood-coniferous forests below 6,500 feet msl have a somewhat limited distribution in the region and are primarily found in the Cascade and Coast Ranges and Klamath Mountains. Younger coniferous and mixed forests may provide habitat for the species as they mature and develop suitable habitat conditions over time, and these forests are more widespread across the region (see Figure CHFU-2 and Table CHFU-4).

TABLE CHFU-4

Extent of Forests that Could Provide Habitat for *Chaenotheca furfuracea* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 6,500 feet		LSOG Forests below 6,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,767,240	10,401,880	6,009,900	3,717,080
Local Area	576,260	196,340	183,520	80,410
Project Area	1,360	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. furfuracea* is distributed across 10 5th field watersheds that overlap the project area (see Table CHFU-5 and Figure CHFU-3). The sites are scattered across the watersheds. All of the sites appear to have some level of connectivity between them and others in the regional area, with multiple opportunities for dispersal, based on the extent of LSOG coniferous and mixed hardwood-coniferous forests in the watersheds.

All of the 16 sites in the local area are at least partially on BLM and NFS lands, and one is partially on private land. The sites on BLM and NFS lands are located on lands designated as Other (Matrix) and LSR. Of the 16 sites in the local area, eight sites are on reserve lands, representing 50 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table CHFU-5 and on Figure CHFU-3. These sites are in LSRs in the East Fork Coquille River, Middle Fork Coquille River, North Fork Coquille River, Olalla Creek-Lookingglass Creek, and South Umpqua River watersheds.

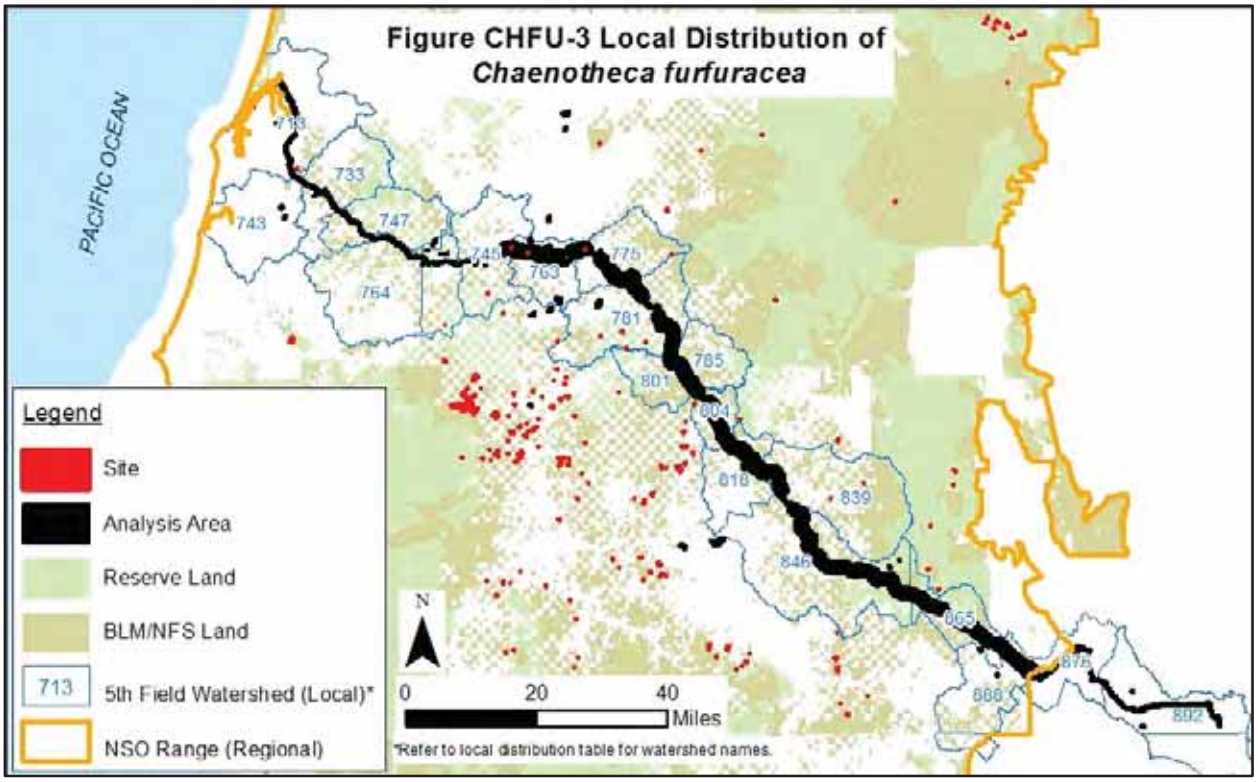
LSOG coniferous and mixed hardwood-coniferous forests below 6,500 feet msl encompass approximately 183,520 acres are LSOG, including 80,410 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number and distribution of sites in the local and regional areas and the extent of forests that may provide suitable habitat (see Figures CHFU-2 and CHFU-3).

TABLE CHFU-5

Distribution of *Chaenotheca furfuracea* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	2	-
Coos Bay Frontal (713)	1	-
East Fork Coquille River (747)	1	1
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	1	1
Middle South Umpqua River (763)	2	-
Myrtle Creek (775)	2	-
North Fork Coquille River (733)	1	1
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	4	4
Spencer Creek (865)	-	-
Trail Creek (804)	1	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain four sites of *C. furfuracea*, all of which are at least partially on BLM lands. One site is partially on private lands. The analysis area sites are in three watersheds: Myrtle Creek and Middle Smith Umpqua River watersheds in the Roseburg District and North Fork Coquille River in the Coos Bay District. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

Four sites in the analysis area are at least partially located on lands designated as Other (Matrix). One site is at least partially in a Riparian Reserve.

Surveys for the PCGP Project resulted in four observations of the species (Siskiyou BioSurvey LLC 2008). These recorded observations comprise the four sites in the analysis area. Within the project area, one site is located at MP 27, two sites are located between MPs 61.3 and 64.6, and one site is between MPs 75.7 and 75.8.

Project Impacts

Analysis

The PCGP Project would affect four sites out of the 359 sites on BLM-and Forest Service-managed lands in the region, representing approximately 1 percent of the sites (or four out 363 total sites on all lands in the NSO range). Table CHFU-6 presents an overview of the features of the PCGP Project that would affect the *C. furfuracea* sites. The construction corridor and associated work and storage areas would affect approximately 4.6 acres within the sites (about 33 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. furfuracea* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 2.6 acres of vegetation and soils within four sites and could result in the removal of *C. furfuracea* populations or individuals on trees that are removed. Disturbance in the TEWAs would result in similar impacts on about 0.4 acre within three sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to understory habitat components could negatively affect *C. furfuracea* in adjacent areas by removing its habitat, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 1.6 acres of understory habitat in three sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat unsuitable for the species.

TABLE CHFU-6

Impacts to *Chaenotheca furfuracea* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	4	2.6 ac
Temporary Extra Work Area (TEWA)	3	0.4 ac
Uncleared Storage Area (UCSA)	3	1.6 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 220 acres of LSOG coniferous and mixed hardwood-coniferous forests below 6,500 feet msl. These impacts would result in a reduction of habitat that may be suitable for *C. furfuracea*. Within this impact area, about 160 acres (about 73 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, but these areas would not return to LSOG conditions for more than 80 years and would not likely provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would also remain across the project area and would not provide habitat for the species. The permanent loss of LSOG coniferous and mixed hardwood-coniferous forests below 6,500 feet msl represents less than 1 percent of the total estimated area of these forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the four sites as a result of the PCGP Project, 12 sites of *C. furfuracea* would remain on BLM and NFS lands in the local area, including seven in reserves, and 355 sites, including 119 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 119 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 34 percent of the remaining *C. furfuracea* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. furfuracea* is a Category F (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, information on Category F species is insufficient to determine what level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *C. furfuracea* has a wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (359 on BLM and NFS lands). The species appears to be well distributed in the Klamath Mountains in Oregon, but has a scattered distribution outside the mountain range. The currently known number of sites on BLM and NFS lands is an increase of 25 sites since 2007, with some new sites documented during the PCGP Project surveys.
    - An estimated 33 percent of the sites (120 sites) are in reserves.

- LSOG coniferous and mixed hardwood-coniferous forests below 6,500 feet msl (general habitat for the species) have a somewhat limited distribution across the region and encompass approximately 6 million acres on BLM and NFS lands with an estimated 62 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain LSOG coniferous and mixed hardwood-coniferous forests, and several sites are located in the Coast Range. *C. furfuracea* is likely restricted to a subcomponent of LSOG coniferous and mixed forests based on available information on its habitat and life history requirements.
- The PCGP Project would affect four of 359 BLM- and Forest Service-managed sites of *C. furfuracea*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the four sites, a moderate-high number of sites (355) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (12 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Klamath Mountains and Cascade Range. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in a Riparian Reserve, but the percentage of sites in reserves would be about the same (34 percent). Of the remaining sites, 109 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 10 are in Congressionally Reserved areas where management activities that may adversely affect *C. furfuracea* are unlikely. One site is in a Riparian Reserve, where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 220 acres of LSOG coniferous and mixed hardwood-coniferous forests below 6,500 feet msl (less than 1 percent of the total regional acreage). An estimated 3.7 million acres (62 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. furfuracea*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category F species for which pre-disturbance surveys are not applicable and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the number of sites documented during surveys associated with the PCGP Project.

3.6.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. furfuracea* at four sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 355 sites would remain on BLM and NFS lands across the region, and 12 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. furfuracea* at four sites, these sites are

part of the many sites in the Klamath Mountains in Oregon where the species appears to be well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. furfuracea* would persist in the region without considering the four sites as part of the population.

- The PCGP Project would remove approximately 220 acres of LSOG coniferous and mixed forests below 6,500 feet msl (a negligible amount of the forests). An estimated 73 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 3.7 million acres (62 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. furfuracea* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the four *C. furfuracea* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *C. furfuracea* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

3.7 CHAENOTHECA SUBROSCIDA

Chaenotheca subroscida is an epiphytic pin lichen in the Coniocybaceae family and is commonly known as lemondrop whiskers or needle lichen.

3.7.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. subroscida* as a Category E (rare) species. The ORBIC evaluated *C. subroscida* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010), and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2010, the species was considered to be between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with a cause for long-term concern, within its global range (G3G4). In Oregon, it was rare, uncommon, or threatened, but not immediately imperiled (S3). In 2013, the species was considered too common and was removed from the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive species in Oregon (this species was removed from the Forest Service Sensitive species list in 2011), but it is a Strategic species.

3.7.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Little is known about the autecology and reproductive biology of *C. subroscida*, which is thought to grow slowly, reproduce infrequently, and have such low fecundity that reduced populations recover very slowly (Huff 2010a). *C. subroscida* appears to be able to disperse and colonize suitable substrates, including isolated locations, once they become available, despite its slow growth rate, which may be through the use of bird and insect vectors for dispersal (ORBIC 2004). Calicioid lichens, such as *C. subroscida*, have a crustose thallus and minute stalked fruiting bodies resembling the head of a pin, hence the common name of pin lichen (Huff 2010a).

Range

C. subroscida is widespread in cool temperate and temperate areas of western North America and northern Europe, including eastern Norway, northern and central Sweden, and Finland (Huff 2010a, ORBIC 2004). It occurs in the Pacific Northwest from California to British Columbia and inland to the Rocky Mountains (Huff 2010a). The species' known range in Oregon based on data available in 2004 was restricted to the NSO range (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across western North America and northern Europe. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. subroscida* from more than 100 element occurrences worldwide and approximately 60 element occurrences in North America in 2004. In the Pacific Northwest, British Columbia had the highest number of occurrences at more than 25, and California, Oregon, and Washington had less than 10 occurrences each in 2004 (ORBIC 2004). Based on 2004 information, the species had experienced a population decline across its range since pre-industrial times, correlating to the reduction of old-growth forests. In 2004, *C. subroscida* was considered to be highly vulnerable, primarily because of its slow reproductive process, few documented occurrences, and presumed close association with old-growth forests. It was also considered to be at some risk of extirpation or extinction, based on data available in 2004. The species was found in four locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported a total of 19 sites, all on federal lands.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, including *C. subroscida* (which was a Forest Service Sensitive species at the time), and resulted in seven observations of individuals or populations of *C. subroscida*. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

C. subroscida is primarily found on conifer bark and occasionally wood in old-growth forests at low to middle elevations, generally less than 6,000 feet msl (Huff 2010a). The lichen is typically found on the bark of *Picea* and *Thuja* species, with less frequent occurrences on the bark of *Abies*, *Pinus*, *Quercus*, and *Betula* species. In the Pacific Northwest, *C. subroscida* has been mostly found on conifers more than 200 years old and occasionally on younger trees (about 150 years old), with occurrences on Douglas-fir, grand fir (*Abies grandis*), and Engelmann spruce. The species prefers substrate away from edge habitat and with microclimates having higher humidity and more shade, but protected from direct rainfall. It is rarely found on decorticated twigs of spruce close to the base. It often occurs in colonies covering only a few square centimeters on a single tree trunk within a stand and then again several hundred meters away (ORBIC 2004). Based on available information, *C. subroscida* is presumed to be restricted to specific microclimate conditions of LSOG coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl.

Threats

Because of the apparent association with old-growth stands and shady, humid microclimate, loss of habitat through timber harvest and stand replacement fire are the principle threats to this species (Huff 2010a). Like other calicioid lichens, the removal of old-growth forests, particularly from logging practices, has been the principal cause for the species' decline worldwide and in the Pacific Northwest (ORBIC 2004). Removal of old-growth forests has undoubtedly had severe impacts on the number and sizes of populations and on the average dispersal distance necessary to colonize new substrates. Because of its relationship to older forests and its life history, populations can require several years to recover from disturbance.

With the establishment of LSRs and the reduction of logging in old-growth forests in the Pacific Northwest, *C. subroscida* has the potential to recover in the region because of its ability to disperse to appropriate substrates once they are available, even when those substrates are rather isolated (ORBIC 2004). Although little is known about the reproductive and dispersal biology of the species, the species may be able to overcome some habitat fragmentation, presuming habitat is available, and populations may increase as LSRs continue to function and LSOG forests are maintained and enhanced across the Pacific Northwest.

Management Recommendations

For Category E S&M species, the direction from the 2001 ROD is to manage all known sites until a determination can be made regarding which S&M category, if any, the species should be assigned to (USDA and USDI 2001). No management recommendations have been developed for *C. subroscida*.

3.7.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. subroscida* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CHSU-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 369 observations from BLM and Forest Service geodatabases were converted into 177 sites in the NSO range (region). Table CHSU-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CHSU-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CHSU-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CHSU-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE CHSU-1

Number of *Chaenotheca subroscida* Sites (2013)

Location*	Number of Sites
Regional Area	177
Local Area	31
Analysis (Project Area)	8 (8)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE CHSU-2

Distribution of *Chaenotheca subroscida* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	132	27	5
Forest Service	45	4	3
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	30	5	2

Data Source: Merged land ownership data for WA, OR, and CA in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.



Figure CHSU-1. Regional Distribution of *Chaenotheca subroscida*

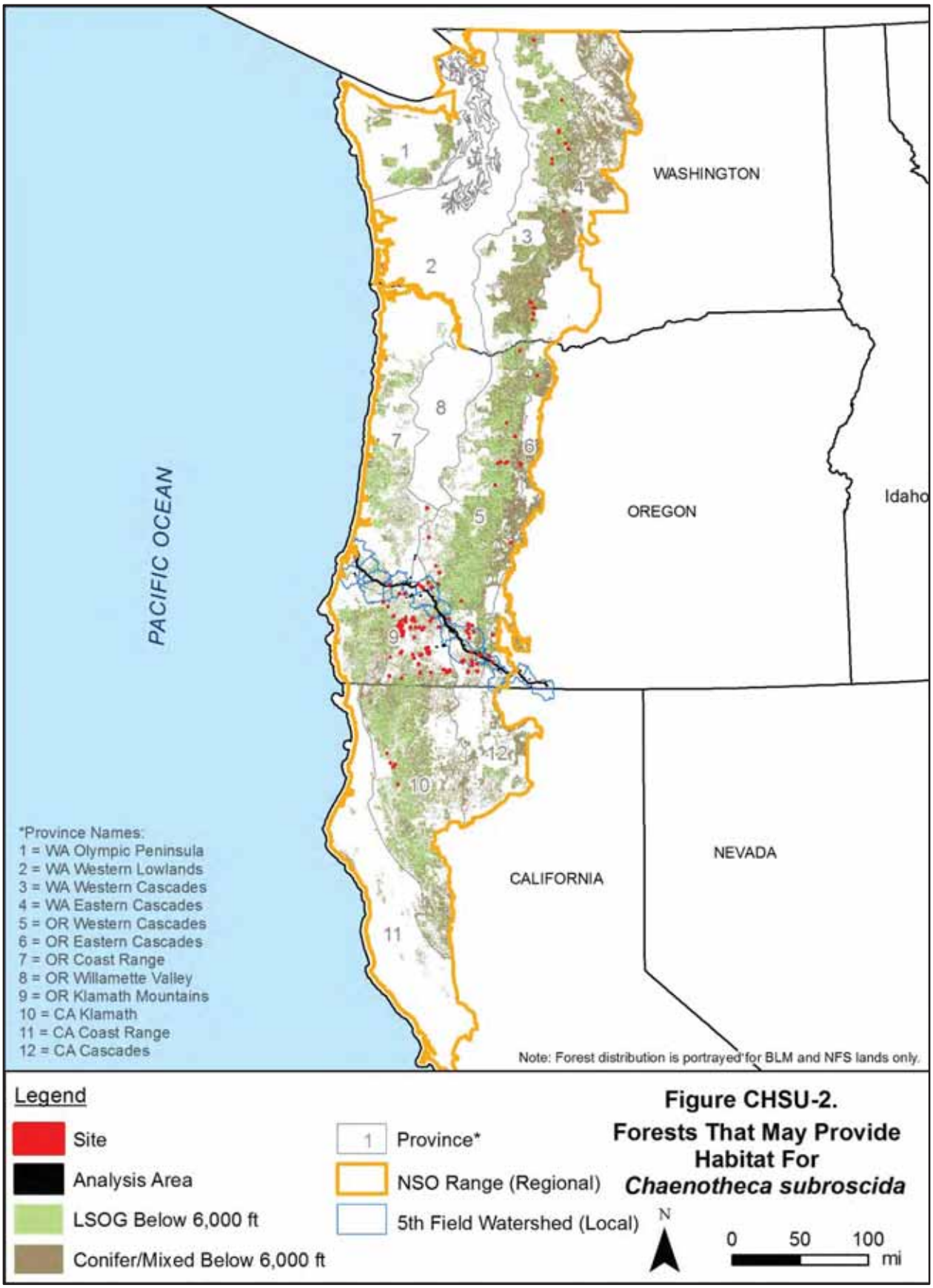


Figure CHSU-2.
Forests That May Provide Habitat For *Chaenotheca subroscida*

TABLE CHSU-3

Distribution of *Chaenotheca subroscida* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	13	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	6	-	-
Congressionally Reserved (CR)	**9**	**-**	**-**
Late Successional Reserve (LSR)	**23**	**5**	**2**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**5**	**1**	**-**
Managed Late Successional Area (MLSA)	1	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	128	26	6
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

C. subroscida is widely distributed across seven physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Coast Range, Cascades West and East, and Klamath Mountains), and California (Klamath) (see Figure CHSU-1). Most sites are found along the Klamath Mountains and Cascade Range, where sites tend to be clustered and near other sites. Sites in California are found in a small group in the Klamath Mountains, but sites in northern Oregon and Washington are scattered across the Cascade Range. Many opportunities for dispersal between sites appear to exist, particularly in the Klamath Mountains and Cascade Range, based on the proximity of sites to one another and the extent of LSOG forests in the mountain ranges. The species appears to be well distributed in the Klamath Mountains in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Thirty of 177 sites are located on private lands (at least partially), and all sites (177) are at least partially on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include 117 sites in the Medford District and 14 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include four sites on the Winema National Forest, four sites on the Rogue River National Forest, and one site on the Umpqua National Forest. The remaining 37 sites on BLM and NFS lands are in the Eugene District and on the Deschutes, Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Siskiyou, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 36 sites are located on reserve lands managed by BLM and the Forest Service, including 23 in LSRs, five in Known Owl Activity Centers, and nine in Congressionally Reserved areas. This represents 20 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

C. subroscida is primarily found in LSOG forests based on available data (155 of 177 total sites are in LSOG), and the lichen is presumed to be restricted to certain subcomponents of LSOG forests based on available life history and habitat information. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 5,600 feet

msl and has been documented in most of the NSO range. LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl across the NSO range could provide habitat for *C. subroscida* and support additional sites. These forests encompass an estimated 5.9 million acres (see Figure CHSU-2 and Table CHSU-4), including 3.7 million acres in reserve land allocations (62 percent of the forests). LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl have a somewhat limited distribution in the region and are primarily found in the Cascade and Coast Ranges and Klamath Mountains. Younger coniferous and mixed forests may provide habitat for the species as they mature and develop suitable habitat conditions over time, and these forests are more widespread across the region (see Figure CHSU-2 and Table CHSU-4).

TABLE CHSU-4

Extent of Forests that Could Provide Habitat for *Chaenotheca subroscida* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	18,066,540	9,909,630	5,912,860	3,650,600
Local Area	570,840	192,010	182,040	79,240
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. subroscida* is distributed across six 5th field watersheds that overlap the project area (see Table CHSU-5 and Figure CHSU-3). The sites in Big Butte Creek and Little Butte Creek watersheds are more clustered than sites in the other three watersheds. All of the sites appear to have some level of connectivity between them and others in the regional area, with multiple opportunities for dispersal, based on the extent of LSOG coniferous and mixed hardwood-coniferous forests in the watersheds and region.

All of the 27 sites in the local area are on BLM and NFS lands, and five sites are partially on private lands. The sites on BLM and NFS lands are located on lands designated as Other (Matrix) and LSR. Of the 27 sites in the local area, six sites are on reserve lands, representing 22 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table CHSU-5 and on Figure CHSU-3. These sites are in LSRs in the Little Butte Creek, Middle Fork Coquille River, Myrtle Creek, and Olalla Creek-Lookingglass Creek watersheds.

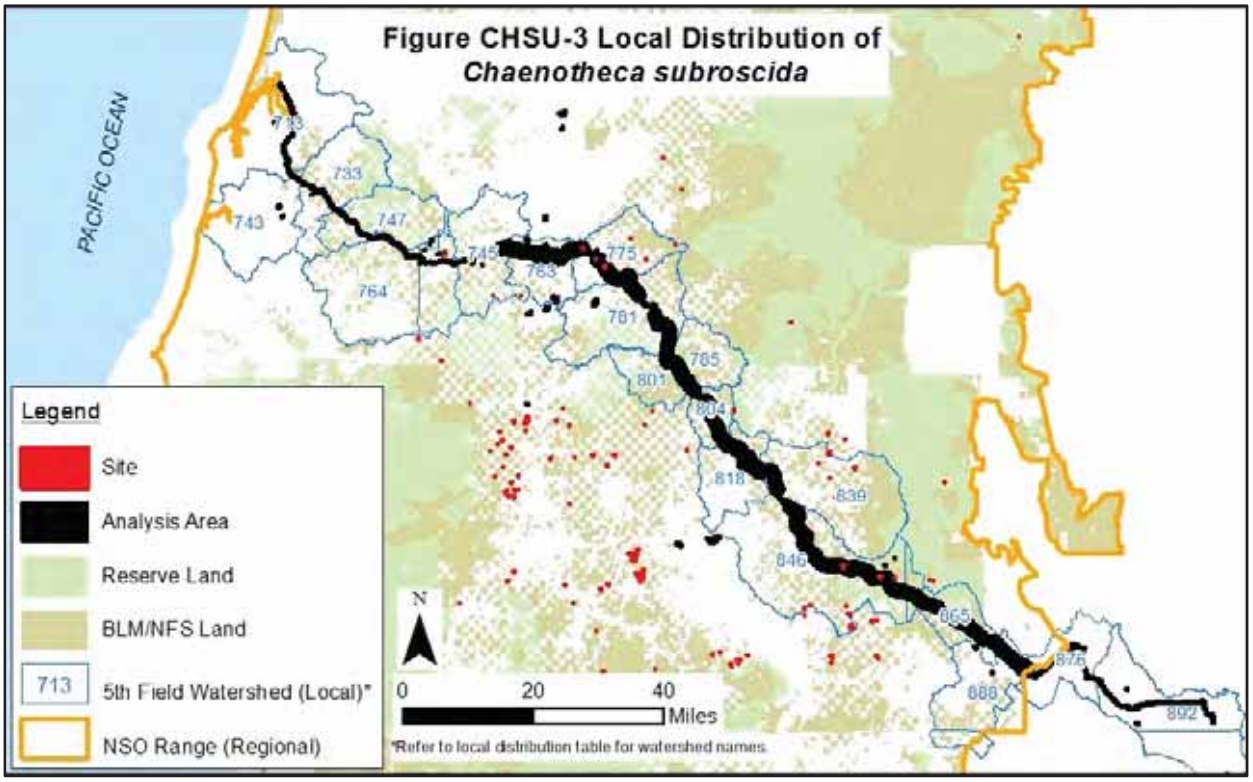
LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 182,040 acres are LSOG, including 79,240 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the distribution of sites in the local area, proximity of other sites in the region, and the extent of forests that may provide suitable habitat (see Figures CHSU-2 and CHSU-3).

TABLE CHSU-5

Distribution of *Chaenotheca subroscida* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	6	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	13	3
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	1	1
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	8	1
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	2	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	1	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain eight sites of *C. subroscida*, all of which are at least partially on BLM or NFS lands. Five sites are on BLM-managed lands, and three sites are on NFS lands. Two sites are partially on private lands. The analysis area sites are in three watersheds: Myrtle Creek watershed in the Roseburg District, Little Butte Creek watershed on the Rogue River National Forest, and Spencer Creek watershed on the Winema National Forest.

Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

The five sites on BLM lands and one site on NFS lands are located on lands designated as Other (Matrix). The other two sites on NFS lands are located in LSRs.

Surveys for the PCGP Project resulted in 22 observations of the species in seven locations (Siskiyou BioSurvey LLC 2008, 2011a). Twelve of these recorded observations comprise the eight sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, five sites are between MPs 75.9 and 80.7, and one site is located near each of the following MPs: 154.3, 161.2, and 173.4.

Project Impacts

Analysis

The PCGP Project would affect eight sites out of the 177 sites on BLM- and Forest Service-managed lands in the region, representing approximately 5 percent of the sites (all sites are at least partially on BLM or NFS lands). Table CHSU-6 presents an overview of the features of the PCGP Project that would affect the *C. subroscida* sites. The construction corridor and associated work and storage areas would affect approximately 12 acres within the sites (about 47 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. subroscida* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 5.9 acres of vegetation and soils within eight sites and could result in the removal of *C. subroscida* populations or individuals on trees that are removed. Disturbance in the TEWAs would result in similar impacts on about 2.0 acres within six sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees could negatively affect *C. subroscida* in adjacent areas by removing its habitat and potential host trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 4.0 acres of understory habitat in six sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat unsuitable for the species, but individuals on trees are not likely to be removed or disturbed. Rock source/disposal activities on about 0.03 acre in one site would result in similar impacts as in UCSAs.

TABLE CHSU-6

Impacts to *Chaenotheca subroscida* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	8	5.9 ac
Temporary Extra Work Area (TEWA)	6	2.0 ac
Uncleared Storage Area (UCSA)	6	4.0 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	1	0.03 ac

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 220 acres of LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. These impacts would result in a reduction of habitat that may be suitable for *C. subroscida*. Within this impact area, about 160 acres (about 73 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, but these areas would not return to LSOG conditions for more than 80 years and would not likely provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would also remain across the project area and would not provide habitat for the species. The permanent loss of LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl represents less than 1 percent of the total estimated area of these forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the eight sites as a result of the PCGP Project, 19 sites of *C. subroscida* would remain on BLM and NFS lands in the local area, including four in reserves, and 169 sites, including 34 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 34 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 20 percent of the remaining *C. subroscida* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. subroscida* is a Category E (rare) S&M species throughout the NSO range. Per the 2001 ROD, information on Category E species is insufficient to determine what level of management is needed for reasonable assurance of species persistence. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *C. subroscida* has a wide distribution across seven physiographic provinces and three states in the region and a moderate-high number of overall sites (177 on

BLM and NFS lands). The species appears to be well distributed in the Klamath Mountains in Oregon. The currently known number of sites on BLM and NFS lands is an increase of about 158 sites since 2007, with several sites documented during the PCGP Project surveys.

  - An estimated 20 percent of the sites (36 sites) are in reserves.

- LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) have a somewhat limited distribution across the region and encompass approximately 5.9 million acres on BLM and NFS lands with an estimated 62 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain LSOG forests, but fewer sites are located in the Coast Range. *C. subroscida* is likely restricted to a subcomponent of LSOG coniferous and mixed forests based on available information on its habitat and life history requirements.
- The PCGP Project would affect eight of 177 BLM- and Forest Service-managed sites of *C. subroscida*, representing approximately 5 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the eight sites, a moderate-high number of sites (169) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (19 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Klamath Mountains. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at two sites in LSRs, but the percentage of sites in reserves would be about the same (20 percent). Of the remaining sites, 26 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and nine are in Congressionally Reserved areas where management activities that may adversely affect *C. subroscida* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 220 acres of LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. subroscida*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category E species for which pre-disturbance surveys are not applicable and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

3.7.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. subroscida* at eight sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 169 sites would remain on BLM and NFS lands across the region, and 19 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. subroscida* at eight sites, these sites are part of the many sites in the Klamath Mountains in Oregon where the species appears to be well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. subroscida* would persist in the region without considering the eight sites as part of the population.
- The PCGP Project would remove approximately 220 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 73 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 3.7 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2007.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. subroscida* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the eight *C. subroscida* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *C. subroscida* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

3.8 DENDRISCOCAULON INTRICATULUM

Dendriscocaulon intricatulum is a minute fruticose lichen in the Lobariaceae family and is commonly known as olive-thorn lichen. The taxonomy of the species needs clarification because six distinct taxa may occur in North America, including two separate taxa in the Pacific Northwest (Helliwell 2007).

3.8.1 Regulatory Status and Ranking

The 2001 ROD identifies *D. intricatulum* as a Category B (rare) species. The ORBIC evaluated *D. intricatulum* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, *D. intricatulum* was considered to be between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern, within its global range (G3G4Q), although the ranking was questionable because of the taxonomy issues. In Oregon, it was not

rare and apparently secure, but with cause for long-term concern (S4). The species is not currently on the ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

3.8.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *D. intricatulum*. It grows as an epiphyte on lower twigs of understory conifer trees or on the boles and large branches of oak trees, with specific growth conditions varying by location within its range (Helliwell 2007). The species appears to be a cyanotype, which has both green algal and cyanobacterial components, and may be a blue-green photomorph of other species, such as *Lobaria* or *Pseudocyphellaria* species or *Sticta oroborealis*. The lichen may reproduce asexually via fragmentation, and dispersal may be limited based on the species' patchy distribution and rarity.

Range

D. intricatulum is endemic to North America, with a range from Alaska along the Pacific coast to northern California and inland to Montana (ORBIC 2004, Helliwell 2007). A similar species has also been documented in eastern North America, although the taxonomy of the possible distinct species has not been verified. In the Pacific Northwest, the species is most abundant in southwestern Oregon, which appears to be the center of the species' population (Helliwell 2007). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *D. intricatulum* from an estimated 300 element occurrences in North America in 2004, assuming populations in western and eastern North America are the same species. In the Pacific Northwest, Oregon had the most occurrences with 134, and the species is locally abundant in the southwestern portion of the state. California and Washington had far fewer occurrences (5 and 10, respectively) in 2004 (ORBIC 2004). In 2004, *D. intricatulum* was considered to be moderately vulnerable and extremely sensitive to air moisture. The species was found in three locations during Random Multi-Species surveys across the NSO

range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 750 sites on federal lands and 777 total sites on all lands in the NSO range.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, and incidental observations of other lichens were documented, although no observations of *D. intricatulum* were reported. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

D. intricatulum is found in coniferous, mixed hardwood-coniferous, and hardwood forests in areas with high humidity (Helliwell 2007). It is always found in association with cyanolichens. It is primarily found in old-growth forests in the northern portion of its range in the Pacific Northwest, while it is also found in more open forests in the southern portion of its range. Common associated species include western hemlock, Pacific silver fir, Douglas-fir, lodgepole pine, bishop pine, bigleaf maple, and various oak trees. The lichen has been documented between about 30 and 2,170 feet msl in the NSO range (Lesher et al. 2003). *D. intricatulum* may prefer specific microclimate conditions of LSOG forests in parts of its range, but it may not be as restricted to these conditions as much as it is restricted to high humidity habitats.

Threats

Primary threats to *D. intricatulum* include changes in microclimate conditions, particularly changes in moisture, light, or temperature; removal of colonized trees; overtopping of oak habitat by encroaching Douglas-fir; and deteriorating air quality (Helliwell 2007). Localized threats also include collecting twigs for firewood at Horse Mountain. Severe air pollution may prevent the species from colonizing the area based on the lack of documentation of populations in areas affected by pollution.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *D. intricatulum* in 2003 with several other lichens (Lesher et al. 2003). The following recommendations were identified to manage known sites on federal lands by maintaining habitat, forest structure, occupied and potential suitable substrate, and micro-climate conditions:

- Maintain trees with colonies of *D. intracatulum*; leave colonized trees standing.
- Maintain existing environmental conditions for local populations and adjacent suitable habitat.
- Leave adequate standing trees and understory vegetation adjacent to colonized trees to maintain the microclimatic conditions and to provide substrate for colonization.

3.8.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *D. intricatulum* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table DEIN-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 1,302 observations from BLM and Forest Service geodatabases were converted into 639 sites in the NSO range (region). Table DEIN-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table DEIN-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure DEIN-1 displays the regional distribution of the species across BLM and NFS lands, and Figure DEIN-2 displays the species' regional distribution with the extent of coniferous, mixed hardwood-coniferous, and hardwood forests and LSOG forests below 4,500 feet msl on BLM and NFS lands.

TABLE DEIN-1

Number of *Dendriscocaulon intricatulum* Sites (2013)

Location*	Number of Sites
Regional Area	639
Local Area	174
Analysis Area (Project Area)	5 (4)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, and project areas are provided in Chapter 1.

TABLE DEIN-2

Distribution of *Dendriscocaulon intricatulum* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	499	165	5
Forest Service	137	9	-
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	87	37	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE DEIN-3

Distribution of *Dendriscocaulon intricatulum* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	202	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	11	1	-
Congressionally Reserved (CR)	**5**	**-**	**-**
Late Successional Reserve (LSR)	**35**	**3**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**19**	**6**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	2	-	-
Other (Matrix, Riparian Reserve, Other)	397	172	5
Riparian Reserve**	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

D. intricatulum is widely distributed across eight physiographic provinces in Washington (Western and Eastern Cascades, and Olympic Peninsula), Oregon (Coast Range, Cascades West, and Klamath Mountains), and California (Klamath and Coast Range) (see Figure DEIN-1). The majority of the sites are found in the Klamath Mountains and southern Cascade Range in Oregon, where sites are clustered in a large group. Some clusters of sites are located in the western Cascade Range in northern Oregon and Washington, but the sites tend to be more scattered in the mountain range. A few sites are located in the Coast Range, Klamath Mountains in California, and the Olympic Peninsula in Washington. Many opportunities for dispersal between sites appear to exist across the region based on the proximity of sites to one another, widespread distribution of the sites, and the extent of coniferous, mixed hardwood-coniferous, and hardwood forests. The species appears to be well distributed in the Klamath Mountains and western Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Of the 639 sites in the region, 87 sites are located on private lands (at least partially), and 633 sites are at least partially on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include 490 sites in the Medford District and five sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include 30 sites on the Rogue River National Forest. The remaining 108 sites on BLM and NFS lands are in the Arcata District and on the Gifford Pinchot, Mendocino, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Shasta-Trinity, Siskiyou, Siuslaw, Six Rivers, and Willamette National Forests.



Figure DEIN-1.
Regional Distribution of
Dendriscocaulon intricatulum

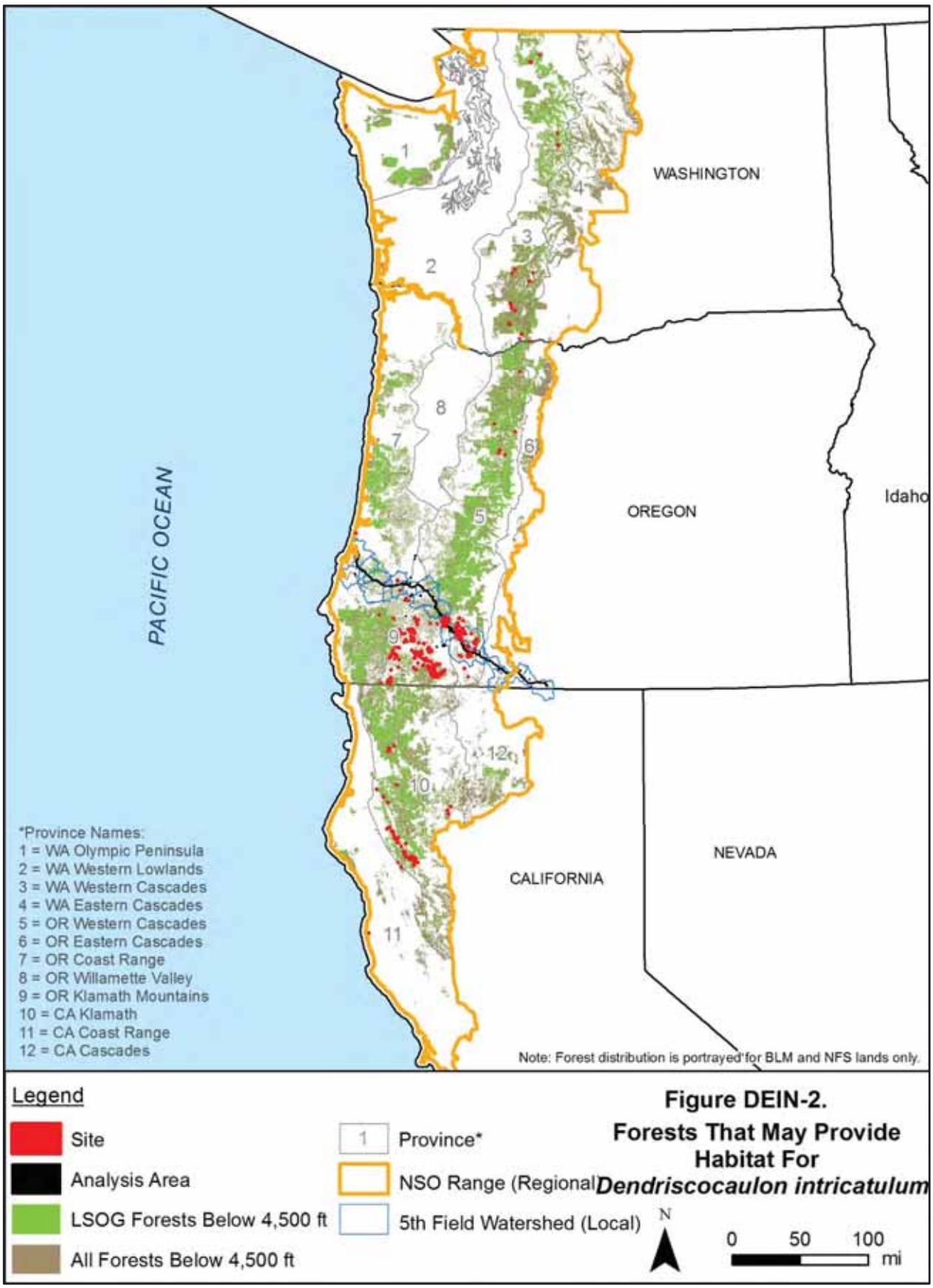


Figure DEIN-2.
Forests That May Provide Habitat For *Dendriscocaulon intricatulum*

Across the NSO range, 58 sites are located on reserve lands managed by BLM or the Forest Service, including 35 in LSRs (at least partially), 19 in Known Owl Activity Centers, and five in Congressionally Reserved areas (at least partially). This represents 9 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The one NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

D. intricatulum is more commonly found in LSOG forests based on available data (446 of 639 total sites are in LSOG), but it is also relatively common in non-LSOG forests. Based on current site locations, the species is found in all forest types up to about 4,300 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests below 4,500 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *D. intricatulum* and support additional sites. These forests encompass an estimated 14.6 million acres on BLM and NFS lands in the region, including an estimated 7.5 million acres in reserve land allocations (51 percent of the forests; Table DEIN-4). Of this acreage, an estimated 5.1 million acres are LSOG (see Figure DEIN-2), including 3.1 million acres in reserve land allocations (60 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests below 4,500 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE DEIN-4

Extent of Forests that Could Provide Habitat for *Dendriscocaulon intricatulum* on BLM and NFS Lands*

Location	All Forests below 4,500 feet		LSOG Forests below 4,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	14,636,690	7,516,260	5,134,680	3,103,420
Local Area	510,900	153,180	154,780	63,730
Project Area	1,150	280	200	80

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *D. intricatulum* is distributed across five 5th field watersheds that overlap the project area (see Table DEIN-5 and Figure DEIN-3). Sites are more abundant in the Klamath Mountains and western Cascade Range in the local area, while sites in the Coast Range appear more isolated. The sites in the west appear to have some level of connectivity between them and others in the regional area based on the proximity of other sites in the region and extent of coniferous, mixed, and hardwood forests. Multiple opportunities for dispersal appear to be available between sites in the eastern portion of the local area.

Of the 174 sites in the local area, 173 sites are at least partially on BLM and NFS lands, and 37 sites are at least partially on private lands. The sites on BLM and NFS lands are located on lands designated as Other (Matrix), LSR, LSR4, and Administratively Withdrawn. Of the 173 sites on BLM and NFS lands in the local area, nine sites are on reserve lands, representing 5 percent of the BLM- and Forest Service-managed sites. The distribution of these reserve sites across the

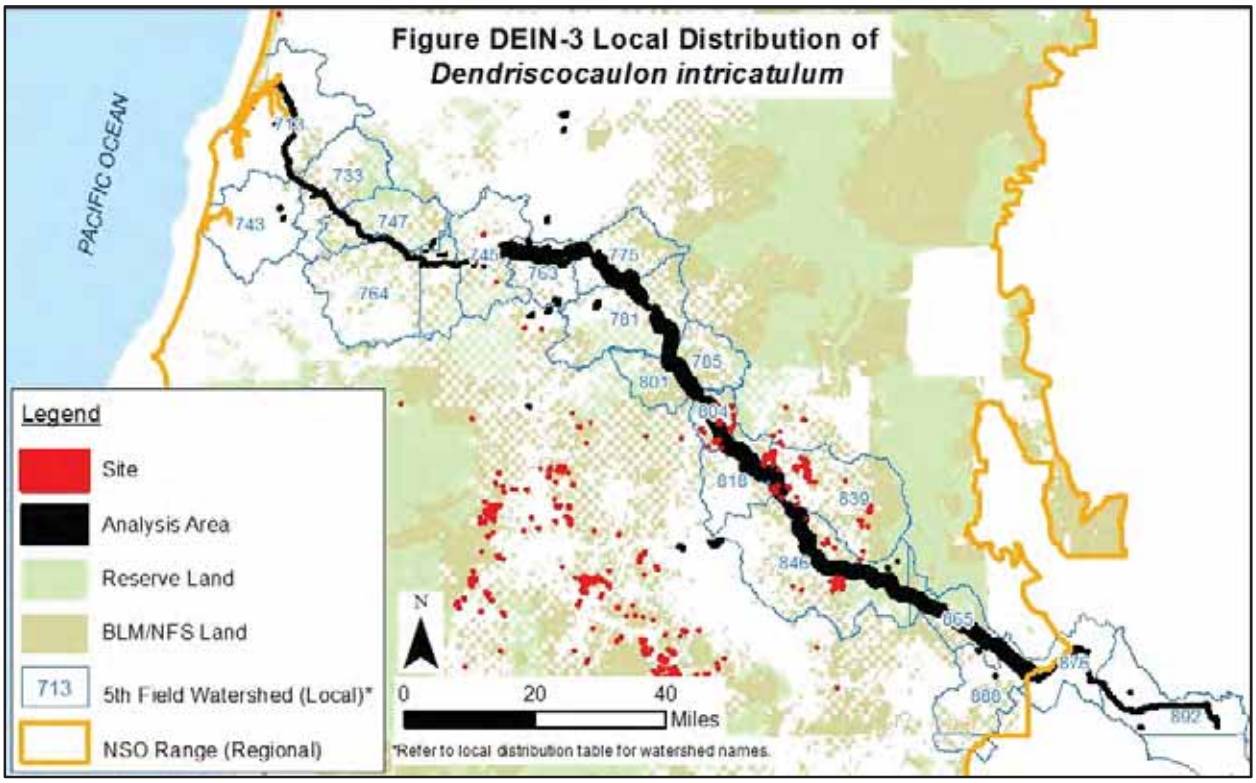
watersheds is depicted in Table DEIN-5 and on Figure DEIN-3. These sites are in the Big Butte Creek, Little Butte Creek, Olalla Creek-Lookingglass Creek, and Trail Creek watersheds.

TABLE DEIN-5

Distribution of *Dendriscocaulon intricatulum* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	91*,**	2
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	32*	2
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	2	1
Rogue River-Shady Cove (818)	4**	-
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	50**	4
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*One site is in the Big Butte Creek and Little Butte Creek watersheds.
**One site is in the Rogue River-Shady Cove and Big Butte Creek watersheds and one site is in the Rogue River-Shady Cove and Trail Ceek watersheds.



Coniferous, mixed hardwood-coniferous, and hardwood forests below 4,500 feet msl encompass approximately 510,900 acres on BLM and NFS lands in the local area, with 153,180 acres in

reserve land allocations (30 percent of the forests). Of this acreage, an estimated 154,780 acres are LSOG, including 63,730 acres in reserves (41 percent of the forests). Other sites may also exist in the local area, particularly in the Klamath Mountains and Cascade Range, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures DEIN-2 and DEIN-3).

Analysis/Project Area Distribution

The analysis area contains five sites of *D. intricatulum*, and the project area contains four sites. All of the sites are on BLM lands (Medford District). The analysis area sites are in two watersheds: Big Butte Creek and Trail Creek. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

All of the sites are located on lands designated as Other (Matrix) and are not within regionally mapped reserves.

Surveys for the PCGP Project resulted in no observations of the species (Siskiyou BioSurvey LLC 2008, 2011a). Nine recorded observations from 2001-2002 in agency records comprise the five sites in the analysis area. Within the project area, two sites are between MPs 115.4 and 115.6, and one site is at MP 133.4. One site is along a road east of MP 115.6.

Project Impacts

Analysis

The PCGP Project would affect five sites out of the 633 sites on BLM and NFS lands in the region, representing less than 1 percent of the sites (or five out of 639 total sites on all lands in the NSO range). Table DEIN-6 presents an overview of the features of the PCGP Project that would affect the *D. intricatulum* sites. The construction corridor and associated work and storage areas would affect approximately 3.7 acres within four sites (about 27 percent of all sites in the analysis area). One site could be indirectly affected by road improvements, but would not be subject to direct effects. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *D. intricatulum* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 1.6 acres of vegetation and soils within three sites and could result in the removal of *D. intricatulum* populations or individuals on trees that are removed. Disturbance in the TEWAs would result in similar impacts on about 0.7 acre within two sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees could negatively affect *D. intricatulum* in adjacent areas by removing its habitat and potential host trees, potentially affecting site persistence even if the entire site is not disturbed, although the species may be resilient to edge effects at some sites. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor

would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.3 acre of understory habitat in two sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat unsuitable for the species, but individuals on trees are not likely to be removed or disturbed. Road improvements and establishment would disturb approximately 1.0 acre within one site and could remove habitat and extant populations or individuals of *D. intricatulum*. Road improvements could also modify microclimate conditions near one site, potentially affecting site persistence even though the site would not be directly affected.

TABLE DEIN-6

Impacts to *Dendriscocaulon intricatulum* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	3	1.6 ac
Temporary Extra Work Area (TEWA)	2	0.7 ac
Uncleared Storage Area (UCSA)	2	0.3 ac
Roads (TMP)	1	1.0 ac
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 920 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 4,500 feet msl. These impacts would result in a reduction of habitat that may be suitable for *D. intricatulum*. Within this impact area, about 580 acres (about 63 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 180 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 4,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of forests below 4,500 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the five sites as a result of the PCGP Project, 168 sites of *D. intricatulum* would remain on BLM and NFS lands in the local area, including nine in reserves, and 628 sites, including 58 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 58 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 9 percent of the remaining *D. intricatulum* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the

persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *D. intricatulum* is a Category B (rare) species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines in parts of Oregon via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M. The species remained on the list as Category E in California and Category A in other parts of Oregon and in Washington.
    - *D. intricatulum* has a wide distribution across eight physiographic provinces in three states and a moderate-high number of overall sites (633 on BLM and NFS lands). The species appears to be well distributed in the Klamath Mountains and western Cascade Range in Oregon and Washington. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites documented since 2007, but is still moderate-high.
    - An estimated 9 percent of the sites (58 sites) are in reserves.
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 4,500 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 14.6 million acres on BLM and NFS lands with an estimated 51 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain these forests, and fewer sites are located in these areas. A subcomponent of these forests likely provides habitat for *D. intricatulum*.
- The PCGP Project would affect five of 633 BLM- and Forest Service-managed sites of *D. intricatulum*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the five sites, a moderate-high number of sites (628) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (168 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Klamath Mountains and Cascade Range. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 54 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and five are at least partially in Congressionally Reserved areas where management activities that may adversely affect *D. intricatulum* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 180 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 4,500 feet msl (less than 1 percent of the total regional acreage). An estimated 7.5 million acres (51 percent)

of all forests and 3.1 million acres (60 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the NSO range.

- The remaining forests could support additional populations of *D. intricatulum*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during pre-disturbance, strategic, and other surveys.

3.8.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *D. intricatulum* at five sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 628 sites would remain on BLM and NFS lands across the region, and 168 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *D. intricatulum* at five sites, these sites are part of a group of sites in the Klamath Mountains and Cascade Range in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *D. intricatulum* would persist in the region without considering the five sites as part of the population.
- The PCGP Project would remove approximately 920 acres of all forests below 4,500 feet msl (a negligible amount of the forests). An estimated 63 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 7.5 million acres (51 percent) of all forests and 3.1 million acres (60 percent) of LSOG forests below 4,500 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *D. intricatulum* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the five *D. intricatulum* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *D. intricatulum* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

3.9 FUSCOPANNARIA SAUBINETII

Fuscopannaria saubinetii is an epiphytic lichen in the Pannariaceae family and is commonly known as shingle lichen or pink-eyed mouse. The species has also been known as *Pannaria saubinetii*. In 2000, Jorgensen determined that lichen collections in North America actually contained specimens of *F. pacifica*, a common species, and were not *F. saubinetii* as previously thought (Stone 2012d). The taxonomy was changed in 2000 to reflect the distinction between the two species, and *F. saubinetii* is no longer assumed to occur in North America (Stone 2012d). Identification of *F. saubinetii* in the NSO range is being reviewed, but this discussion assumes the species is found in the NSO range because it is still on the S&M list, pending an annual species review.

3.9.1 Regulatory Status and Ranking

The 2001 ROD identifies *F. saubinetii* as a Category F (uncommon) species. The ORBIC evaluated *F. saubinetii* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, *F. saubinetii* was considered to be between rare, uncommon, or threatened, but not immediately imperiled, and widespread, abundant, and secure within its global range (G3G5) and had an unknown rank in Oregon (SU). Since 2004, the documented occurrences of *F. saubinetii* in North America were confirmed to be misidentifications (Stone 2012d). It is not currently on the ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

3.9.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *F. saubinetii*. Like many similar lichens in the *Pannaria* and *Fuscopannaria* genera, the species grows as tiny thalli or tufts on large mature trees and is a nitrogen-fixing lichen (Stone 2012d). It is similar in appearance and growth to the more common *F. pacifica*.

Range

The species is widespread in the Mediterranean region of Europe and portions of southern and central Europe (ORBIC 2004). In North America, it was thought to have been found in humid lowland locations along the Pacific coast north to British Columbia, although the specimens were recently confirmed to have been misidentified (Stone 2012d). The more common *F. pacifica* is found along the Pacific coast from San Mateo, California to Alaska (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data (the data still report the species as *F. saubinetii*) is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations widely distributed across western North America (for *F. pacifica*) and Europe (for *F. saubinetii*). Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The population status of *F. saubinetii* in North America is unknown because the species is thought to occur only in Europe, and previously identified specimens in North America may actually be the more common *F. pacifica* (ORBIC 2004, Stone 2012d). *F. pacifica* is considered to be locally common across its range (ORBIC 2004). *F. saubinetii* was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 184 sites on federal lands and 194 total sites on all lands in the NSO range.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens and incidental observations of other lichens were documented, although no observations of *F. saubinetii* were reported. The current estimated number of sites and distribution of the species based on 2013 data (the data still report the species as *F. saubinetii*) are presented below under the Species Distribution discussion.

Habitat

F. saubinetii occurs on the bases of large trees (ORBIC 2004). In Mediterranean climates in Europe, it is known to grow on the base of large oak (*Quercus* spp.) and beech (*Fagus* spp.) trees at low elevations (Stone 2012d). In the Pacific Northwest, *F. saubinetii (pacifica)* has been found in various habitats and stand ages, including trees (mainly hardwoods), shrubs, and mossy rocks in moist hardwood and coniferous forests and riparian areas from low to mid elevations (USDA and USDI 2000). Based on the recent clarification of the taxonomy of the species in the Pacific Northwest, *F. pacifica* is not likely restricted to LSOG forests.

Threats

Threats to the lichen are assumed to be similar to threats experienced by other lichens in the *Pannaria* and *Fuscopannaria* genera, which include air pollution, fire, logging, and other alterations to the habitat and microclimate in which it occurs. As a nitrogen-fixing lichen, the species is most sensitive to air pollution (USDA and USDI 2000).

Management Recommendations

For Category F S&M species, the 2001 ROD indicates that management of known sites is not necessary, but a determination needs to be made regarding which S&M category, if any, the species should be assigned to (USDA and USDI 2001). No management recommendations have been developed for *F. saubinetii*.

3.9.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *F. saubinetii* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table FUSA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 235 observations from BLM and Forest Service geodatabases were converted into 124 sites in the NSO range (region). Table FUSA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table FUSA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure FUSA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure FUSA-2 displays the species' regional distribution with the extent of all forest types and LSOG forests below 6,000 feet on BLM and NFS lands within the currently known range of the species.

TABLE FUSA-1

Number of *Fuscopannaria saubinetii* Sites (2013)

Location*	Number of Sites
Regional Area	124
Local Area	26
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, and project areas are provided in Chapter 1.

TABLE FUSA-2

Distribution of *Fuscopannaria saubinetii* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	72	25	1
Forest Service	35	-	-
NPS	4	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	27	4	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE FUSA-3

Distribution of *Fuscopannaria saubinetii* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	8	-	-
Adaptive Management Reserves (AMR)	2	-	-
Administratively Withdrawn (AW)	2	-	-
Congressionally Reserved (CR)	**6**	**-**	**-**
Late Successional Reserve (LSR)	**53**	**16**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	39	9	-
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

F. saubinetii is widely distributed across eight physiographic provinces in Washington (Western Cascades and Olympic Peninsula), Oregon (Coast Range, Cascades West, Klamath Mountains, and Willamette Valley), and California (Coast and Klamath) (see Figure FUSA-1). Most sites are found along the Coast Range and Cascade Range in Oregon, with fewer sites in the Klamath Mountains. Sites are scattered across the region with some clusters of sites in Oregon, where the species appears to be locally abundant. Sites in Washington and California appear to be isolated from other sites in Oregon. Many opportunities for dispersal between sites appear to exist, particularly in Oregon, based on the proximity of sites to one another and the extent of coniferous, mixed, and hardwood forests. *F. saubinetii* appears to be well distributed in its range in Oregon based on the relative abundance of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges of the state.

Twenty-seven of 124 sites are located on private lands (at least partially), and 107 sites are at least partially on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include 12 sites in the Coos Bay district, two sites in the Medford District, and 41 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include eight sites on the Rogue River National Forests and 12 sites on the Umpqua National Forest. The remaining 32 sites on BLM and NFS lands are in the Salem District and on the Mt. Baker-Snoqualmie, Mt. Hood, Siuslaw, and Willamette National Forests.

Across the NSO range, 61 sites are located on reserve lands managed by BLM and the Forest Service, including 53 in LSRs (at least partially), two in Known Owl Activity Centers, and six in Congressionally Reserved areas (at least partially). This represents 57 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The four NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.



Figure FUSA-1.
Regional Distribution of *Fuscopannaria saubinetii*

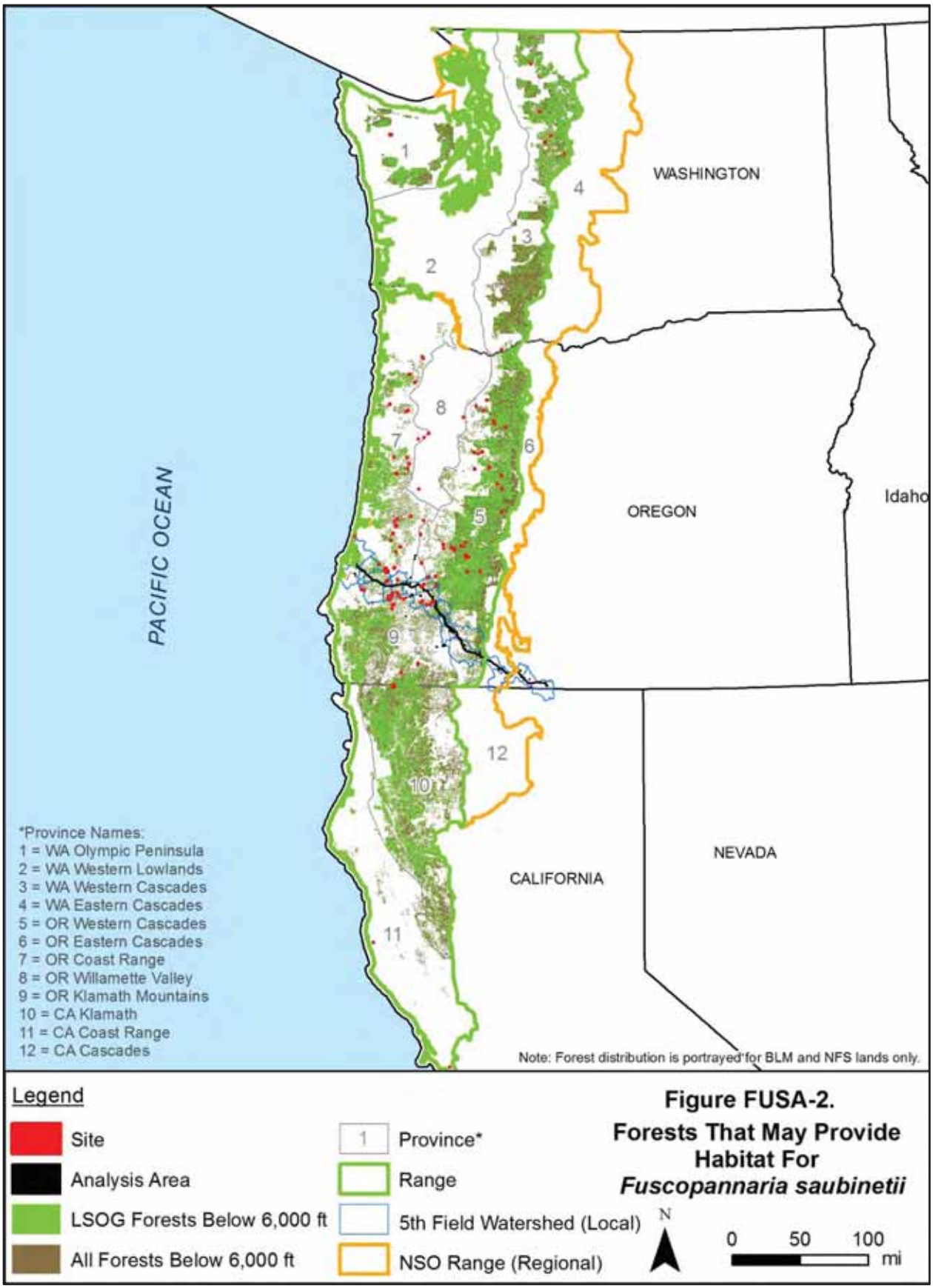


Figure FUSA-2.
Forests That May Provide Habitat For *Fuscopannaria saubinetii*

F. saubinetii is more commonly found in LSOG forests based on available data (107 of 124 total sites are in LSOG), but it is assumed to be the more common *F. pacifica* and is not likely restricted to LSOG conditions. Based on current site locations, the species is found in all forest types below about 4,600 feet msl and has been documented in the western part of the NSO range, excluding the eastern Cascade Range in Oregon and Washington and Cascade Range in California. Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including the LSOG component of these forests, within this range could provide habitat for *F. saubinetii (pacifica)* and support additional sites. These forests encompass an estimated 13.8 million acres on BLM and NFS lands in the region, including an estimated 7.7 million acres in reserve land allocations (56 percent of the forests; Table FUSA-4). Of this acreage, an estimated 5.5 million acres are LSOG (see Figure FUSA-2), including 3.3 million acres in reserve land allocations (60 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl are widespread, LSOG forests are less common and are primarily found along the Cascade Range and Klamath Mountains.

TABLE FUSA-4

Extent of Forests that Could Provide Habitat for *Fuscopannaria saubinetii* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	13,750,350	7,645,190	5,502,710	3,325,820
Local Area	520,780	179,810	176,180	75,990
Project Area	1,250	490	270	150

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *F. saubinetii* is distributed across five 5th field watersheds that overlap the project area (see Table FUSA-5 and Figure FUSA-3). Sites appear to be scattered across the five watersheds, with some clusters of sites in the South Umpqua River watershed. All of the sites appear to have some level of connectivity between them and others in the regional area, with multiple opportunities for dispersal, based on the extent of coniferous, mixed hardwood-coniferous, and hardwood forests in the watersheds and region.

Of the 26 sites in the local area, 25 are at least partially on BLM lands, and four are at least partially on private lands. The sites on BLM lands are located on lands designated as Other (Matrix), LSR, and Adaptive Management Area. Of the 26 sites in the local area, 16 sites are on reserve lands, representing 62 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table FUSA-5 and on Figure FUSA-3. These sites are in LSRs in the East Fork Coquille River, Middle Fork Coquille River, South Umpqua River and Olalla Creek-Lookingglass Creek watersheds.

Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 520,780 acres on BLM and NFS lands in the local area, including 179,810 acres in reserve land allocations (35 percent of the forests). Of this acreage, an estimated 176,180 acres are LSOG, including 75,990 acres in reserve land allocations (43 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the

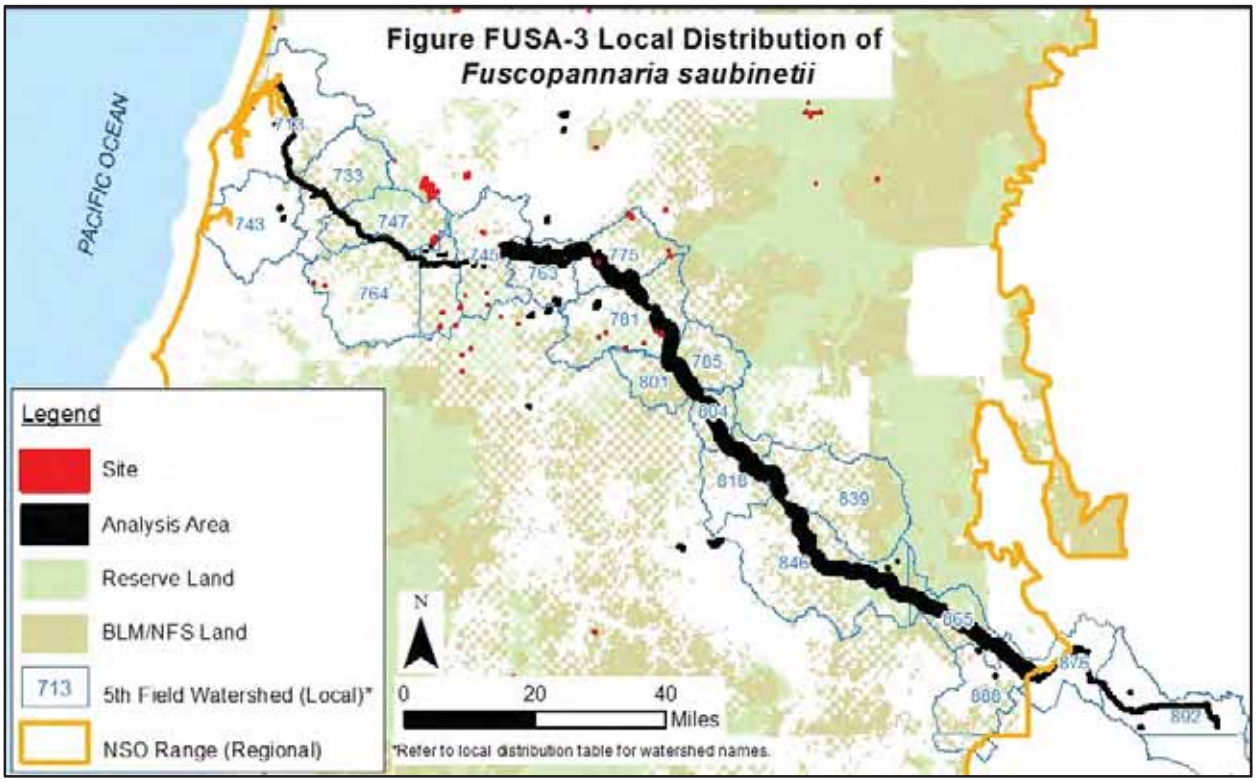
number and distribution of sites in the local area, proximity of other sites in the region, and the extent of forests that may provide suitable habitat (see Figures FUSA-2 and FUSA-3).

TABLE FUSA-5

Distribution of *Fuscopannaria saubinetii* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	2*	1
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	7*	5
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	7**	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	5	5
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	7**	6
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
*One site is in Middle Fork Coquille River and East Fork Coquille River watersheds.
**One site is in Myrtle Creek and South Umpqua River watersheds.



Analysis/Project Area Distribution

The analysis and project areas contain one site of *F. saubinetii*, which is partially on BLM land and partially on private land. The analysis area site is located in the East Fork and Middle Fork Coquille River watersheds in the Coos Bay District. A few sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above). The site is in an LSR.

Surveys for the PCGP Project did not result in any observations of the species (Siskiyou BioSurvey LLC 2008, 2011a). Two recorded observations from 1999 in agency databases comprise the site in the analysis area, which is located near a rock source/disposal area more than 3 miles north of MP 48.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 107 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent of the sites (or one out of 124 total sites on all lands in the NSO range). Table FUSA-6 presents an overview of the features of the PCGP Project that would affect the *F. saubinetii* site. The construction corridor and associated work and storage areas would not affect the site, but rock source and disposal activities would minimally affect 0.1 acre within the site (less than 1 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *F. saubinetii* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

TABLE FUSA -6

Impacts to *Fuscopannaria saubinetii* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	-	-
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	1	0.1 ac

ac = acres

Rock source and disposal activities would affect a small portion of the site (about 0.1 acre) and would result in minimal disturbance around the recorded observations of the species within the site. Activities in the corridor and associated work and storage areas would take place more than 3 miles south of the site and would not affect site persistence. Based on the minimal disturbance and nature of activities associated with the PCGP Project within the site, the lichen is expected to persist at the site following project implementation.

Across the project area, the PCGP Project would remove an estimated 980 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 200 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *F. saubinetii* (*pacifica*). Within this impact area, about 650 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor

would remain across the project area, resulting in a permanent loss of about 200 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests across the species' range.

Discussion

Assuming site persistence is maintained at the site despite impacts associated with the PCGP Project, 26 sites of *F. saubinetii* would remain on BLM lands in the local area, including 16 in reserves, and 107 sites, including 61 in reserves, would remain on BLM and NFS lands in the NSO range. The sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 61 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 57 percent of the *F. saubinetii* on BLM and NFS lands in the NSO range would be protected in reserves. Note that this species is expected to be removed from the S&M list, pending an annual species review, because of the current documentation on misidentifications of the species in the Pacific Northwest.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *F. saubinetii* is a Category F (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, information on Category F species is insufficient to determine what level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - *F. saubinetii* observations in the Pacific Northwest have likely been misidentified and are actually the more common *F. pacifica* (Stone 2012d). Identification of *F. saubinetii* in the NSO range is being reviewed, but this discussion assumes the species is found in the NSO range, pending an annual species review to remove it from the S&M list.
    - *F. saubinetii* has a somewhat wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (107 on BLM and NFS lands). The species appears to be well distributed in its range in Oregon. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites since 2007 (possibly attributed to taxonomic changes), but is still moderate-high.
    - An estimated 57 percent of the sites (61 sites) are in reserves.

- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the species' range and encompass approximately 13.8 million acres on BLM and NFS lands in the region with an estimated 56 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous, mixed hardwood-coniferous, and hardwood forests, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *F. saubinetii*.
- The PCGP Project would affect one of 107 BLM- and Forest Service-managed sites of *F. saubinetii*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. However, the species is expected to persist at the site based on the analysis. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be the same as the currently documented distribution and range.
- The PCGP Project would affect one site in a LSR, but site persistence would not be threatened, and the percentage of sites in reserves would not change. Of the total sites, 56 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and six are in Congressionally Reserved areas where management activities that may adversely affect *F. saubinetii* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 200 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 7.7 million acres (56 percent) of coniferous, mixed, and hardwood forests and 3.3 million acres (60 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *F. saubinetii (pacifica)*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category F species for which pre-disturbance surveys are not applicable and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

3.9.4 Conclusions

If implemented as proposed, the PCGP Project could affect *F. saubinetii* at one site, but *F. saubinetii* is expected to persist at the site, and the PCGP Project would not modify the distribution of the species in the NSO range. The remaining sites would continue to provide a reasonable assurance of species persistence because:

- With project implementation, the number of sites on BLM and NFS lands across the region (107 sites) and on BLM lands in the local area (26 sites) would not change. Although the PCGP Project could affect individuals of *F. saubinetii* at one site, site persistence is not expected to be affected. The species' distribution and range within the NSO range would be the same as its currently known distribution and range (and are likely wider based on the observations being the more common *F. pacifica*).

- The PCGP Project would remove approximately 980 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 200 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 7.7 million acres (56 percent) of coniferous, mixed, and hardwood forests and 3.3 million acres (60 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Considering the observations in the sites are actually the more common *F. pacifica*, other sites are likely located in unsurveyed areas where suitable habitat exists.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans until an annual species review removes the species from the S&M list. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *F. saubinetii* site in the analysis area, but individuals within the site are expected to persist following project implementation. Based on the above conclusions, avoidance of the *F. saubinetii* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *F. saubinetii* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term (or until the species is removed from the S&M list), as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

3.10 LEPTOGIUM TERETIUSCULUM

Leptogium teretiusculum is an epiphytic lichen in the Collemataceae family and is commonly known as shrubby vinyl or terete skin lichen.

3.10.1 Regulatory Status and Ranking

The 2001 ROD identifies *L. teretiusculum* as a Category E (rare) species. The ORBIC evaluated *L. teretiusculum* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010), and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2010, the species was considered to be between not rare and apparently secure, but with cause for long-term concern, and widespread, abundant, and secure within its global range (G4G5Q) and was imperiled because of rarity or other factors that make it vulnerable to extirpation in Oregon (S2?), although its rankings globally and in Oregon were questioned. In 2013, the species was considered too common and was removed from the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive species in Oregon, but it is a Strategic species.

3.10.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *L. teretiusculum*. It grows as tiny thalli or tufts on the bark of hardwood trees (Huff 2010b). Dispersal is assumed to be by fragments of isidia on the thalli carried by birds, snails, slugs, wind, and rain. The lichen occurs as epiphytes on trees within riparian areas (Holthausen et al. 1994).

Range

L. teretiusculum has been found across the northern hemisphere in Europe, North America, and Russia (ORBIC 2004). In North America, *L. teretiusculum* occurs in northern states and provinces in the west and east. The species is likely more widespread than currently documented, particularly in the Pacific Northwest, because it is small and inconspicuous, making it difficult to locate. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across the northern hemisphere. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *L. teretiusculum* from less than 100 element occurrences in North America in 2004. In the Pacific Northwest, Oregon had the most occurrences with 10, and California had two occurrences in 2004 (ORBIC 2004). In 2004, *L. teretiusculum* was considered to be moderately vulnerable, although it was presumed to be able to recover from disturbance. The species was found in three locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 29 sites on federal lands and 30 total sites on all lands in the NSO range.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, and incidental observations of other lichens were documented, although no observations of *L. teretiusculum* were reported. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

L. teretiusculum is found in hardwood stands in riparian areas, particularly in shaded areas where humidity is high (ORBIC 2004, Holthausen et al. 1994). It is more abundant on hardwood species than softwood species and prefers larger, older trees (Holthausen et al. 1994). It may be strongly associated with mixed conifer and hardwood stands having a hardwood basal area of 51–70 percent (Martin et al. 2002). East of the Cascade Range, the lichen is found in floodplains with black cottonwood (*Populus balsamifera ssp. trichocarpa*), particularly within suboceanic climates. West of the Cascade Range, it is more common on oak (*Quercus* spp.) trees and other hardwoods at low- to mid-elevations. *L. teretiusculum* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions as much as it is restricted to high humidity habitats.

Threats

Disturbance to large, old trees is the primary threat to *L. teretiusculum* (ORBIC 2004). Fire and logging alter shade and moisture regimes in riparian forests and can affect the species (Huff 2010b). The species may recover from disturbance over a period of several years based on its presumed moderate age of maturity, frequency of reproduction, and/or fecundity (ORBIC 2004).

Management Recommendations

For Category E S&M species, the direction from the 2001 ROD is to manage all known sites until a determination can be made regarding which S&M category, if any, the species should be assigned to (USDA and USDI 2001). No management recommendations have been developed for *L. teretiusculum*.

3.10.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *L. teretiusculum* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table LETE-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 376 observations from BLM and Forest Service geodatabases were converted into 178 sites in the NSO range (region). Table LETE-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table LETE-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure LETE-1 displays the regional distribution of the species across BLM and NFS lands, and Figure LETE-2 displays the species' regional

distribution with the extent of all forest types and LSOG forests below 6,000 feet msl on BLM and NFS lands.

TABLE LETE-1

Number of *Leptogium teretiusculum* Sites (2013)

Location*	Number of Sites
Regional Area	178
Local Area	26
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, and project areas are provided in Chapter 1.

TABLE LETE-2

Distribution of *Leptogium teretiusculum* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	163	25	1
Forest Service	15	1	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	35	5	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE LETE-3

Distribution of *Leptogium teretiusculum* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	69	-	-
Adaptive Management Reserves (AMR)	3	-	-
Administratively Withdrawn (AW)	4	-	-
Congressionally Reserved (CR)	**1**	**-**	**-**
Late Successional Reserve (LSR)	**13**	**6**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**7**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	91	21	1
Riparian Reserve**	**1**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).



Figure LETE-1.
Regional Distribution of
Leptogium teretiusculum

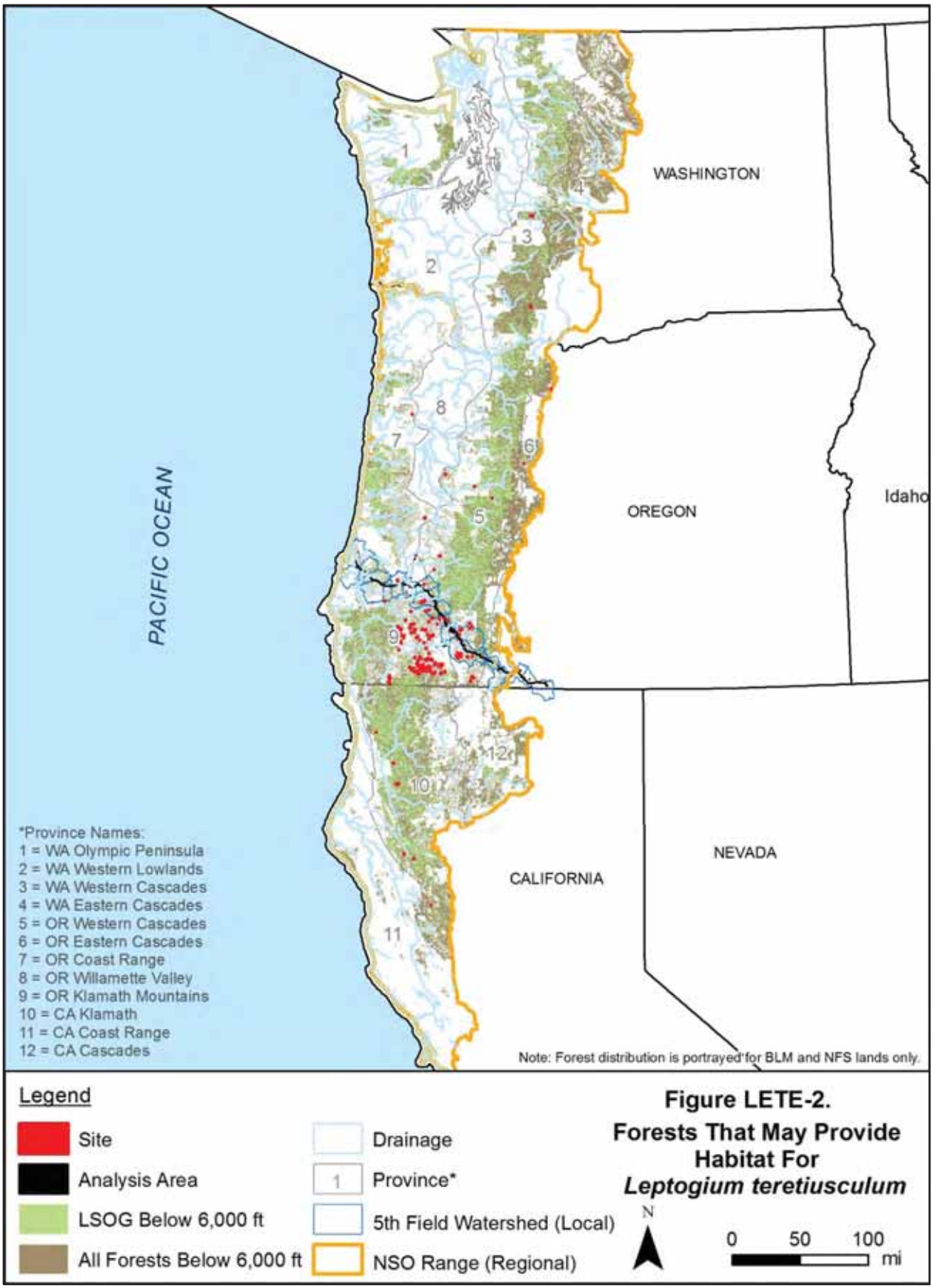


Figure LETE-2.
Forests That May Provide Habitat For *Leptogium teretiusculum*

Regional Distribution

L. teretiusculum is somewhat widely distributed across seven physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Coast Range, Cascades West and East, and Klamath Mountains), and California (Klamath) (see Figure LETE-1). The majority of the sites are clustered in the Klamath Mountains and the southern portion of the Cascade Range in Oregon. Sites in California are scattered in the Klamath Mountains, and sites in Washington are apparently isolated from other sites in the region. Many opportunities for dispersal between sites in the Klamath Mountains and Cascade Range in Oregon appear to exist based on the proximity of sites to one another and the extent of coniferous, mixed hardwood-coniferous, and hardwood forests and riparian corridors within these forests. Other sites are more isolated and appear to have limited connectivity between sites. The species appears to be well distributed in the Klamath Mountains in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

All 178 sites in the region are at least partially on BLM and NFS lands. Thirty-five sites are partially located on private lands. Sites managed by the BLM Districts that encompass the project area include 152 sites in the Medford District and seven sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest. Sites managed by other BLM Districts include three sites in the Eugene District and one site in the Salem District. Sites managed by other National Forests include one site on the Deschutes National Forest, one site on the Gifford Pinchot National Forest, one site on the Mendocino National Forest, two sites on the Mt. Baker-Snoqualmie National Forest, one site on the Mt. Hood National Forest, seven sites on the Six Rivers National Forest (one site is partially on the Shasta-Trinity National Forest), and one site on the Willamette National Forest.

Across the NSO range, 22 sites are located on reserve lands managed by BLM and the Forest Service, including 13 sites in LSRs, seven sites in Known Owl Activity Centers, one site in a Congressionally Reserved area, and one site in a Riparian Reserve. This represents 12 percent of the total BLM- and Forest Service-managed sites in the region. Other sites may also be associated with Riparian Reserves that have not been mapped at the regional scale, as defined in the respective BLM and Forest Service land management plans. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

L. teretiusculum is more commonly found in LSOG forests based on available data (129 of 178 total sites are in LSOG), but it is also found in non-LSOG forests and may be restricted to riparian or high humidity areas of coniferous, mixed-hardwood coniferous, and hardwood forests. Based on current site locations, the species is found in all forest types below about 5,600 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *L. teretiusculum* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 10.4 million acres in reserve land allocations (54 percent of the forests; Table LETE-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure LETE-2), including 3.8 million acres in reserve land allocations (62 percent of the forests).

Although all forests below 6,000 feet msl are widespread across the NSO range, riparian areas of these forests are less common and are scattered across the region.

TABLE LETE-4

Extent of Forests that Could Provide Habitat for *Leptogium teretiusculum* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	19,194,850	10,381,240	6,092,570	3,750,320
Local Area	611,850	199,720	185,170	80,260
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *L. teretiusculum* is distributed across eight 5th field watersheds that overlap the project area (see Table LETE-5 and Figure LETE-3). The sites in Big Butte Creek and Little Butte Creek watersheds are more clustered than sites in the other three watersheds. All of the sites appear to have some level of connectivity between them and others in the regional area, with multiple opportunities for dispersal, based on the extent of all forests below 6,000 feet msl in the watersheds and region.

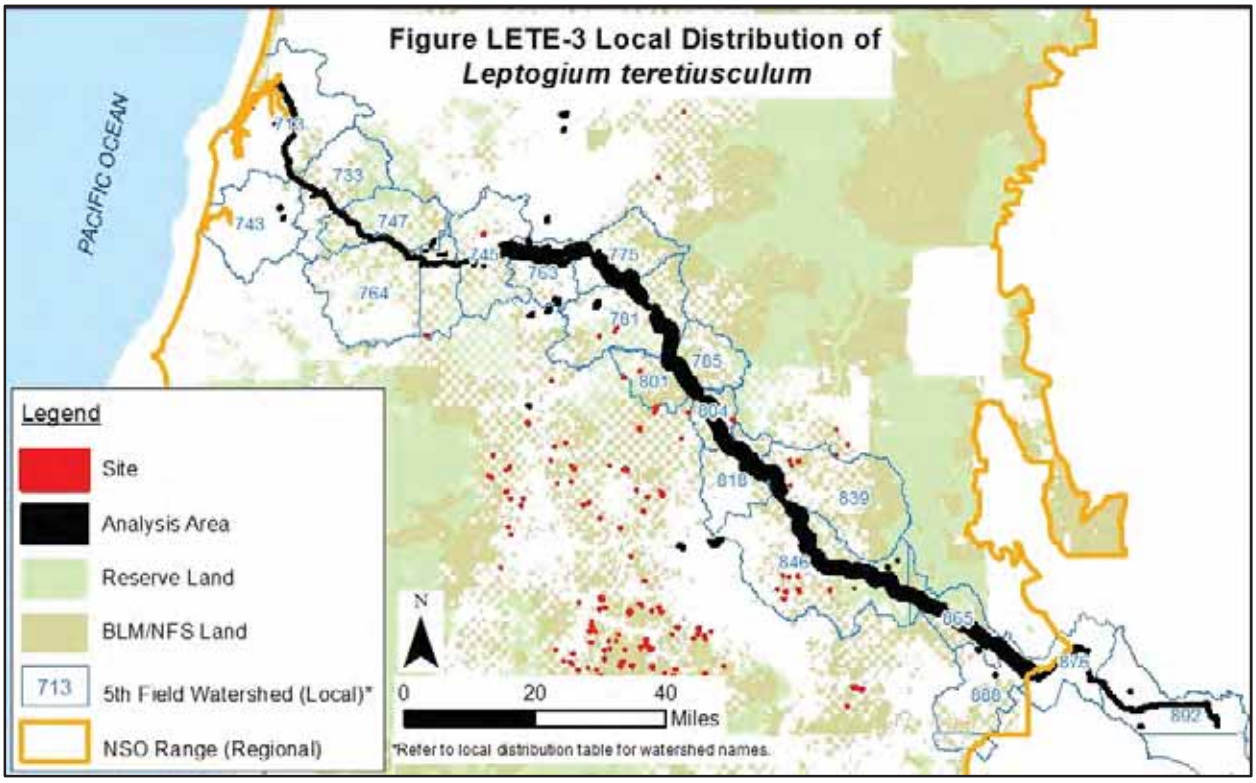
All of the 26 sites in the local area are at least partially on BLM and NFS lands, and five are partially on private lands. The sites on BLM and NFS lands are located on lands designated as Other (Matrix) and LSR. Of the 26 sites in the local area, seven sites are on reserve lands, representing 27 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table LETE-5 and on Figure LETE-3. These sites are in LSRs in the Little Butte Creek, Olalla Creek-Lookingglass Creek, South Umpqua River, and Upper Cow Creek watersheds.

TABLE LETE-5

Distribution of *Leptogium teretiusculum* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	4	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	12	2
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	1	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	1	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	1	1
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	3	3
Spencer Creek (865)	-	-
Trail Creek (804)	3	-
Upper Cow Creek (801)	1	1

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 611,850 acres on BLM and NFS lands in the local area, including 199,720 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 185,170 acres are LSOG, including 80,260 acres in reserve land allocations (43 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number and distribution of sites in the local area, proximity of other sites in the region, and the extent of forests that may provide suitable habitat (see Figures LETE-2 and LETE-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *L. teretiusculum*. The site is partially on BLM land and private land and is on land designated as Other (Matrix). The analysis area site is located in the Trail Creek watershed in the Medford District. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

Surveys for the PCGP Project did not result in any observations of the species (Siskiyou BioSurvey LLC 2008, 2011a). A recorded observation from 2001 in agency databases comprises the site in the analysis area. The site is along a road just west of MP 115.4.

Project Impacts

Analysis

The PCGP Project would affect one site of the 178 sites on BLM-and Forest Service-managed lands in the region, representing less than 1 percent of the sites (all sites are at least partially on BLM or NFS lands). Table LETE-6 presents an overview of the features of the PCGP Project that would affect the *L. teretiusculum* site. The construction corridor and associated work and

storage areas would not directly affect the site, but road improvements would result in direct effects on the site. Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *L. teretiusculum* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

TABLE LETE -6

Impacts to *Leptogium teretiusculum* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	-	-
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	1	0.1 ac
Other Minimal Disturbance Activity	-	-

ac = acres

Road improvements and establishment would disturb approximately 0.1 acre within one site and could remove habitat and extant populations or individuals of *L. teretiusculum*. The *L. teretiusculum* site could also be indirectly affected by activities within the corridor and TEWAs. The establishment of the corridor could modify microclimate conditions near populations or individuals of *L. teretiusculum* in the site. The removal of forests and host trees could negatively affect *L. teretiusculum* in nearby areas by removing its habitat, reducing humidity levels by opening the canopy, and reducing opportunities for dispersal, potentially affecting site persistence even though the site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *L. teretiusculum*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the effects of the PCGP Project, 25 sites of *L. teretiusculum* would remain on BLM and NFS lands in the local area, including seven in reserves, and 177 sites, including 22 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g.,

fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 22 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 12 percent of the remaining *L. teretiusculum* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *L. teretiusculum* is a Category E (rare) S&M species throughout the NSO range. Per the 2001 ROD, information on Category E species is insufficient to determine what level of management is needed for reasonable assurance of species persistence. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *L. teretiusculum* has a somewhat wide distribution across seven physiographic provinces and three states in the region and a moderate-high number of overall sites (178 on BLM and NFS lands). The species appears to be well distributed in the Klamath Mountains in Oregon, but has a scattered distribution outside the mountain range with few clusters of sites. The currently known number of sites on BLM and NFS lands is an increase of about 149 sites since 2007.
    - An estimated 12 percent of the sites (22 sites) are in reserves.
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 54 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous, mixed hardwood-coniferous, and hardwood forests, but fewer sites are located in these areas. A subcomponent of these forests likely provides habitat for *L. teretiusculum*.
- The PCGP Project would affect one of 178 BLM- and Forest Service-managed sites of *L. teretiusculum*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (177) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Washington, Oregon, and California. Many sites (25 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Klamath Mountains. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.

- The PCGP Project would not affect any sites in reserves and would not change the percentage of sites in reserves. Of the remaining sites, 20 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and one is in a Congressionally Reserved area where management activities that may adversely affect *L. teretiusculum* are unlikely. At least one other site is in a Riparian Reserve where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources; more sites are likely in Riparian Reserves based on the species' habitat requirements.
- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *L. teretiusculum*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category E species for which pre-disturbance surveys are not applicable and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

3.10.4 Conclusions

If implemented as proposed, the PCGP Project would affect site persistence of *L. teretiusculum* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 177 sites would remain on BLM and NFS lands across the region, and 25 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *L. teretiusculum* at one site, this site is part of the many sites in the Klamath Mountains in Oregon, where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *L. teretiusculum* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.4 million acres (54 percent) of coniferous, mixed, and hardwood forests and 3.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2007
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable

future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is somewhat widely distributed.

The PCGP Project would not be able to avoid impacts to the *L. teretiusculum* site in the analysis area, although some individuals or populations within the site may persist following project implementation. Based on the above conclusions, avoidance of the *L. teretiusculum* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

3.11 PELTIGERA PACIFICA

Peltigera pacifica is a pelt lichen in the Peltigeraceae family and is commonly known as fringed pelt, Pacific felt lichen, or frog pelt.

3.11.1 Regulatory Status and Ranking

The 2001 ROD identifies *P. pacifica* as a Category E (rare) species. The ORBIC evaluated *P. pacifica* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be rare, uncommon, or threatened, but not immediately imperiled, within its global range and in Oregon (G3, S3?, respectively), although its ranking in Oregon was questioned. The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

3.11.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *P. pacifica*. It is a nitrogen-fixing lichen (USDA and USDI 2007). The lichen likely disperses by lobules via rain, waterflow, and animal vectors (Stone 2007). It appears to require high moisture content, as it is primarily found near water. High water levels may also aid dispersal in winter months. Spore-bearing structures, or apothecia, are common in *P. pacifica*, and dispersal over longer distances could be by spores.

Range

The range of *P. pacifica* is restricted to northwestern North America, extending from coastal Alaska to Oregon, mostly west of the Cascade Range (ORBIC 2004). It has also been reported

in northern Idaho. It appears to be restricted to oceanic environments, but may be more widely distributed (identification is difficult and may prevent an accurate understanding of the species' distribution due to misidentifications). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across northwestern North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported less than 100 element occurrences across the species' known range in 2004. In the Pacific Northwest, most occurrences were in Oregon (51), with fewer in Washington (16) (ORBIC 2004). The ORBIC estimated that 20 of the occurrences in Oregon were in protected areas in the NSO range in 2004. Population trends of *P. pacifica* have not been determined because of the difficulty in identifying the species due to its similarity to other *Peltigera* species; more populations likely exist than are currently known (ORBIC 2004). The species was found in 12 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 156 sites on federal lands and 165 total sites on all lands in the NSO range.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, and incidental observations of other lichens were recorded in the survey area, which resulted in one observation of a population of *P. pacifica* (Siskiyou BioSurvey LLC 2011a). Because the species was not specifically targeted, more occurrences may exist in or near the project area based on the species' overall distribution across the region. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

The lichen grows on soil, moss, rocks, logs, and tree bases, mainly in moist coniferous and hardwood forests with closed canopy stands (Stone 2007, Forest Service and BLM 2002). It primarily grows on rotten logs and humus and is occasionally found on lower boles of trees, including Douglas-fir, western redcedar, red alder (*Alnus rubra*), and subalpine fir (Forest Service and BLM 2002). At higher elevations of its range, *P. pacifica* is often found in or near Riparian Reserves (e.g., along creek drainages and on forested lake shores) (Stone 2007). As a nitrogen-fixing lichen, this species is most productive in mature and old-growth forests with trees greater than 140 years old (Holthausen et al. 1994). It requires rough bark and the microclimate created by the multi-layered canopy of older forests. *P. pacifica* was previously documented as occurring below about 2,200 feet msl (Stone 2007). Based on available information, *P. pacifica* appears to prefer specific microclimate conditions found in LSOG forests, but it is also found in younger forests with suitable conditions (e.g., moist understory, closed canopy) and may not be as restricted to LSOG conditions.

Threats

Reduction of protected riparian zones and loss of associated habitats occupied by *P. pacifica* are the primary threats to the species (Stone 2007). Air pollution is not considered a threat to soil lichens (ORBIC 2004). *P. pacifica* likely matures quickly and/or reproduces frequently and is expected to recover quickly from disturbance (i.e., within 5–10 years).

Management Recommendations

For Category E S&M species, the direction from the 2001 ROD is to manage all known sites until a determination can be made regarding which S&M category, if any, the species should be assigned to (USDA and USDI 2001). No management recommendations have been developed for *P. pacifica*.

3.11.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *P. pacifica* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table PEPA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 599 observations from BLM and Forest Service geodatabases were converted into 466 sites in the NSO range (region). Table PEPA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table PEPA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure PEPA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure PEPA-2 displays the species' regional distribution with the extent of all forest types and LSOG forests below 6,000 feet on BLM and NFS lands within the currently known range of the species.

TABLE PEPA-1

Number of *Peltigera pacifica* Sites (2013)

Location*	Number of Sites
Regional Area	466
Local Area	4
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE PEPA-2

Distribution of *Peltigera pacifica* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	48	3	1
Forest Service	405	-	-
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	33	1	-

Data Source: Merged land ownership data for WA, OR, and CA in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE PEPA-3

Distribution of *Peltigera pacifica* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	65	-	-
Adaptive Management Reserves (AMR)	3	-	-
Administratively Withdrawn (AW)	46	-	-
Congressionally Reserved (CR)	**10**	**-**	**-**
Late Successional Reserve (LSR)	**125**	**-**	**-**
Marbled Murrelet Area (LSR3)	**1**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**7**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	2	-	-
Other (Matrix, Riparian Reserve, Other)	235	3	1
Riparian Reserve**	**4**	**-**	**-**

Data Sources: 1994 ROD land allocation data, September 2009; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

P. pacifica is widely distributed across eight physiographic provinces in Washington (Western and Eastern Cascades, Olympic Peninsula) and Oregon (Coast Range, Cascades West and East, Willamette Valley, and Klamath Mountains). Most sites are found along the western Cascade Range, where sites tend to be found in clusters or small groups. Scattered sites exist in the Coast Range, Klamath Mountains, and other outlying areas. The species' presence in California is currently unknown. *P. pacifica* appears to be well distributed in the western Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Thirty-three of 466 sites are located on private, state, or other lands (at least partially); three sites are on NPS lands (North Cascades National Park); and 453 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include three sites in the Coos Bay District, seven sites in the Medford District, and 13 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include one site on the Rogue River National Forest and 77 sites on the Umpqua National Forest. The remaining 352 sites are in the Eugene and Salem Districts and on the Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Siskiyou, Siuslaw, Wenatchee, and Willamette National Forests.

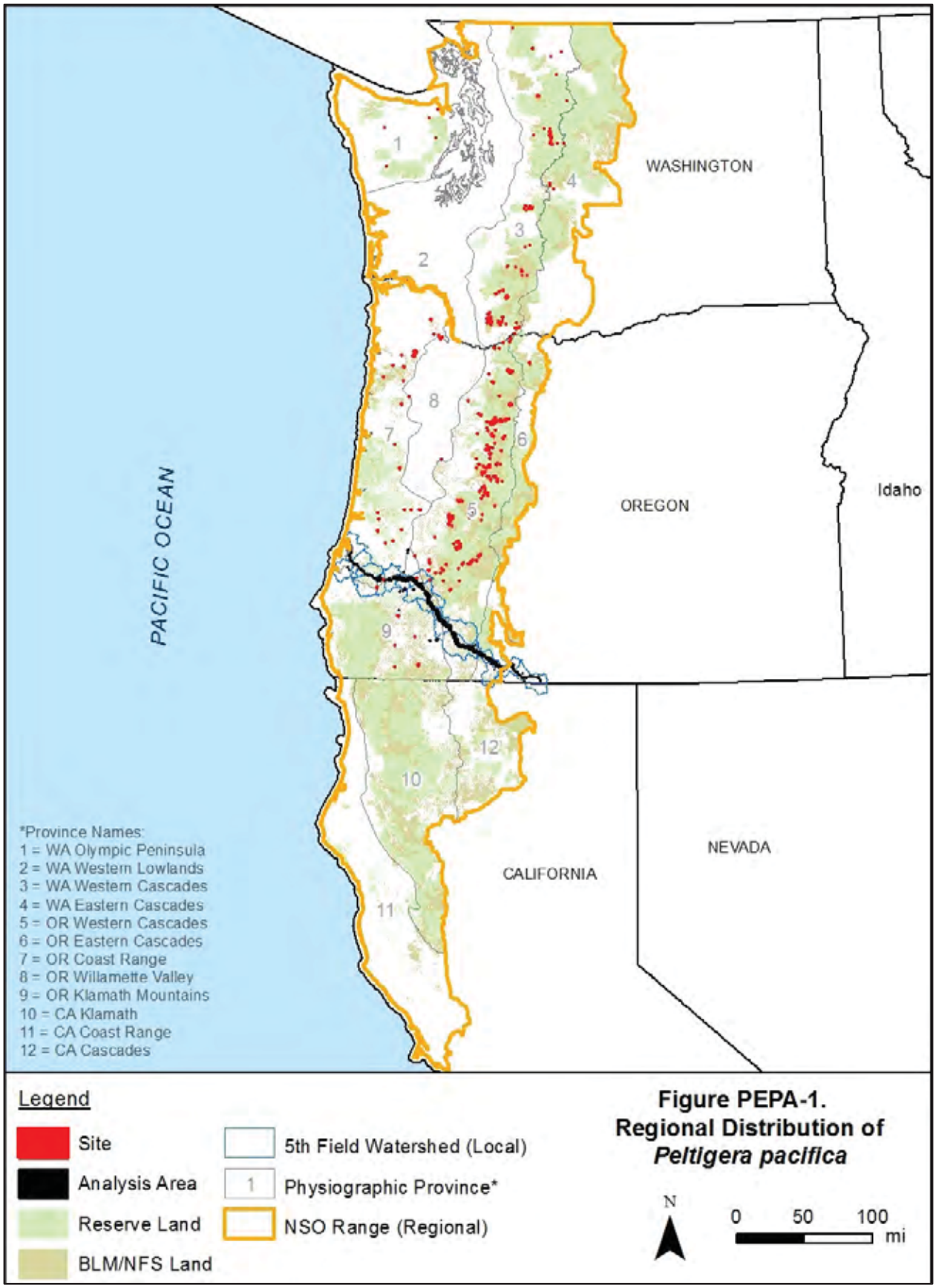


Figure PEPA-1. Regional Distribution of *Peltigera pacifica*

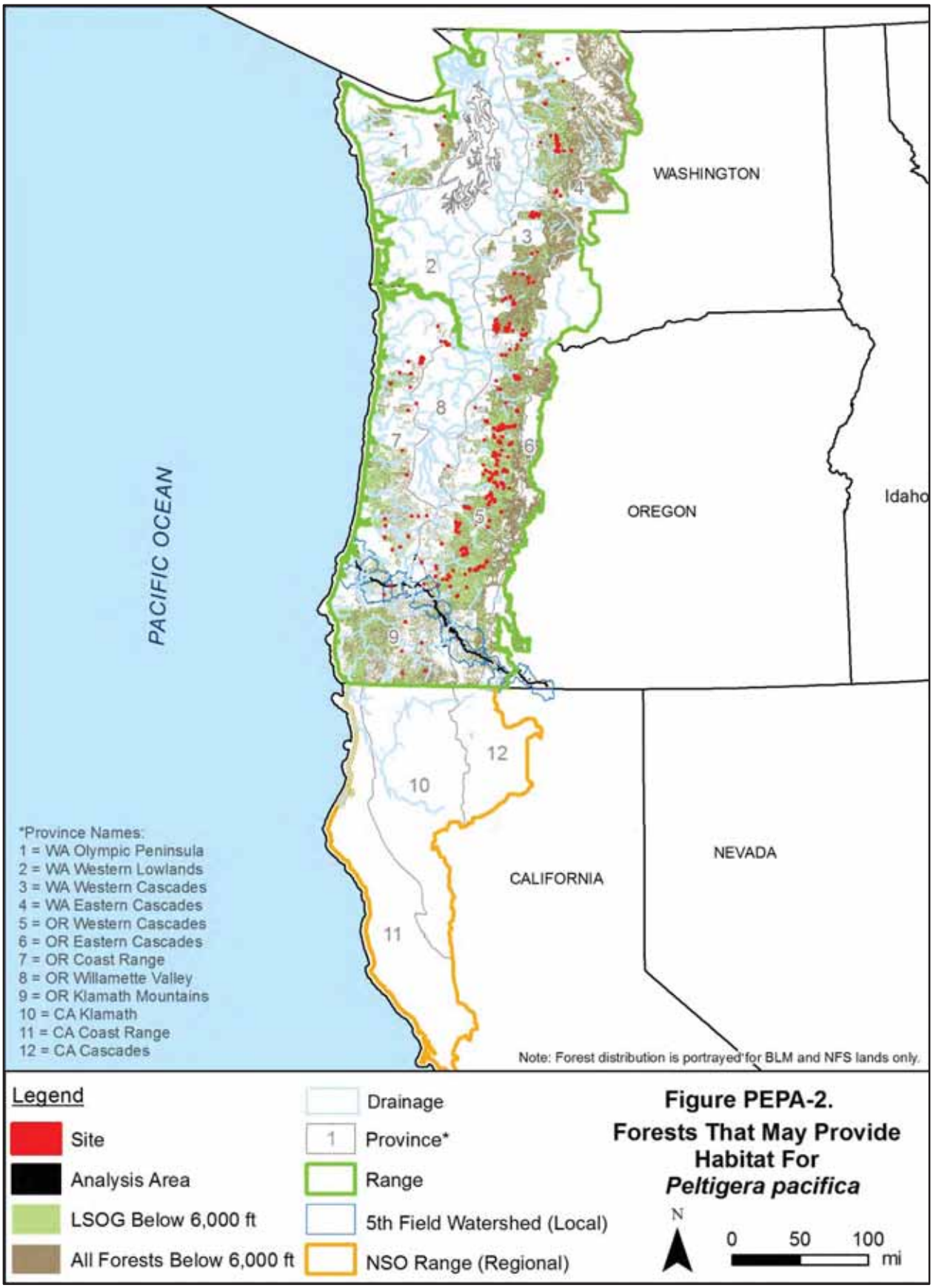


Figure PEPA-2.
Forests That May Provide Habitat For *Peltigera pacifica*

Across the NSO range, 143 sites are located on reserve lands managed by BLM and the Forest Service, including 125 in LSRs, one in Marbled Murrelet Areas, seven in Known Owl Activity Centers, 10 in Congressionally Reserved areas, and four in Riparian Reserves. This represents 32 percent of the total BLM- and Forest Service-managed sites in the region. Other sites may also be associated with Riparian Reserves that have not been mapped at the regional scale, as defined in the respective BLM and Forest Service land management plans. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

P. pacifica is more commonly found in LSOG forests based on available data (354 of 466 total sites are in LSOG), but it is relatively common in non-LSOG forests and may also be found in younger forests with suitable habitat conditions. Based on current site locations, the species is found in coniferous, mixed hardwood-coniferous, and hardwood forests below about 4,600 feet msl and has only been documented in Oregon and Washington. Coniferous, mixed, and hardwood forests below 6,000 feet msl, including the LSOG component of these forests, within this range could provide habitat for *P. pacifica* and support additional sites. These forests encompass an estimated 14.3 million acres on BLM and NFS lands in Oregon and Washington, including an estimated 7.9 million acres in reserve land allocations (56 percent of the forests; Table PEPA-4). Of this acreage, an estimated 4.6 million acres are LSOG (see Figure PEPA-2), including 2.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl are widespread, LSOG forests are less common and are primarily found along the Cascade Range and Klamath Mountains.

TABLE PEPA-4

Extent of Forests that Could Provide Habitat for *Peltigera pacifica* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	14,276,890	7,929,360	4,557,490	2,821,020
Local Area	611,850	199,720	185,170	80,260
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for Oregon and Washington only, which is the extent of the species' currently known range.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *P. pacifica* is found in three 5th field watersheds that overlap the project area (see Table PEPA-5 and Figure PEPA-3). The two sites in the Middle Fork Coquille River watershed are distant from others in the region; the nearest sites are more than 25 miles to the southeast in the Klamath Mountains and north in the Coast Range. The two sites in the Myrtle Creek watershed are within about 10 miles of other sites in the Cascade Range to the northeast, and dispersal opportunities may exist between the sites. Other opportunities for dispersal within the local area may also exist via waterflow and animal vectors based on the extent of forests that may provide suitable habitat.

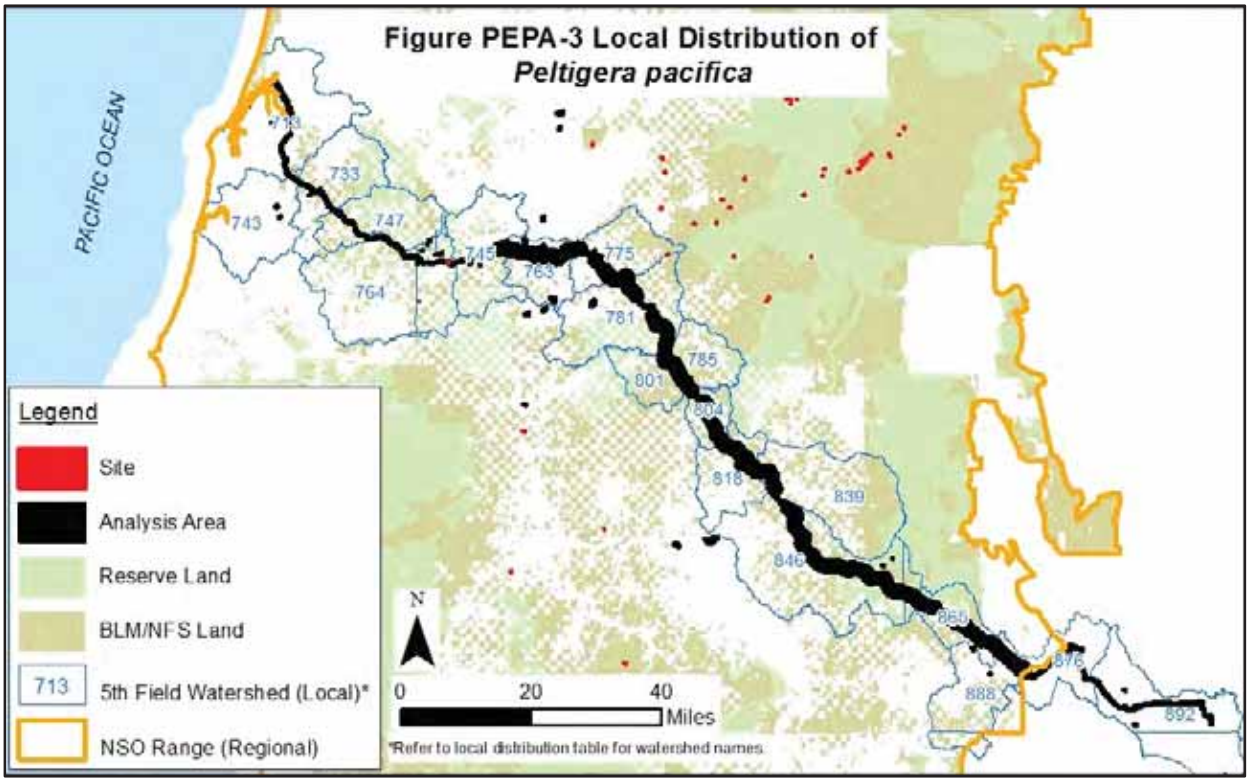
Of the four sites in the local area, three are on BLM lands in the Roseburg District and one is on private land. The BLM-managed sites are located on lands designated as Other (Matrix); these sites may be in Riparian Reserves, as defined in the Roseburg District land and resource management plan, because of the species' preference for moist habitats, which are typically found along or near drainages. It is possible that Riparian Reserves offer protection or refugia for other sites as well.

TABLE PEPA-5

Distribution of *Peltigera pacifica* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	2	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	2*	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1*	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
*Note: Site counts are not additive because one site occurs in both watersheds and the counts overlap.



Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 611,850 acres on BLM and NFS lands in the local area, including 199,720 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 185,170 acres are LSOG, including 80,260 acres in reserve land allocations (43 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the distribution of sites in the local and regional areas and the extent of forests that may provide suitable habitat (see Figures PEPA-2 and PEPA-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *P. pacifica*. This site is in the Middle Fork Coquille River 5th field watershed on land designated as Other (Matrix) and managed by BLM in the Roseburg District. It is about 7 miles from another site on private land in the same watershed. Few sites are located within the immediate vicinity of the site (see Local Distribution discussion above), but dispersal opportunities may exist across suitable habitat via animal vectors or waterflow.

Surveys for the PCGP Project resulted in two observations of the species in coniferous forest near MP 51.2 (Siskiyou BioSurvey LLC 2011a). These recorded observations comprise the one site in the analysis area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 453 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent of the sites (or one out of 466 total sites on all lands in the NSO range). Table PEPA-6 presents an overview of the features of the PCGP Project that would affect the *P. pacifica* site. The construction corridor would affect approximately 0.9 acre within the site (about 19 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *P. pacifica* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.9 acre of vegetation and soils within the site and would likely remove individuals of *P. pacifica*. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established and could affect persistence of other individuals within the site. The removal of forests and understory components and disturbance to soil could negatively affect *P. pacifica* individuals outside the corridor by removing its habitat and potential substrate. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE PEPA-6

Impacts to *Peltigera pacifica* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.9 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *P. pacifica*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, two sites of *P. pacifica* would remain on BLM lands in the local area, with none in reserves, and 452 sites, including 143 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 143 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 32 percent of the remaining *P. pacifica* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *P. pacifica* is a Category E (rare) S&M species throughout the NSO range. Per the 2001 ROD, information on Category E species is insufficient to determine what level of management is needed for reasonable assurance of species persistence. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:

  - *P. pacifica* has a wide distribution across eight physiographic provinces in Washington and Oregon and a moderate-high number of overall sites (453 on BLM and NFS lands), although its presence in California is currently unknown (no sites have been documented). The species appears to be well distributed in the western Cascade Range and has a scattered distribution outside the mountain range. The currently known number of sites on BLM and NFS lands is an increase of about 297 sites on BLM and NFS lands since 2007, with one site documented during the PCGP Project surveys.
  - An estimated 32 percent of the sites (143 sites) are in reserves.

- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across Oregon and Washington and encompass approximately 14.3 million acres on BLM and NFS lands in the region with an estimated 56 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous, mixed hardwood-coniferous, and hardwood forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *P. pacifica*.
- The PCGP Project would affect one of 453 BLM- and Forest Service-managed sites of *P. pacifica*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (452) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington and Oregon. Few sites (two sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Cascade Range. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 133 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 10 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *P. pacifica* are unlikely. At least four other sites are in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources; more sites are likely in Riparian Reserves based on the species' habitat requirements.
- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 7.9 million acres (56 percent) of coniferous, mixed, and hardwood forests and 2.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *P. pacifica*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category E species for which pre-disturbance surveys are not applicable and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO

that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

3.11.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *P. pacifica* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 452 sites would remain on BLM and NFS lands across the region, and two sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *P. pacifica* at one site, this site is part of many sites in the Klamath Mountains and Coast Range in Oregon. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *P. pacifica* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 220 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 7.9 million acres (56 percent) of coniferous, mixed, and hardwood forests and 2.8 million acres (62 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2007.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *P. pacifica* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *P. pacifica* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *P. pacifica* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

3.12 RAMALINA THRAUSTA

Ramalina thrausta is an epiphytic lichen in the Ramalinaceae family and does not have a common name.

3.12.1 Regulatory Status and Ranking

The 2001 ROD identifies *R. thrausta* as a Category A (rare) species. The ORBIC evaluated *R. thrausta* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern globally (G3G4) and rare, uncommon, or threatened, but not immediately imperiled in Oregon (S3). The species is not currently on the ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

3.12.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

R. thrausta is an epiphytic fruticose lichen that is typically found hanging on branches of conifer trees. Asexual reproduction through thallus fragmentation and the use of sporidea is the main form of reproduction for this species. Sexual reproduction is rare because the lichen produces relatively few apothecia (spore producing structures) (Brodo et al. 2001, as cited in Derr et al. 2003). It has a moderate rate of growth and reproduction, so that reduced populations can recover through natural recolonization over a period of several years. Because it mainly relies on asexual reproduction over short distances, it has a low dispersal rate (ORBIC 2004).

Range

R. thrausta has a widespread distribution, occurring in boreal regions in North America and Europe. In western North America it is found from British Columbia south to central California and east to western Montana (McCune & Geiser 1997, as cited in ORBIC 2004). In midwestern Canada and North America, it occurs from the Great Lakes north to Hudson Bay. In eastern North America, it is found from southern Quebec south to Newfoundland (Brodo et al. 2001, as cited in ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across North America and Europe. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *R. thrausta* from more than 300 element occurrences worldwide. In the Pacific Northwest, most occurrences were in Oregon (95), with fewer in Washington (five)

and an unknown number in California (ORBIC 2004). The species was found in 15 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported a total of 718 sites on federal lands and 722 total sites on all lands in the NSR range.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, including *R. thrausta*, and resulted in one observation of a population of *R. thrausta*. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

R. thrausta occurs in moist coniferous and mixed hardwood-coniferous forests at low to mid-elevations (sea level to about 2,250 feet). It grows on the branches and boles of conifers and hardwoods, as well as on understory shrubs (Derr et al. 2003). In Norway, the species was found almost exclusively on spruce trees and was found in the upper tree crown as well as the lower branches (Rolstad et al. 2001). While *R. thrausta* was originally thought to be a riparian species (USDA and USDI 1994, 2001), several occurrences have been found away from the riparian zone, suggesting it may not be restricted to this habitat (Derr et al. 2003). In Norway, *R. thrausta* populations tend to increase as the stand age increases (Rolstad et al. 2001). However, it has been found in stands of various ages, including several LSOG Douglas-fir stands, a 14-year old stand, and a 30-year old stand (USDA 1998, as cited in Derr et al. 2003). *R. thrausta* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Threats to the species include air pollution and the removal of older trees, though it is considered to be more susceptible to threats in Europe than in North America (ORBIC 2004). *R. thrausta* has a moderate rate of reproduction, meaning the species may be able to overcome some decreases in population through natural recolonization over a period of several years. Habitat fragmentation may be a greater threat, however, as *R. thrausta* spreads slowly (ORBIC 2004).

Management Recommendations

As a Category A S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). No management recommendations have been developed for *R. thrausta* because it was removed from the S&M list after 2001.

3.12.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *R. thrausta* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table RATH-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 879 observations from BLM and Forest Service geodatabases were converted into 410 sites in the NSO range (region). Table RATH-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table RATH-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure RATH-1 displays the regional distribution of the species across BLM and NFS lands, and Figure RATH-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 4,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE RATH-1

Number of *Ramalina thrausta* Sites (2013)

Location*	Number of Sites
Regional Area	410
Local Area	82
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE RATH-2

Distribution of *Ramalina thrausta* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	277	76	1
Forest Service	111	3	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	90	16	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

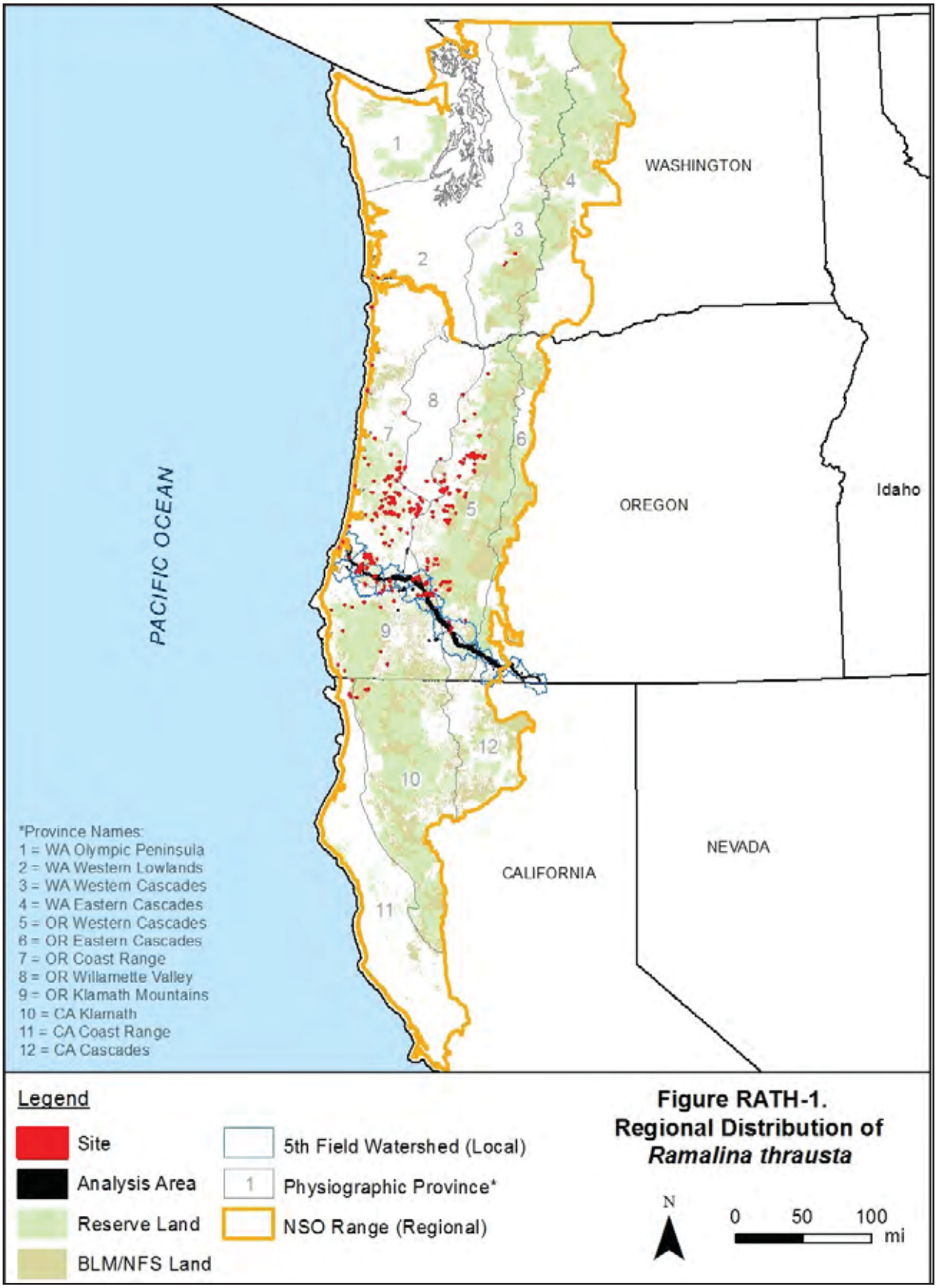


Figure RATH-1.
Regional Distribution of *Ramalina thrausta*

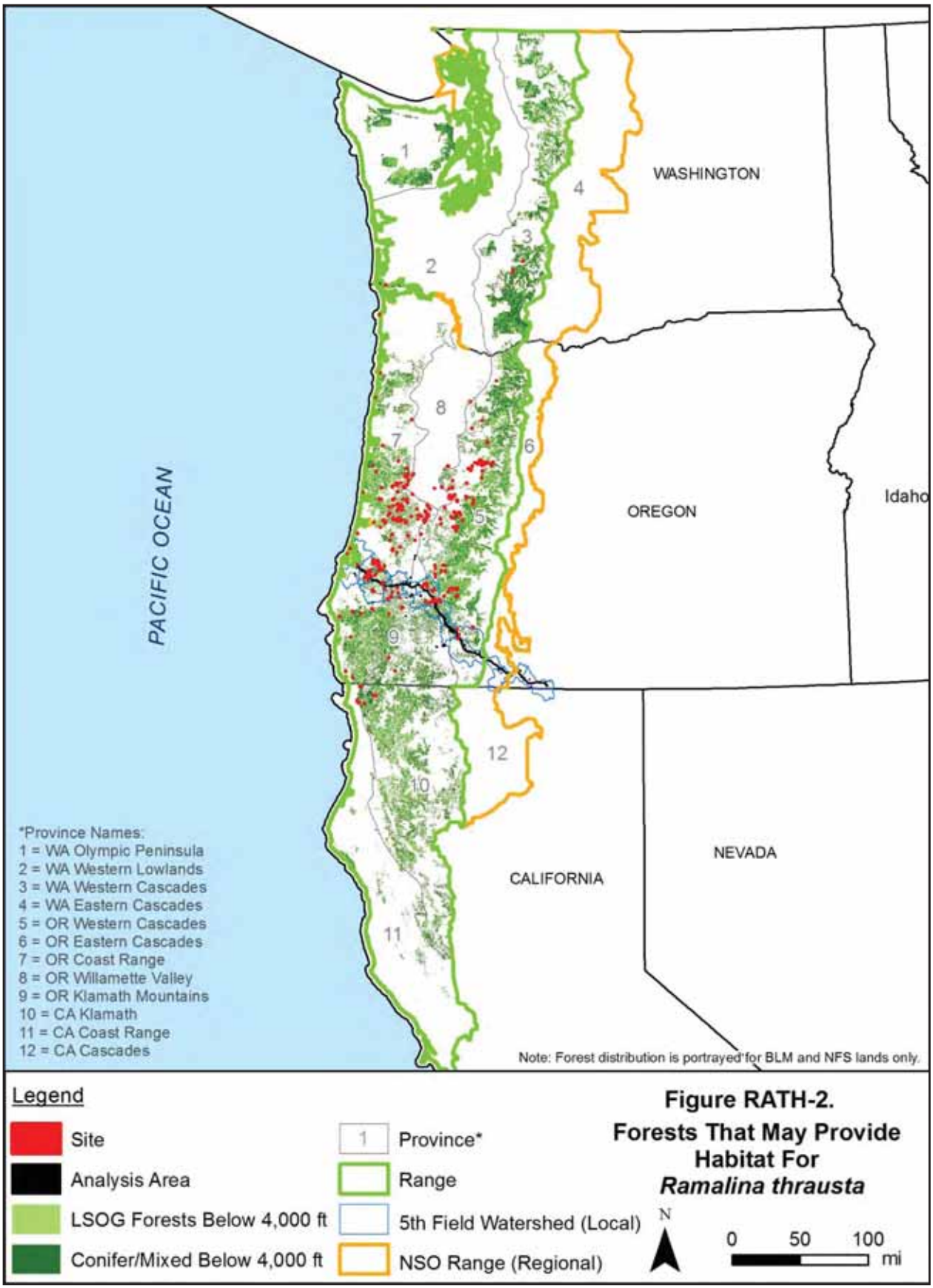


Figure RATH-2.
Forests That May Provide Habitat For *Ramalina thrausta*

TABLE RATH-3

Distribution of *Ramalina thrausta* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	32	-	-
Adaptive Management Reserves (AMR)	1	-	-
Administratively Withdrawn (AW)	10	-	-
Congressionally Reserved (CR)	**4**	**-**	**-**
Late Successional Reserve (LSR)	**170**	**38**	**-**
Marbled Murrelet Area (LSR3)	**7**	**2**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**14**	**5**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	176	36	1
Riparian Reserve**	**6**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

R. thrausta has a wide distribution across eight physiographic provinces in Washington (Western Lowlands and Western Cascades), Oregon (Coast Range, Cascades West, Willamette Valley, and Klamath Mountain), and California (Coast and Klamath). Most sites are found along the western Cascade Range, Klamath Mountains, and southern Coast Range in Oregon, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the northern Coast Range in Oregon and the Western Lowlands in Washington, along with other outlying areas. The Coast Range and Klamath Mountains in California contain several clustered sites near the Oregon border. *R. thrausta* appears to be well distributed in its range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Ninety of 410 sites are located on private, state, or other lands (at least partially), and 387 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 81 sites in the Coos Bay District, 10 sites in the Medford District, and 61 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include seven sites on the Rogue River National Forest and 30 sites on the Umpqua National Forest. The remaining 222 sites on BLM and NFS lands are in the Salem and Eugene Districts and on the Gifford-Pinchot, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 195 sites are located on reserve lands managed by BLM and the Forest Service, including 170 in LSRs (at least partially), four in Congressionally Reserved areas (at least partially), seven in Marbled Murrelet areas (at least partially), 14 in Known Owl Activity Centers (at least partially), and six in Riparian Reserves (at least partially). This represents 50 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

R. thrausta is more commonly found in LSOG forests based on available data (335 of 410 total sites are in LSOG), but is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests up to about 3,300 feet msl and has been documented in the western portion of the NSO range. Coniferous and mixed hardwood-coniferous forests below 4,000 feet msl, including the LSOG components of these forests, in the western portion of the NSO range, excluding the eastern Cascade Range in Oregon and Washington and Cascade Range in California, could provide habitat for *R. thrausta* and support additional sites. These forests encompass an estimated 9.9 million acres on BLM and NFS lands in the region, including an estimated 5.2 million acres in reserve land allocations (53 percent of the forests; Table ALEL-4). Of this acreage, an estimated 4 million acres are LSOG (see Figure ALEL-2), including 2.5 million acres in reserve land allocations (61 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 4,000 feet msl are widespread across the species' range, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE RATH-4

Extent of Forests that Could Provide Habitat for *Ramalina thrausta* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 4,000 feet		LSOG Forests below 4,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	9,893,790	5,229,970	4,030,990	2,452,890
Local Area	425,530	137,850	143,840	60,620
Project Area	910	220	170	80

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *R. thrausta* is found in 10 5th field watersheds that overlap the project area (see Table RATH-5 and Figure RATH-3). The sites are clustered and near one another in the Coast Range, Klamath Mountains, and western Cascade Range in the western portion of the local area. A group of three sites in the Big Butte Creek and Little Butte Creek watersheds is separated from the rest of the local sites. In the western-most watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests below 4,000 feet msl, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located to the north in the Coast Range and western Cascade Range and to the south in the Klamath Mountains.

Of the 82 sites in the local area, 78 sites are at least partially on BLM or NFS lands, and 16 sites are at least partially on private lands. Thirty-six of the local sites are on land designated as Other (Matrix), and 44 sites are on reserve lands, including 38 sites in LSRs (at least partially), two in Marbled Murrelet areas, and five in Known Owl Activity Centers (at least partially). The number of sites on reserve lands represents 56 percent of the BLM- and Forest Service-managed sites in the local area. Sites on reserve lands are located in six out of the 10 watersheds, with the majority of sites on reserve lands located in the North Fork Coquille River watershed (Table RATH-5).

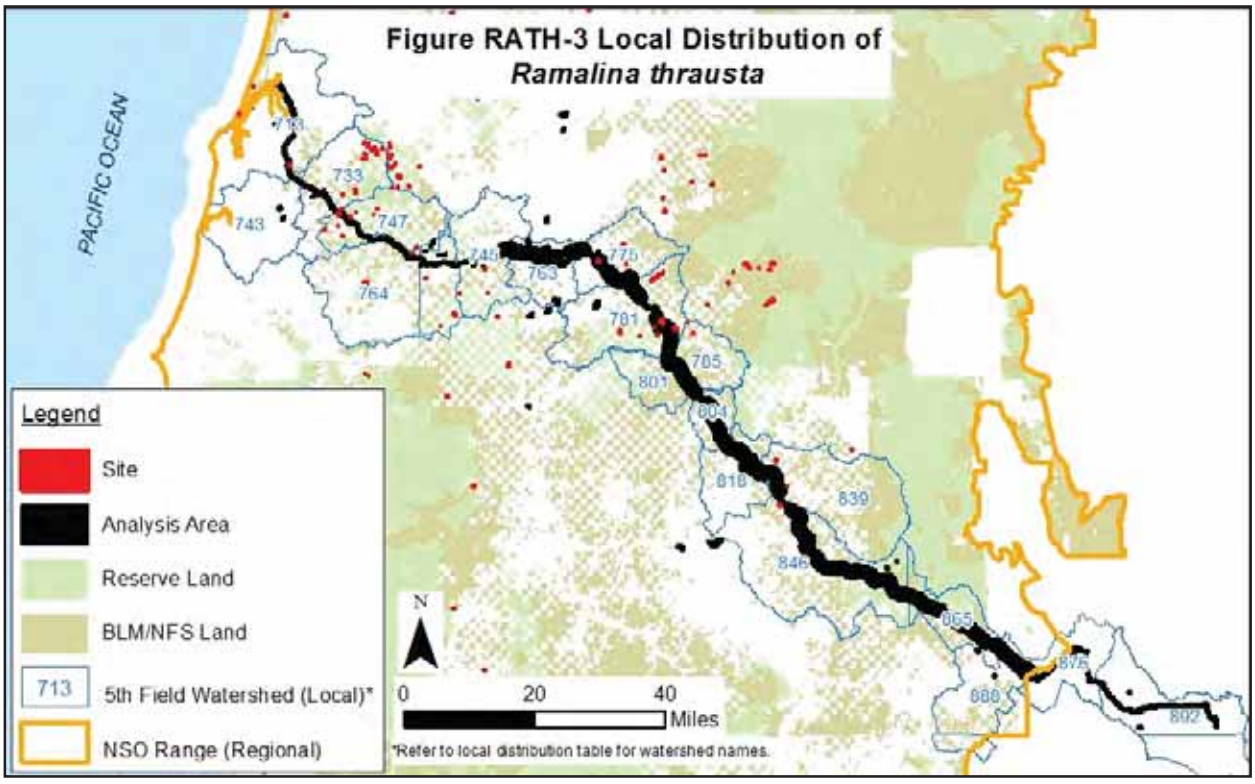
Coniferous and mixed hardwood-coniferous forests below 4,000 feet msl encompass approximately 425,530 acres, including 137,850 acres in reserve land allocations (32 percent of the forests). Of this acreage, an estimated 143,840 acres are LSOG, including 60,620 acres in reserve land allocations (42 percent of the forests). Other sites may also exist in the local area, particularly in the western portion, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures RATH-2 and RATH-3).

TABLE RATH-5

Distribution of *Ramalina thrausta* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	3	-
Coos Bay Frontal (713)	3	-
East Fork Coquille River (747)	11	3
Elk Creek-South Umpqua (785)	2	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	1	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	7	6
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	10	3
North Fork Coquille River (733)	26	23
Olalla Creek-Lookingglass Creek (745)	3	2
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	16	7
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, November 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *R. thrausta*. This site is on BLM-managed lands in the Roseburg District. It is on land designated as Other (Matrix) in the Myrtle Creek watershed. Several other sites are located in the nearby Klamath Mountains (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in one observation of the species in one location in the project area (Siskiyou BioSurvey LLC 2011a). This recorded observation is located at MP 78.2 and comprises the site in the project area.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 387 sites on BLM- and Forest Service-managed lands in the region, representing less than 1 percent of the sites (or one out of 410 total sites on all lands in the NSO range). Table RATH-6 presents an overview of the features of the PCGP Project that would affect the *R. thrausta* sites. The construction corridor and associated work and storage areas would affect approximately 2.7 acres within the site (about 65 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *R. thrausta* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 1.1 acres of vegetation and soil within the site and could result in the removal of *R. thrausta* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.2 acre within the site. The establishment of the corridor could modify microclimate conditions in the site after the corridor is established. The removal of forests and host trees could negatively affect *R. thrausta* in adjacent areas by removing its habitat and potential host trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 1.4 acres of understory habitat in the site, which could modify microhabitats near extant individuals, potentially making the habitat no longer suitable for the species.

TABLE RATH-6

Impacts to *Ramalina thrausta* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	1.1 ac
Temporary Extra Work Area (TEWA)	1	0.2 ac
Uncleared Storage Area (UCSA)	1	1.4 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activities	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 720 acres of coniferous and mixed hardwood-coniferous forests below 4,000 feet msl, including 130 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *R. thrausta*. Within this impact area, about 450 acres (about 63 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 140 acres of coniferous and mixed hardwood-coniferous forests below 4,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests below 4,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, 77 sites of *R. thrausta* would remain on BLM and NFS lands in the local area, including 44 in reserves, and 386 sites, including 195 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 195 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 51 percent of the remaining *R. thrausta* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *R. thrausta* is a Category A (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category A species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M.
    - *R. thrausta* has a wide distribution across eight physiographic provinces and three states in the region and a moderate-high number of overall sites (387 on BLM and NFS lands). The species appears to be well distributed in its range in Oregon. The currently known number of sites on BLM and NFS lands is actually a decrease of sites documented since 2007, but is still moderate-high. One site was documented during PCGP Project surveys.

  - An estimated 50 percent of the sites (195 sites) are in reserves.

- Coniferous and mixed hardwood-coniferous forests below 4,000 feet msl (general habitat for the species) are widespread across the species' range and encompass approximately 9.9 million acres on BLM and NFS lands with an estimated 53 percent in reserves. Most of the forests are found in the Cascade Range, Klamath Mountains, and Coast Range, where most sites are documented. A subcomponent of these forests likely provides habitat for *R. thrausta*.
- The PCGP Project would affect one of 387 BLM- and Forest Service-managed sites of *R. thrausta*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (386) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (77 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across 10 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be about the same (51 percent). Of the remaining sites, 187 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and four are at least partially in Congressionally Reserved areas where management activities that may adversely affect *R. thrausta* are unlikely. Six other sites are at least partially in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 140 acres of coniferous and mixed hardwood-coniferous forests below 4,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 5.2 million acres (53 percent) of coniferous and mixed hardwood-coniferous forests and 2.5 million acres (61 percent) of LSOG forests below 4,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *R. thrausta*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category A species for which pre-disturbance surveys are practical and have been conducted in many areas; thus, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during surveys, including surveys associated with the PCGP Project.

3.12.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *R. thrausta* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 386 sites would remain on BLM and NFS lands across the region, and 77 sites would remain on BLM and NFS lands in the local area. Although the

PCGP Project would affect site persistence of *R. thrausta* at one site, this sites is a part of the many sites in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *R. thrausta* would persist in the region without considering the site as part of the population.

- The PCGP Project would remove approximately 720 acres of coniferous and mixed hardwood-coniferous forests and 130 acres of LSOG forests below 4,000 feet msl (a negligible amount of the forests). An estimated 63 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 5.2 million acres (53 percent) of coniferous and mixed hardwood-coniferous forests and 2.5 million acres (61 percent) of LSOG forests below 4,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2004.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *R. thrausta* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *R. thrausta* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *R. thrausta* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

3.13 USNEA LONGISSIMA

Usnea longissima is an epiphytic lichen in the Parmeliaceae family and is commonly known as Methuselah's beard or beard lichen.

3.13.1 Regulatory Status and Ranking

The 2001 ROD identifies *U. longissima* as a Category A (rare) species in Oregon (in Curry, Josephine, and Jackson Counties) and in California and as a Category F (uncommon) species in Oregon (outside those three counties) and in Washington. The ORBIC evaluated *U. longissima* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010), but it was not re-evaluated in the most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern, within its global range (G3G4) and was imperiled because of rarity or other factors that make it vulnerable to extirpation in Oregon (S2). In 2010, the species was

considered too common and was removed from the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive species in Oregon, but it is a Strategic species.

3.13.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

U. longissima occurs as an epiphyte on trees in riparian areas (Holthausen et al. 1994). It has a large thallus that is identifiable year-round and produces many long, draping strands on trees (Ponzetti and Wittmann 2006). Small, isolated specimens may be less readily observed. Apothecia are extremely rare, and the species primarily reproduces asexually by fragmentation of the main thallus, side branches, and fibrils. Most propagules disperse only a short distance from the source, and the relatively large size of the propagules may limit dispersal. The species' dispersal ability likely limits its ability to recover after disturbance (ORBIC 2004).

Range

U. longissima is found in boreal coniferous forests of Europe, North America, and Asia (ORBIC 2004). In western North America, *U. longissima* occurs from northern California to Alaska (Ponzetti and Wittmann 2006). Historically, the species was fairly common globally and was found in eastern and western North America, Scandinavia, Europe, Asia (including China, Indonesia, India, and Bhutan), and Africa. Due to significant population declines as a result of habitat loss and air quality degradation, the species has become threatened or extirpated in many areas of Europe and Scandinavia. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed in Europe, Asia, and North America. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *U. longissima* from an estimated 227 element occurrences in the Pacific Northwest in 2004. Oregon had the highest number of occurrences at about 180, and fewer occurrences were reported in California (21) and Washington (26) in 2004 (ORBIC 2004). Based on 2004 information, the species had experienced a population decline of an estimated 10–30 percent across its range in more recent years and 50–75 percent based on historic estimates. The population trend of *U. longissima* is clearly declining across its range, based on the extirpation of the species from several countries. *U. longissima* is considered to be highly vulnerable based on available population data in 2004, primarily because of its environmental

sensitivity, low dispersal rate, and slow reproductive process. The species was found in 13 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 261 sites on federal lands and 364 total sites on all lands in the NSO range.

For the PCGP Project, surveys for S&M lichens were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C lichens and other special-status lichens, including *U. longissima*, and resulted in three observations of *U. longissima*. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

U. longissima is found at low to mid elevations in coniferous and hardwood stands in riparian areas, particularly in coastal climates or on fog-swept mountains where humidity is high (Holthausen et al. 1994, Ponzetti and Wittmann 2006). It has been found in greater abundance on hardwood species than softwood species and seems to prefer larger, older trees (Holthausen et al. 1994). In forests in the Pacific Northwest, the species has been found more often in stands greater than 80 years old (Ponzetti and Wittmann 2006). The most suitable habitat in the Oregon Coast Range is stands older than 120 years with north to northeast-facing slopes. The species has established in younger stands during transplant efforts, although naturally occurring populations are more common in older, moist forests. *U. longissima* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions as much as it is restricted to high humidity habitats.

Threats

U. longissima is extremely sensitive to pollution and human disturbance, such as habitat alteration and air quality degradation (Ponzetti and Wittmann 2006). Habitat modifications can greatly affect populations due to the species' specific habitat requirements and low dispersal ability (ORBIC 2004). Air pollution is a major threat to the species. With the environmental sensitivity of the species and its low dispersal rate, *U. longissima* has difficulty recovering after a disturbance or increased air pollution. Forest management practices, although beneficial for many species, can threaten populations of *U. longissima* by removing host trees and creating younger stands, which provide less suitable habitat (Ponzetti and Wittmann 2006). The lichen is also subject to illegal harvesting for floral shops, other decorative uses, and medicinals.

Management Recommendations

As a Category F S&M species in part of its range, the 2001 ROD indicates that management of known sites is not necessary, but a determination needs to be made regarding which S&M category, if any, the species should be assigned to (USDA and USDI 2001). As a Category A S&M species in part of its range, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites. No management recommendations have been developed for *U. longissima*.

3.13.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *U. longissima* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table USLO-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 946 observations from BLM and Forest Service geodatabases were converted into 587 sites in the NSO range (region). Table USLO-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table USLO-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure USLO-1 displays the regional distribution of the species across BLM and NFS lands, and Figure USLO-2 displays the species' regional distribution with the extent of coniferous, mixed hardwood-coniferous, and hardwood forests and LSOG forests below 6,500 feet msl on BLM and NFS lands.

TABLE USLO-1

Number of *Usnea longissima* Sites (2013)

Location*	Number of Sites
Regional Area	587
Local Area	31
Analysis Area (Project Area)	3 (2)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, and project areas are provided in Chapter 1.

TABLE USLO-2

Distribution of *Usnea longissima* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	214	19	3
Forest Service	308	6	-
NPS	4	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	135	12	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

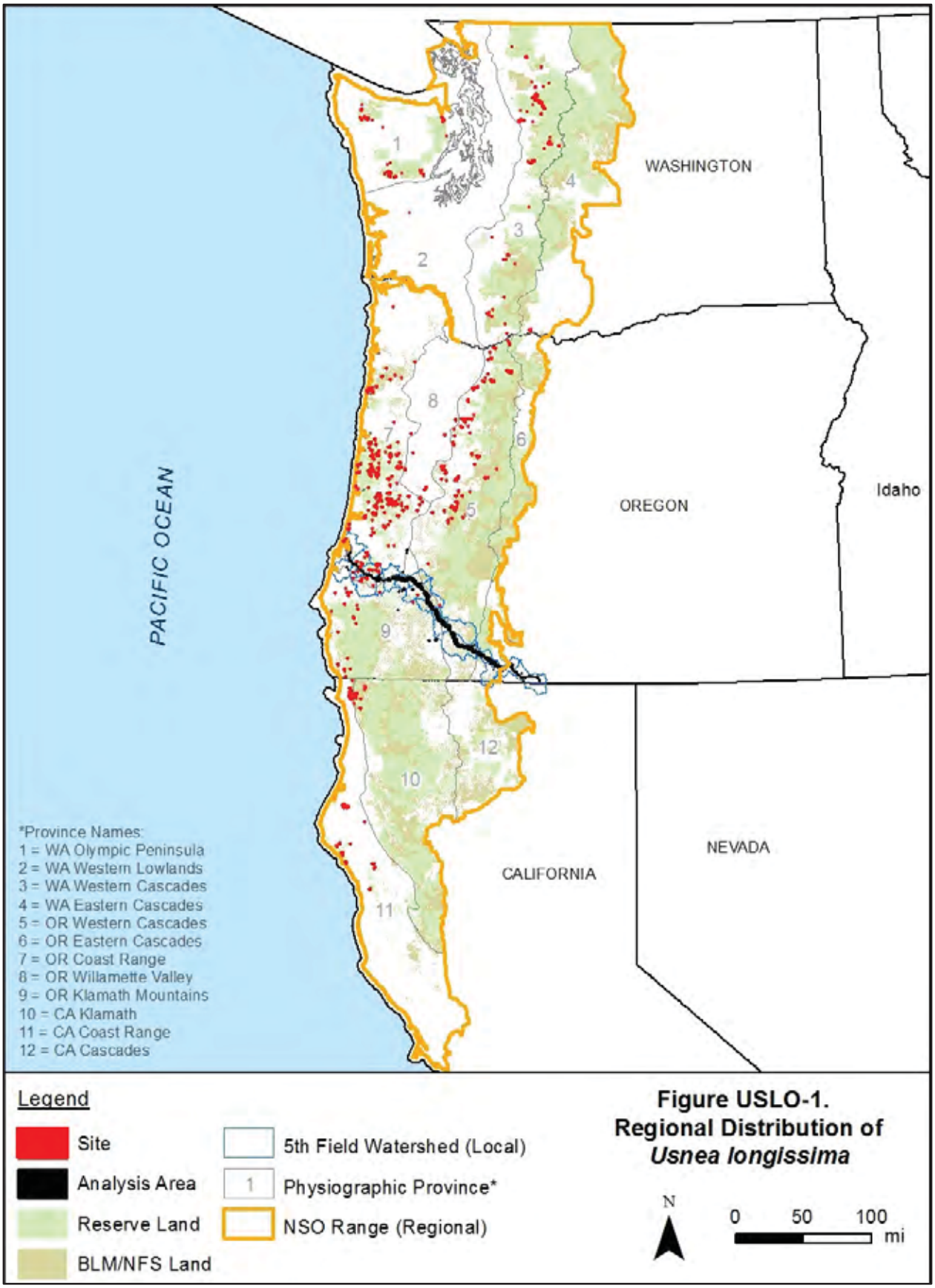


Figure USLO-1. Regional Distribution of *Usnea longissima*

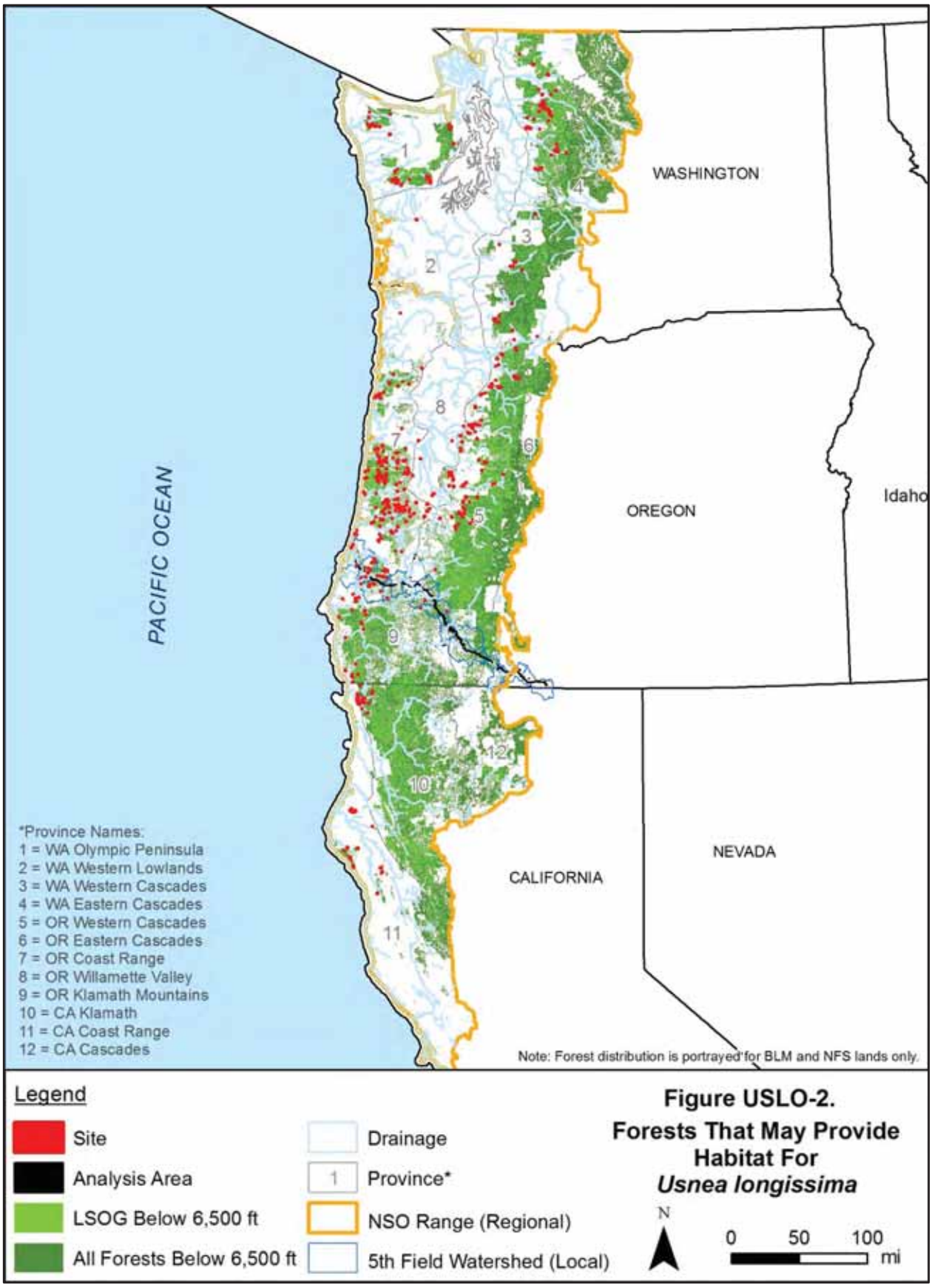


Figure USLO-2.
Forests That May Provide Habitat For *Usnea longissima*

TABLE USLO-3

Distribution of *Usnea longissima* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	31	-	-
Adaptive Management Reserves (AMR)	11	-	-
Administratively Withdrawn (AW)	54	1	-
Congressionally Reserved (CR)	**25**	**-**	**-**
Late Successional Reserve (LSR)	**231**	**6**	**-**
Marbled Murrelet Area (LSR3)	**16**	**4**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**6**	**1**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	19	5	-
Other (Matrix, Riparian Reserve, Other)	186	13	3
Riparian Reserve**	**13**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

U. longissima is widely distributed across 11 physiographic provinces in Washington (Western and Eastern Cascades, Western Lowlands, and Olympic Peninsula), Oregon (Coast Range, Cascades West and East, Klamath Mountains, and Willamette Valley), and California (Klamath and Coast Range) (see Figure USLO-1). The majority of the sites are found along the Coast Range, where sites are clustered and close to one another. Some clusters of sites are located in the western Cascade Range, but the sites tend to be more scattered in the mountain range. Fewer sites are located in the Klamath Mountains in Oregon and the Olympic Peninsula in Washington. Many opportunities for dispersal between sites appear to exist across the species' range in the region based on the proximity of sites to one another, widespread distribution of the sites, and the extent of coniferous, mixed hardwood-coniferous, and hardwood forests. The species appears to be well distributed in the Coast Range, western Cascade Range in Oregon and Washington, and Olympic Peninsula in Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Of the 587 sites in the region, 135 are located on private lands (at least partially), and 519 sites are at least partially on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include 40 sites in the Coos Bay District, one site in the Medford District, and eight sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include 11 sites on the Rogue River National Forest and six sites on the Umpqua National Forest. The remaining 456 sites on BLM and NFS lands are in the Arcata, Eugene, and Salem Districts and on the Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Siskiyou, Siuslaw, Six Rivers, and Willamette National Forests (three sites are partially on the Siuslaw National Forest and partially on BLM lands in the Coos Bay, Eugene, and Salem Districts).

Across the NSO range, 272 sites are located on reserve lands managed by BLM or the Forest Service, including 231 in LSRs (at least partially), 16 in Marbled Murrelet Areas, six in Known Owl Activity Centers, 25 in Congressionally Reserved areas (at least partially), and 13 in

Riparian Reserves. This represents 52 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The four NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

U. longissima is more commonly found in LSOG forests based on available data (482 of 587 total sites are in LSOG), but it is also relatively common in non-LSOG forests and has been found colonizing younger forests. Based on current site locations, the species is found in all forest types up to about 6,500 feet msl and has been documented in most of the NSO range. Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *U. longissima* and support additional sites. These forests encompass an estimated 19.9 million acres on BLM and NFS lands in the region, including an estimated 10.9 million acres in reserve land allocations (55 percent of the forests; Table USLO-4). Of this acreage, an estimated 6.2 million acres are LSOG (see Figure USLO-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE USLO-4

Extent of Forests that Could Provide Habitat for *Usnea longissima* on BLM and NFS Lands*

Location	All Forests below 6,500 feet		LSOG Forests below 6,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	19,897,450	10,875,040	6,189,600	3,816,800
Local Area	617,090	204,040	186,650	81,430
Project Area	1,470	500	300	160

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *U. longissima* is distributed across six 5th field watersheds that overlap the project area (see Table USLO-5 and Figure USLO-3). Sites are more abundant in the Coast Range and western portion of the Klamath Mountains in the local area, while sites in the Cascade Range and eastern portion of the Klamath Mountains appear more isolated. The sites in the west appear to have some level of connectivity between them and others in the regional area based on the proximity of other sites in the region and extent of coniferous, mixed, and hardwood forests.

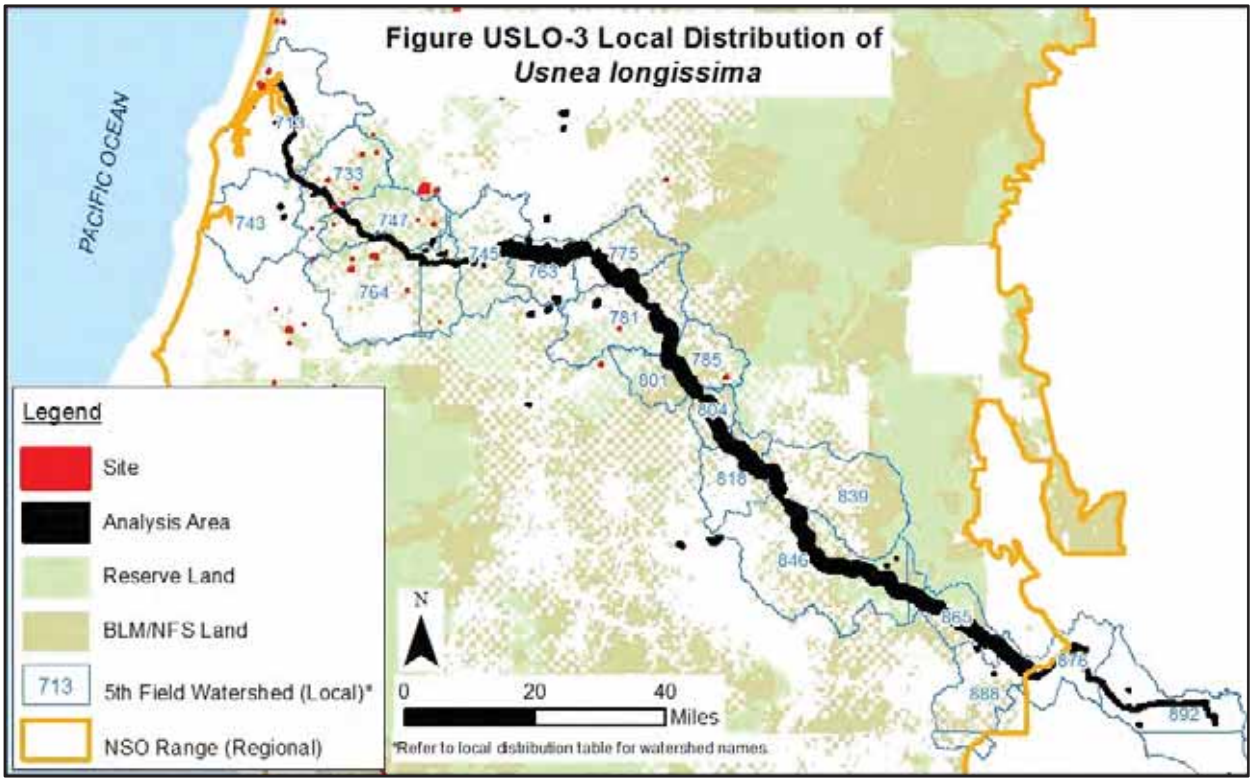
Of the 31 sites in the local area, 25 sites are at least partially on BLM and NFS lands, and 12 sites are at least partially on private lands. The sites on BLM and NFS lands are located on lands designated as Other (Matrix), LSR, and Administratively Withdrawn. Of the 25 sites on BLM and NFS lands in the local area, 11 sites are on reserve lands, representing 44 percent of the BLM- and Forest Service-managed sites. The distribution of these reserve sites across the watersheds is depicted in Table USLO-5 and on Figure USLO-3. These sites are in LSRs in the East Fork, Middle Fork, North Fork Coquille River, and the South Umpqua River watersheds.

TABLE USLO-5

Distribution of *Usnea longissima* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	6	-
East Fork Coquille River (747)	5	2
Elk Creek-South Umpqua (785)	1	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	7	4
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	11	4
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1	1
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl encompass approximately 617,090 acres on BLM and NFS lands in the local area, with 204,040 acres in reserve land allocations (33 percent of the forests). Of this acreage, an estimated 186,650 acres are LSOG, including 81,430 acres in reserves (44 percent of the forests). Other sites may also exist in the local area, particularly in the Coast Range, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures USLO-2 and USLO-3).

Analysis/Project Area Distribution

The analysis and project areas contain three sites of *U. longissima*, all of which are at least partially on BLM lands in the Coos Bay District. The analysis area sites are in two watersheds: Coos Bay Frontal and North Fork Coquille River. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

The three sites are located on lands designated as Other (Matrix) and are not within regionally mapped reserves. One site is partially on private land. The sites are in Coos County, Oregon, where the species is a Category F S&M species.

Surveys for the PCGP Project resulted in three observations of the species (Siskiyou BioSurvey LLC 2008, 2011a). These recorded observations comprise the three sites in the analysis area. Within the project area, one site is at MP 16.9, and two sites are located between MPs 27.3 and 27.5.

Project Impacts

Analysis

The PCGP Project would affect three sites out of the 519 sites on BLM and NFS lands in the region, representing less than 1 percent of the sites (or three out of 587 total sites on all lands in the NSO range). Table USLO-6 presents an overview of the features of the PCGP Project that would affect the *U. longissima* sites. The construction corridor would affect approximately 1.5 acres within two sites (about 25 percent of the sites). The corridor would also pass through the portion of the third site on private land, but this analysis focuses on the potential effects on BLM lands, which would primarily be indirect. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *U. longissima* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb vegetation and soils within two sites and could result in the removal of *U. longissima* populations or individuals on trees that are removed. A third site could be indirectly affected by nearby activities within the corridor. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees could negatively affect *U. longissima* in adjacent areas by removing its habitat and potential host trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

TABLE USLO-6

Impacts to *Usnea longissima* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	2	1.5 ac
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres

Across the project area, the PCGP Project would remove an estimated 1,170 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *U. longissima*. Within this impact area, about 770 acres (about 66 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of forests below 6,500 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the three sites as a result of the PCGP Project, 22 sites of *U. longissima* would remain on BLM and NFS lands in the local area, including 11 in reserves, and 516 sites, including 272 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 272 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 53 percent of the remaining *U. longissima* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *U. longissima* is a Category A (rare) species in Oregon (in Curry, Josephine, and Jackson Counties) and in California and is a Category F (uncommon) species in Oregon (outside those three counties) and in Washington. The species is a Category F species in the analysis area. Per the 2001 ROD, information on Category F species is insufficient to determine what level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information since the

species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:

  - *U. longissima* has a wide distribution across 11 physiographic provinces in three states and a moderate-high number of overall sites (519 on BLM and NFS lands). The species appears to be well distributed in the Coast Range, western Cascade Range in Oregon and Washington, and Olympic Peninsula in Washington. The currently known number of sites on BLM and NFS lands is an increase of about 259 sites since 2007, with some sites documented during the PCGP Project surveys.
  - An estimated 52 percent of the sites (272 sites) are in reserves.

- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.9 million acres on BLM and NFS lands with an estimated 55 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where several sites are documented. The Coast Range and other areas also contain these forests, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *U. longissima*.
- The PCGP Project would affect three of 519 BLM- and Forest Service-managed sites of *U. longissima*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the three sites, a moderate-high number of sites (516) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (22 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Coast Range. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 253 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 25 are in Congressionally Reserved areas where management activities that may adversely affect *U. longissima* are unlikely. At least 13 other sites are in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources; more sites are likely in Riparian Reserves based on the species' habitat requirements.
- The PCGP Project would result in a permanent loss of an estimated 240 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl (less than 1 percent of the total regional acreage). An estimated 10.9 million acres (55 percent) of all forests and 3.8 million acres (62 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *U. longissima*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category A and F species, depending on the area, and pre-disturbance surveys are not applicable in parts of the region. It is reasonable to conclude that additional sites exist in the range of the NSO that have not

been discovered based on the increased number of sites documented during pre-disturbance, strategic, and other surveys, including surveys associated with the PCGP Project.

3.13.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *U. longissima* at three sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 516 sites would remain on BLM and NFS lands across the region, and 22 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *U. longissima* at three sites, these sites are part of a group of sites in the Coast Range in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *U. longissima* would persist in the region without considering the three sites as part of the population.
- The PCGP Project would remove approximately 1,170 acres of all forests and 220 acres of LSOG forests below 6,500 feet msl (a negligible amount of the forests). An estimated 66 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 10.9 million acres (55 percent) of all forests and 3.8 million acres (62 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2007.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *U. longissima* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the three *U. longissima* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *U. longissima* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

This page intentionally left blank.

4.0 BRYOPHYTE SPECIES

4.1 BUXBAUMIA VIRIDIS

Buxbaumia viridis is an annual moss in the Buxbaumiaceae family and is commonly known as green bug moss.

4.1.1 Regulatory Status and Ranking

The 2001 ROD identifies *B. viridis* as a Category D (uncommon) species across the NSO range. The ORBIC evaluated *B. viridis* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2004, the species was considered to be between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern, within its global range and in Oregon (G3G4, S3S4, respectively). The species is not currently on the ORBIC Lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

4.1.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

B. viridis grows as a persistent mat of protonema, lacking a leafy gametophyte typical of bryophytes, and has sporophytes that are relatively large and very distinctive (Forest Service and BLM 1996). The moss is dioecious, with male and female reproductive structures on separate individuals. It may grow in close association with mycorrhizal or decomposer fungi. *B. viridis* reproduces readily by spores and fragmentation of gametophytes, and plants will recolonize sites when suitable habitat and substrate are present (ORBIC 2004).

Range

B. viridis has an interruptedly circumboreal range across the United Kingdom, Scandinavia, Europe, Russia, Corsica, southwest Asia, China, and western North America (British Columbia, Alberta, Idaho, Montana, Colorado, Washington, Oregon, and California) (ORBIC 2004). In western North America, it is known from Canada south to northern California and inland to Idaho and Montana (ORBIC 2004, Forest Service and BLM 1996). In Oregon, it has been documented in the Coast Range, Cascade Range, Klamath Mountains, and Blue Mountains (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across the world. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been

affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *B. viridis* from more than 1,000 element occurrences worldwide, with an estimated 5,000 individuals, in 2004. Oregon and Washington had the highest number of occurrences with more than 400 each, and fewer occurrences were reported in California (5) in 2004 (ORBIC 2004). Based on 2004 information, the species had experienced a population decline of an estimated 25–50 percent in parts of Europe, but appeared to be stable in North America. *B. viridis* is not considered to be intrinsically vulnerable, but has experienced localized threats in Europe. The species was found in 19 locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 743 sites on federal lands and 845 total sites on all lands in the NSO range.

For the PCGP Project, surveys for S&M bryophytes were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted Category A, B, and C species and other special-status bryophytes, but did not specifically target *B. viridis* because it had been removed from the S&M list in 2002. Incidental observations of *B. viridis* would have been recorded; however, the species was not observed during surveys. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

B. viridis grows on rotten stumps and logs and on mineral or organic soil, in cool, shaded, humid coniferous forests at low to middle elevations (generally 3,500 to 5,000 feet msl) (Forest Service and BLM 1996). Floodplains, stream terraces, and old-growth stands are favorable habitats because of the large amount of decayed wood available, but the species can be found on almost any landform as long as microclimatic conditions are favorable. It has been documented on soils and shaded cutbanks near trails and road cuts. Typical associated conifer trees include mountain hemlock, western redcedar, and silver fir. *B. viridis* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions and may be found in younger forests with suitable microclimatic conditions.

Threats

Threats to *B. viridis* include changes in light level and microclimate caused by removal or thinning of the canopy, removal of coarse woody debris and decayed wood in forests, recreational impacts, and diminishing mesic forest (Forest Service and BLM 1996, ORBIC 2004). Logging in the Pacific Northwest does not appear to have threatened the species because populations have remained relatively stable (ORBIC 2004).

Management Recommendations

As a Category D S&M species, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). Management

recommendations were developed for *B. viridis* (Forest Service and BLM 1996). Specific management recommendations for *B. viridis* include:

- Maintain decay class 3, 4, and 5 logs, leaving windfalls in place to provide structurally diverse habitat at known sites.
- Maintain a dense overstory to maintain humidity, with greater than 70 percent closed-canopy forest for shade at known sites.

4.1.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *B. viridis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table BUVI-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 1,276 observations from BLM and Forest Service geodatabases were converted into 720 sites in the NSO range (region). Table BUVI-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table BUVI-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure BUVI-1 displays the regional distribution of the species across BLM and NFS lands, and Figure BUVI-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands.

TABLE BUVI-1

Number of *Buxbaumia viridis* Sites (2013)

Location*	Number of Sites
Regional Area	720
Local Area	171
Analysis Area (Project Area)	10 (6)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, and project areas are provided in Chapter 1.

TABLE BUVI-2

Distribution of *Buxbaumia viridis* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	320	169	10
Forest Service	393	2	-
NPS	3	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	60	27	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE BUVI-3

Distribution of *Buxbaumia viridis* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	50	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	28	-	-
Congressionally Reserved (CR)	**19**	**-**	**-**
Late Successional Reserve (LSR)	**103**	**13**	**-**
Marbled Murrelet Area (LSR3)	**8**	**5**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**21**	**8**	**-**
Managed Late Successional Area (MLSA)	1	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	520	154	10
Riparian Reserve**	**1**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

B. viridis is widely distributed across nine physiographic provinces in Washington (Western and Eastern Cascades and Olympic Peninsula), Oregon (Coast Range, Cascades West and East, and Klamath Mountains), and California (Klamath and Coast Range) (see Figure BUVI-1). The majority of the sites are found in the Klamath Mountains and Cascade Range in Oregon and southern Washington, where sites are clustered and close to one another. Some clusters of sites are located in the Coast Range in Oregon, and sites are more scattered in other areas. Fewer sites are located in California and the Olympic Peninsula in Washington. Many opportunities for dispersal between sites appear to exist across the species' range in the region based on the proximity of sites to one another, widespread distribution of the sites, and the extent of coniferous, mixed hardwood-coniferous, and hardwood forests. The species appears to be well distributed in its range in Oregon and in the Cascade Range in Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Of the 720 sites in the region, 60 are located on private lands (at least partially), and 713 sites are at least partially on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include 13 sites in the Coos Bay District, 201 site in the Medford District, and 104 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include 42 sites on the Rogue River National Forest, 91 sites on the Umpqua National Forest, and one site on the Winema National Forest. The remaining 261 sites on BLM and NFS lands are in the Arcata and Eugene Districts and on the Deschutes, Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Olympic, Siskiyou, Siuslaw, Six Rivers, Wenatchee, and Willamette National Forests.

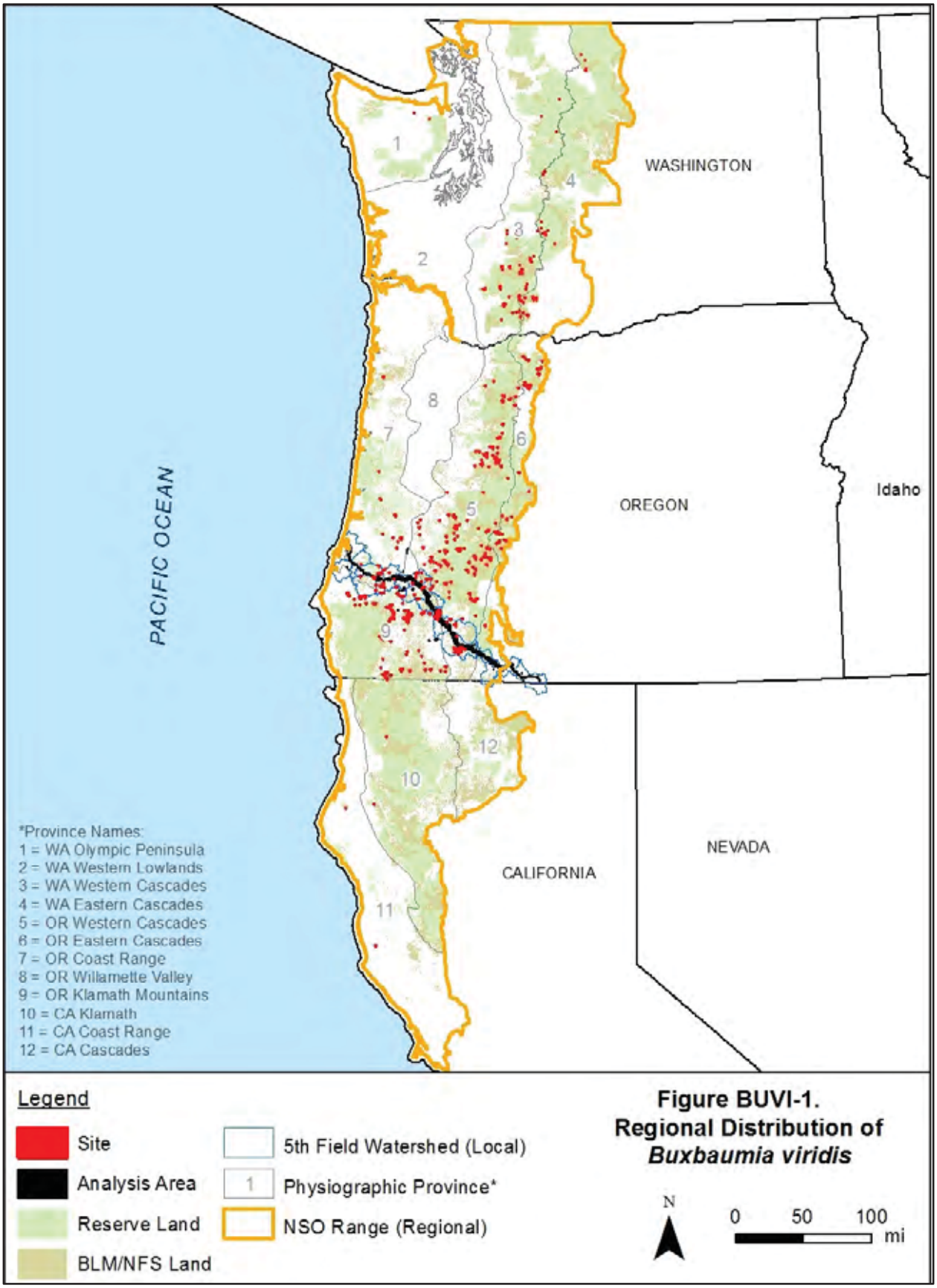


Figure BUVI-1.
Regional Distribution of *Buxbaumia viridis*

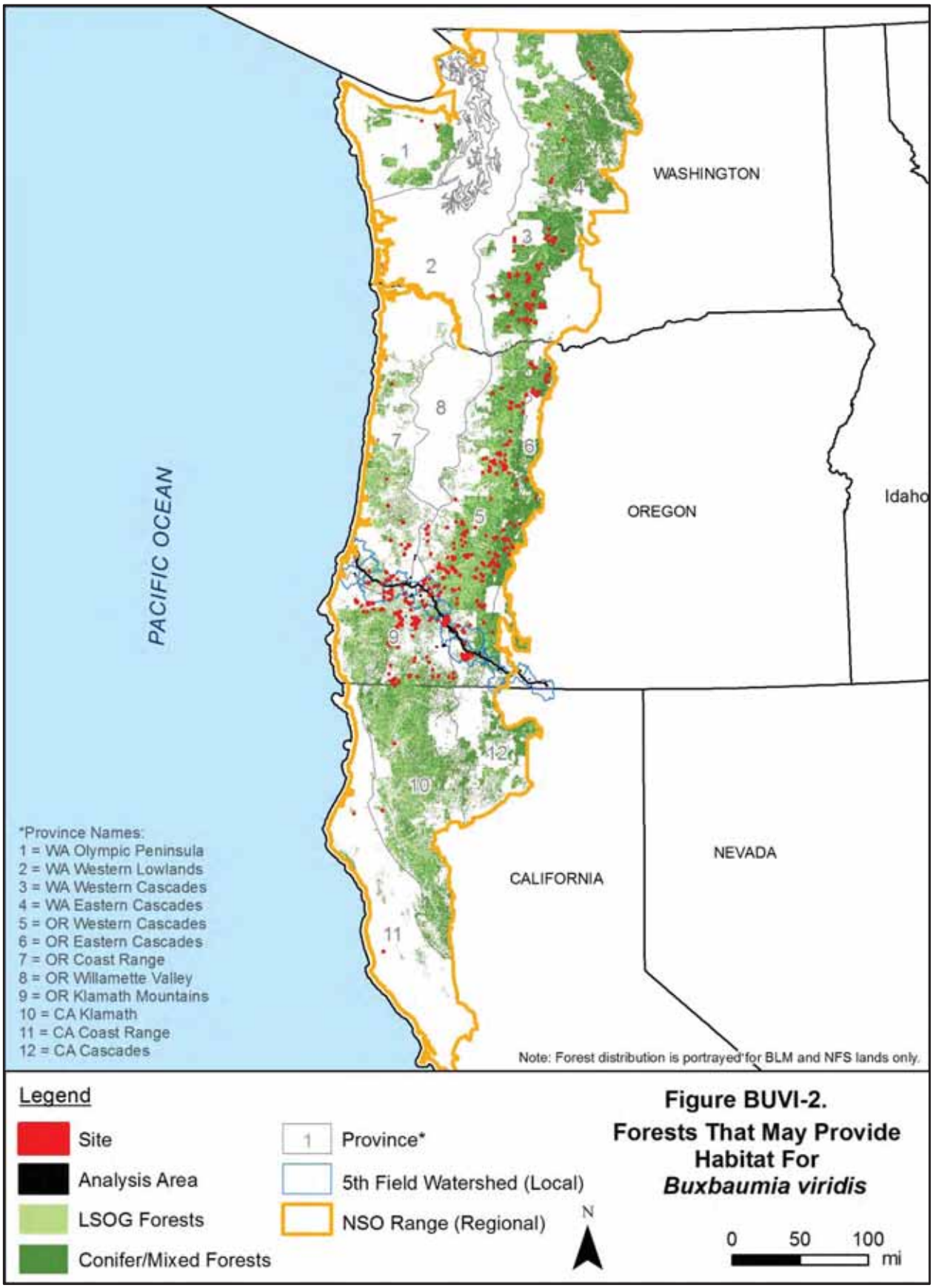


Figure BUVI-2.
Forests That May Provide Habitat For *Buxbaumia viridis*

Across the NSO range, 146 sites are located on reserve lands managed by BLM or the Forest Service, including 103 in LSRs (at least partially), eight in Marbled Murrelet Areas, 21 in Known Owl Activity Centers, 19 in Congressionally Reserved areas (at least partially), and one in a Riparian Reserve. This represents 20 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection based on National Park management.

B. viridis is more commonly found in LSOG forests based on available data (592 of 720 total sites are in LSOG), but it is also relatively common in non-LSOG forests and may be found colonizing younger forests with suitable microclimates. Based on current site locations, the species is found in coniferous and mixed-hardwood coniferous forest types across a wide elevation range and has been documented in most of the NSO range. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *B. viridis* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 12.5 million acres in reserve land allocations (65 percent of the forests; Table BUVI-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure BUVI-2), including 3.8 million acres in reserve land allocations (62 percent of the forests). Although coniferous and mixed hardwood-coniferous forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

TABLE BUVI-4

Extent of Forests that Could Provide Habitat for *Buxbaumia viridis* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Forests	
	Total	Reserves	Total	Reserves
Regional Area	19,231,940	12,513,460	6,067,930	3,753,060
Local Area	1,305,640	201,250	183,900	81,350
Project Area	1,350	490	290	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *B. viridis* is distributed across 10 5th field watersheds that overlap the project area (see Table BUVI-5 and Figure BUVI-3). Sites are widely distributed across the local area, with many clusters of sites in the Coast Range, Klamath Mountains, and western Cascade Range. The sites appear to have some level of connectivity between them and others in the regional area based on the proximity of other sites in the region and extent of coniferous and mixed forests.

All of the 171 sites in the local area are at least partially on BLM and NFS lands, and 27 sites are at least partially on private lands. The sites are located on lands designated as Other (Matrix), LSR, LSR3, and LSR4. Of the 171 sites in the local area, 25 sites are on reserve lands, representing 15 percent of the sites. The distribution of these reserve sites across the watersheds

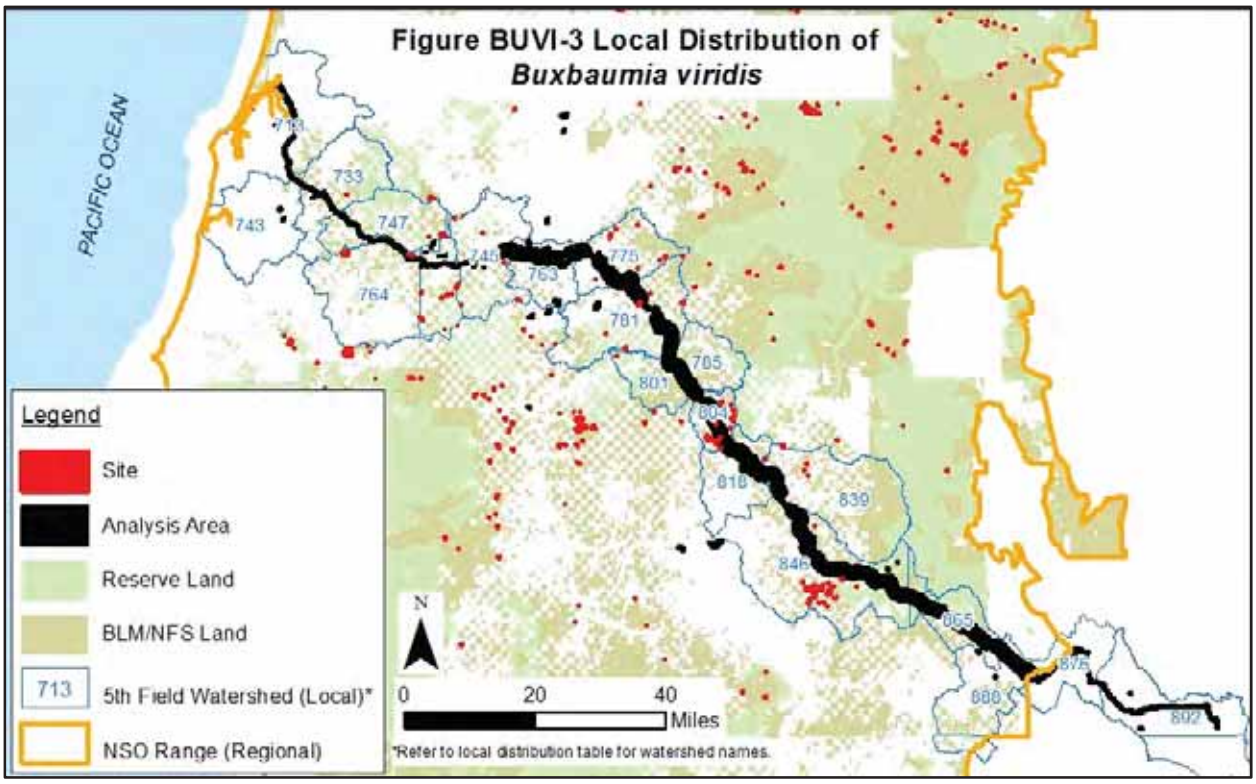
is depicted in Table BUVI-5 and on Figure BUVI-3. These sites are in LSRs in seven of the watersheds.

TABLE BUVI-5

Distribution of *Buxbaumia viridis* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	6	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	5	1
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	52	4
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	23	8
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	10	-
North Fork Coquille River (733)	1	-
Olalla Creek-Lookingglass Creek (745)	7	4
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	13	2
Spencer Creek (865)	-	-
Trail Creek (804)	53	5
Upper Cow Creek (801)	1	1

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous encompass approximately 1.3 million acres on BLM and NFS lands in the local area, with 201,250 acres in reserve land allocations (15 percent of the forests). Of this acreage, an estimated 183,900 acres are LSOG, including 81,350 acres in reserves (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those

sites, and the extent of forests that may provide suitable habitat (see Figures BUVI-2 and BUVI-3).

Analysis/Project Area Distribution

The analysis area contains 10 sites of *B. viridis*, and the project area contains six sites. All of the sites are on BLM lands in the Medford District. The analysis area sites are in the Trail Creek watershed. Many sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

All sites are located on lands designated as Other (Matrix) and are not within regionally mapped reserves.

Surveys for the PCGP Project resulted in no observations of the species (Siskiyou BioSurvey LLC 2008, 2011a). Twenty-four recorded observations from 2001-2002 in agency records comprise the 10 sites in the analysis area. Within the project area, two sites are near MP 115.8, and one site is at MP 119.5. The other sites are near or along roads to the east of MP 115.9 to 116.3.

Project Impacts

Analysis

The PCGP Project would affect 10 sites out of the 713 sites on BLM and NFS lands in the region, representing approximately 1 percent of the sites (or 10 out of 720 total sites on all lands in the NSO range). Table BUVI-6 presents an overview of the features of the PCGP Project that would affect the *B. viridis* sites. The construction corridor would affect approximately 4.2 acres within six sites (about 14 percent of all sites in the analysis area); the other sites may be indirectly affected by nearby PCGP Project activities. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *B. viridis* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.9 acre of vegetation and soils within two sites and could result in the removal of *B. viridis* populations or individuals on logs or understory components that are removed. Disturbance in TEWAs would result in similar impacts on approximately 0.9 acre within three sites. The establishment of the corridor and TEWAs could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and woody debris could negatively affect *B. viridis* in adjacent areas by removing its habitat, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.2 acre of understory habitat in three sites, which could remove logs or woody debris, potentially making the habitat

unsuitable for the species or removing individuals. Road improvements and establishment would disturb approximately 2.6 acres within five sites and could remove habitat and extant populations or individuals of *B. viridis*. In addition, four other sites may be indirectly affected by road improvements and establishment of the construction corridor and TEWAs, which could modify microclimate conditions around populations or individuals near the corridor and roads.

TABLE BUVI-6

Impacts to *Buxbaumia viridis* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	2	0.9 ac
Temporary Extra Work Area (TEWA)	3	0.9 ac
Uncleared Storage Area (UCSA)	3	0.2 ac
Roads (TMP)	5	2.6 ac
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the two sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *B. viridis*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 10 sites as a result of the PCGP Project, 161 sites of *B. viridis* would remain on BLM and NFS lands in the local area, including 25 in reserves, and 703 sites, including 146 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 146 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 21 percent of the remaining *B. viridis* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *B. viridis* is a Category D (uncommon) species throughout the NSO range. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - This species was removed from the S&M Standards and Guidelines in Washington and Oregon via the 2001 Annual Species Review, as a result of new information that demonstrated this species did not meet all of the basic criteria for S&M. The species remained on the list as Category E in California.
    - *B. viridis* has a wide distribution across nine physiographic provinces in three states and a moderate-high number of overall sites (713 on BLM and NFS lands). The species appears to be well distributed in its range in Oregon and in the Cascade Range in Washington. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites recorded in 2007, but is still moderate-high. Many sites have been discovered incidentally or through other efforts since the 2001 ROD.
    - An estimated 20 percent of the sites (146 sites) are in reserves.
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 65 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain these forests, and several sites are located in these areas. A subcomponent of these forests likely provides habitat for *B. viridis*.
- The PCGP Project would affect 10 of 713 BLM- and Forest Service-managed sites of *B. viridis*, representing approximately 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the 10 sites, a moderate-high number of sites (703) would continue to be documented on BLM and NFS lands in the region with a wide distribution across Washington, Oregon, and California. Many sites (161 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Cascade Range and Klamath Mountains. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 132 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 19 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *B. viridis* are unlikely. At least one other site is in a Riparian Reserve where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total regional acreage). An estimated 12.5 million acres (65 percent) of the forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range.

- The remaining forests could support additional populations of *B. viridis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category D species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during pre-disturbance, strategic, and other surveys.

4.1.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *B. viridis* at 10 sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 703 sites would remain on BLM and NFS lands across the region, and 161 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *B. viridis* at 10 sites, these sites are part of a group of sites in southern Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *B. viridis* would persist in the region without considering the 10 sites as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed hardwood-coniferous forests and 220 acres of LSOG forests (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 12.5 million acres (65 percent) of coniferous and mixed forests and 3.8 million acres (62 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2004.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *B. viridis* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 10 *B. viridis* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *B. viridis* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

5.0 VASCULAR PLANTS

5.1 CYPRIPEDIUM FASCICULATUM

Cypripedium fasciculatum is a perennial herb in the Orchidaceae family and is commonly known as clustered lady's-slipper, brownie lady's-slipper, or brownie slipper orchid.

5.1.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. fasciculatum* as a Category C (uncommon) species across the NSO range. The ORBIC evaluated *C. fasciculatum* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be not rare and apparently secure, but with cause for long-term concern, within its global range (G4). In Oregon, it was imperiled because of rarity or other factors that make it vulnerable to extinction (S2). The species is on the ORBIC List 2. It is considered a BLM and Forest Service Sensitive species in Oregon and is a candidate for listing in Oregon.

5.1.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

C. fasciculatum is a long-lived perennial orchid that may take multiple years to flower (Vance 2005). It develops symbiotic relationships with specific mycorrhizal fungi to obtain nutrients, and relies on a small predatory wasp for pollination (Vance 2005, Lichthardt 2003). It may take several years of mycorrhizal-supported growth before seedlings accumulate enough stored starch to develop a stem and leaves above ground (Vance 2005). The species can remain dormant below ground for multiple years while receiving moisture and nutrients from mycorrhizal fungi. It returns as a vegetative shoot to reproduce when environmental conditions are favorable and sufficient carbohydrates have been stored.

Unlike most other plant species, *C. fasciculatum* cannot replace damaged new spring growth until the following year after injury is incurred. Plants whose spring growth is injured by fire, late frost, disease, foraging animals, or other damaging events suffer severe impediments to growth and may die (Vance 2005). Plants with low energy reserves may require more than one vegetative growth season before flowering and may remain dormant below the soil. Fire may play an important role in the species' life cycle (Holthausen et al. 1994), as the species tends to inhabit areas that regularly experience low intensity fire (ORBIC 2004).

Range

C. fasciculatum is found in multiple disjunct ranges in mountainous areas of the western and interior-western United States, from central California to Washington and from the Pacific coast

to Colorado and Wyoming (ORBIC 2004, Vance 2005). The species tends to be scattered and widely separated across its range (Vance 2005), although its distribution within each state is sparse and limited (Lichthardt 2003). In California, *C. fasciculatum* has been found in the Santa Cruz Mountains and Coast Range and from the central Sierra Nevada Mountains through the southern Cascade Range and the Klamath Mountains (ORBIC 2004). In Oregon, it has been found in the Cascade and Coast Ranges and Klamath Mountains, as well as in the northern Cascade and Sawtooth Ranges. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. fasciculatum* from more than 300 element occurrences across western North America in 2004. In the Pacific Northwest, Oregon had the highest number of element occurrences with 304. California had an estimated 100 element occurrences, and Washington had 59 element occurrences (ORBIC 2004). Based on 2004 information, the species had experienced a short-term decline across its range and in Oregon and was also considered to be at moderate risk of further long-term population decline. *C. fasciculatum* has many sites in southwest Oregon that have been documented since the 2001 ROD was published. Many of these sites consist of very few individuals, and small sites are often not relocated in subsequent visits such that the numbers of occurrences may not be an adequate representation of numbers of viable populations (Richard Helliwell, Pers. Comm.). Notwithstanding that information, a large number of occurrences of this species remain. The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 462 sites on federal lands and 1,283 total sites on all lands in the NSO range.

For the PCGP Project, surveys for special-status plants were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted *C. fasciculatum*, but resulted in no observations of the species. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

In the Pacific Northwest, *C. fasciculatum* is found in a wide array of habitats, including a diversity of soil types, vegetation communities, slopes, and aspects (Vance 2005). The species tends to occur at elevations ranging from 100–6,500 feet msl and appears to be strongly associated with Douglas-fir. Habitat ranges from mature coniferous forests to openings and edges of mixed successional forests. The species requires a rich organic humus layer that can support the microfauna associated with its life cycle. It can become damaged by direct sunlight and therefore requires shade from overstory vegetation. In successional forest habitats where tree canopy shading is too thin, *C. fasciculatum* often occurs where it can receive cover from understory vegetation. Localized habitats range from stream banks to forested slopes and areas

that have been subject to some level of disturbance, such as roadside ditches or road cuts, but the plant is almost always found under shade from overhanging vegetation. *C. fasciculatum* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Primary threats to *C. fasciculatum* are those that remove the overstory canopy and disturb soil (Lichthardt 2003), including logging, road construction, development, and grazing (ORBIC 2004, Vance 2005). High intensity fires have a strong potential to eliminate populations, especially in areas that have been subject to decades of fire suppression (ORBIC 2004). Localized threats include collection and trampling, particularly in or near campgrounds (Lichthardt 2003). Habitat fragmentation, physical trampling, specimen collection, and fire suppression are known to have led to reductions in habitat and populations (USDA and USDI 2007). In 1995, lady-slipper orchids of the *Cypripedium* genus, including *Cypripedium fasciculatum*, were rated by the World Wildlife Fund to be among the top 10 most sought plants or animals threatened by illegal trade (Seevers and Lang 1998).

Management Recommendations

As a Category C S&M species, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). Management recommendations for *C. fasciculatum* were developed in 1998 and updated in 2005 (Vance 2005). The guidance includes:

- Maintain sufficient cover to avoid any more than intermittent direct solar radiation on *C. fasciculatum* plants.
- Maintain decayed down logs (decay class 4 and 5), snags, and duff layer within the species habitat area for favorable forest floor conditions, habitat, soil moisture and mycorrhizal associates. Where fuel concentrations are within the historic range of variability, provide for future recruitment of coarse woody debris.
- Avoid activities that alter or remove soil, duff, or the organic matter in the species habitat area.
- Manage sites to include entire populations plus an area large enough to maintain current habitat and associated microclimate, primarily temperature and moisture.
- Where fuel concentrations exceed historic range of variability (fuel condition class 2 and 3), treat fuels within and adjacent to the site to reduce risk of high intensity fire.
- Restrict activities within species habitat areas during the species' growing season which ranges from March (or whenever leaves visible) through August (or when capsules split and shed seeds). Growth season can vary from site-to-site and year-to-year and should be checked before activity takes place.
- Because plants do not appear above ground every year, it is important to buffer species locations in order to capture dormant plants.

5.1.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. fasciculatum* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CYFA-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 3,245 observations from BLM and Forest Service geodatabases were converted into 1,504 sites in the NSO range (region). Table CYFA-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CYFA-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CYFA-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CYFA-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 7,000 feet on BLM and NFS lands within the currently known range of the species.

TABLE CYFA-1

Number of *Cypripedium fasciculatum* Sites (2013)

Location*	Number of Sites
Regional Area	1,504
Local Area	34
Analysis Area (Project Area)	2 (2)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, and project areas are provided in Chapter 1.

TABLE CYFA -2

Distribution of *Cypripedium fasciculatum* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	799	32	1
Forest Service	673	3	1
NPS	-	-	-
Fish and Wildlife Service	1	-	-
Other (Private, State, etc.)	233	11	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

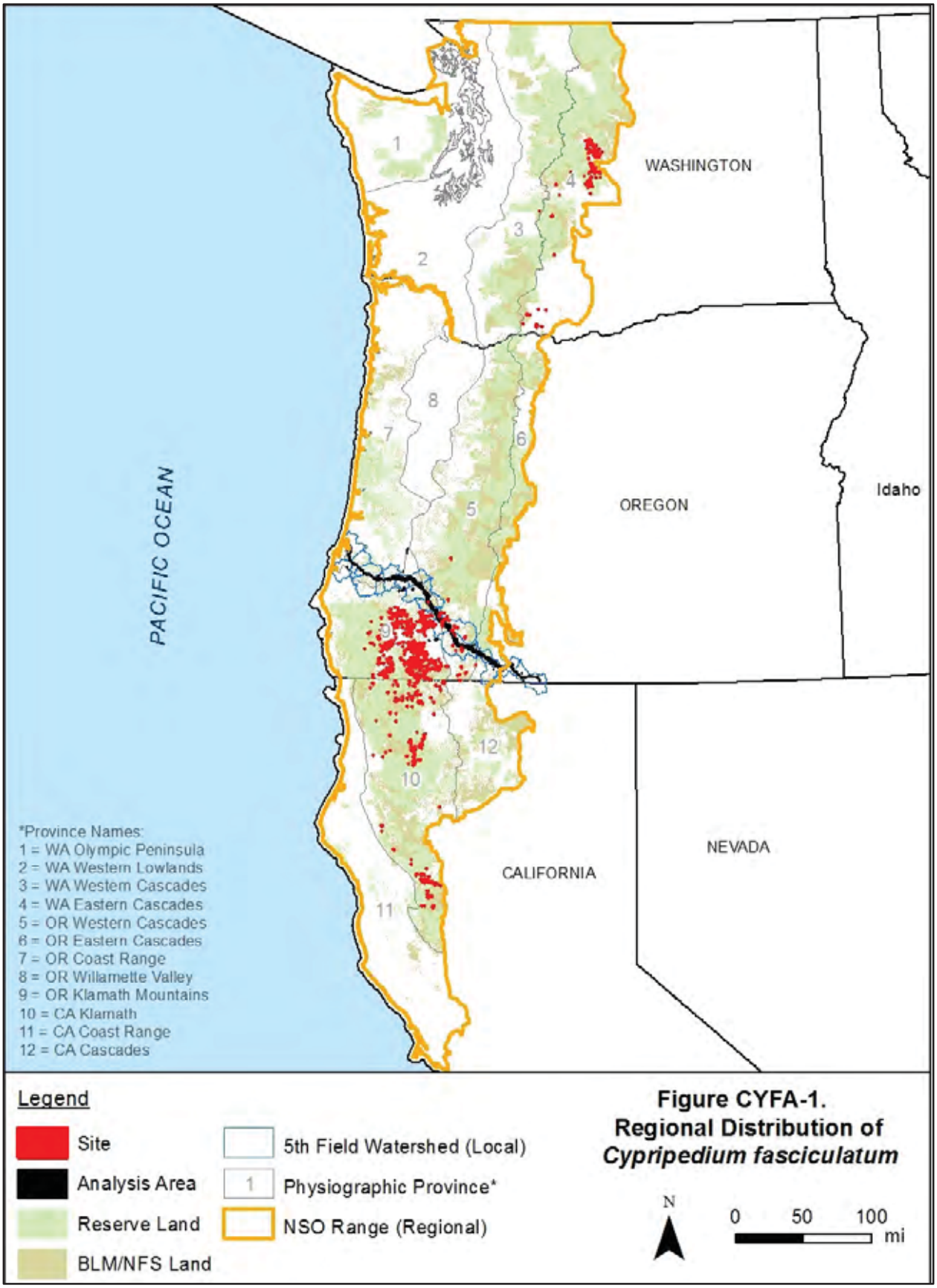


Figure CYFA-1.
Regional Distribution of
Cypripedium fasciculatum

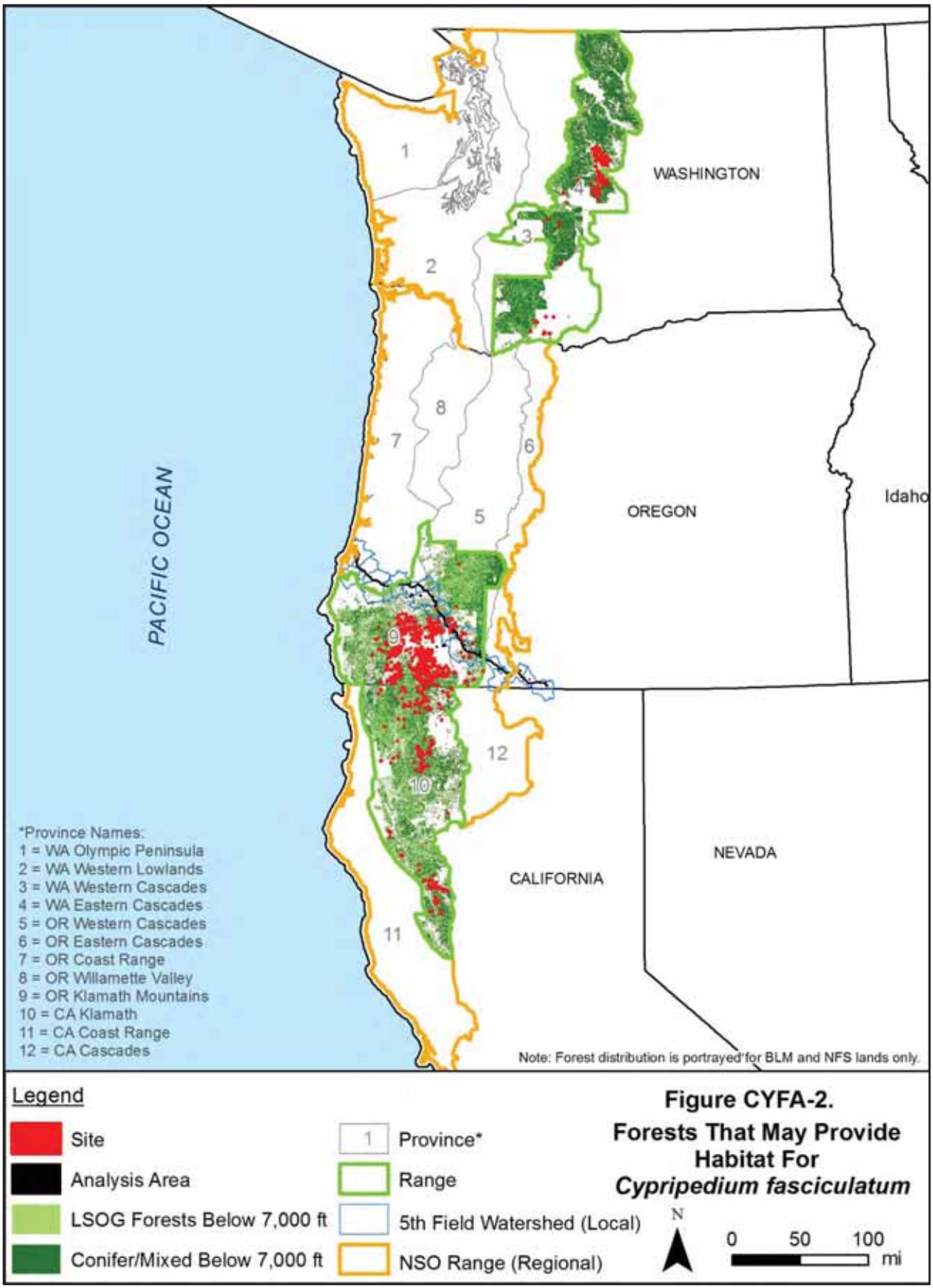


Figure CYFA-2.
Forests That May Provide Habitat For *Cypripedium fasciculatum*

TABLE CYFA -3

Distribution of *Cypripedium fasciculatum* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	467	-	-
Adaptive Management Reserves (AMR)	3	-	-
Administratively Withdrawn (AW)	33	-	-
Congressionally Reserved (CR)	**10**	**-**	**-**
Late Successional Reserve (LSR)	**220**	**1**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**81**	**4**	**-**
Managed Late Successional Area (MLSA)	16	-	-
Not Designated (ND)	1	-	-
Other (Matrix, Riparian Reserve, Other)	714	32	1
Riparian Reserve**	**2**	**2**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

C. fasciculatum has a somewhat wide distribution across five physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Cascades West and Klamath Mountains), and California (Klamath) (see Figure CYFA-1). Sites are found in three general groups in the Klamath Mountains in Oregon and California, southern Klamath Mountains in California, and eastern Cascade Range in Washington. Within each group, sites are abundant and clustered, with some scattered sites around the main clusters. The species is extremely abundant in the Klamath Mountains and is less abundant in the Cascade Range. Many opportunities for dispersal between sites within each group appear to exist based on the proximity of the sites to one another and the extent of coniferous and mixed hardwood-coniferous forests. The species appears to be well distributed in the Klamath Mountains in Oregon and California and eastern Cascade Range in Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Of the 1,504 sites in the region, 233 sites are at least partially located on private lands; one site is located on U.S. Fish and Wildlife Service land; and 1,465 sites are at least partially on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include 797 sites in the Medford District. Sites managed by the National Forests that encompass the project area include 229 sites on the Rogue River National Forest and three sites on the Umpqua National Forest. The remaining 443 sites on BLM and NFS lands are in the Redding District and on the Gifford Pinchot, Klamath, Mendocino, Mt. Baker-Snoqualmie, Shasta-Trinity, Siskiyou, Six Rivers, and Wenatchee National Forests.

Across the NSO range, 313 sites are located on reserve lands managed by BLM or the Forest Service, including 220 in LSRs, 81 in Known Owl Activity Centers, 10 in Congressionally Reserved areas, and two in Riparian Reserves. This represents 21 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

C. fasciculatum is more commonly found in LSOG forests based on available data (1,204 of 1,504 total sites are in LSOG), but it is also relatively common in non-LSOG forests and has been found in a variety of forest types. Based on current site locations, the species is found primarily in coniferous and mixed forests below about 6,600 feet msl and has been documented in part of the NSO range. Coniferous and mixed hardwood-coniferous forests below 7,000 feet msl, including the LSOG component of these forests, in the Klamath Mountains and parts of the Cascade Range in Oregon and Washington could provide habitat for *C. fasciculatum* and support additional sites. These forests encompass an estimated 10.3 million acres on BLM and NFS lands in the species' range, including an estimated 5.8 million acres in reserve land allocations (56 percent of the forests; Table CYFA-4). Of this acreage, an estimated 3.0 million acres are LSOG (see Figure CYFA-2), including 1.8 million acres in reserve land allocations (60 percent of the forests). These forests are widespread across the species' range.

TABLE CYFA-4

Extent of Forests that Could Provide Habitat for *Cypripedium fasciculatum* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 7,000 feet		LSOG Forests below 7,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	10,294,900	5,800,854	2,999,450	1,803,450
Local Area	394,210	119,960	122,910	45,760
Project Area	1,050	410	230	130

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. fasciculatum* is distributed across five 5th field watersheds that overlap the project area (see Table CYFA-5 and Figure CYFA-3). Sites in four of the watersheds are clustered and close to one another. Scattered sites are located in the Upper Cow Creek and Big Butte Creek watersheds. All of the sites appear to have some level of connectivity between them and others in the region because the sites are part of a large group of sites in the Klamath Mountains.

All of the 34 sites in the local area are at least partially on BLM and NFS lands, and 11 sites are at least partially on private lands. The sites are located on lands designated as Other (Matrix), LSR, and Riparian Reserve. Of the 34 sites in the local area, seven sites are on reserve lands, representing 21 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table CYFA-5 and on Figure CYFA-3.

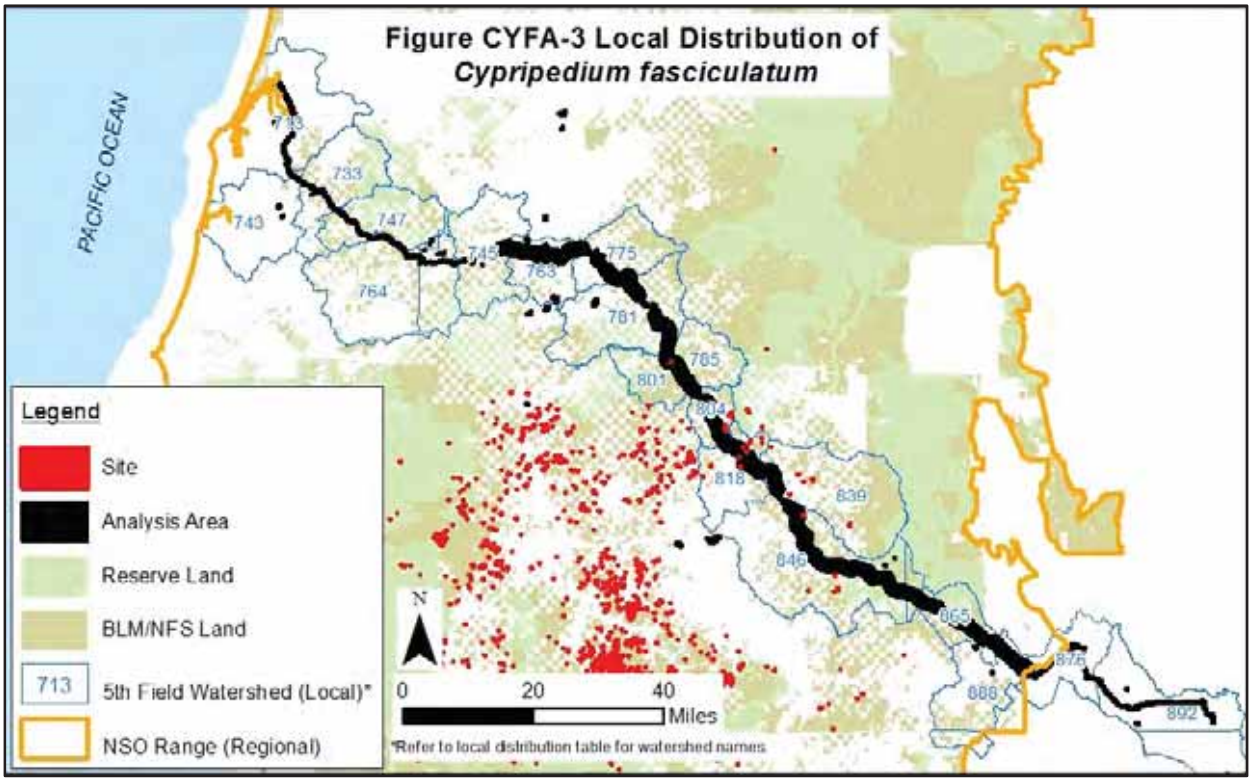
Coniferous and mixed hardwood-coniferous forests below 7,000 feet msl encompass approximately 394,210 acres on BLM and NFS lands in the local area, with 119,960 acres in reserve land allocations (30 percent of the forests). Of this acreage, an estimated 122,910 acres are LSOG, including 45,760 acres in reserve land allocations (37 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the distribution and abundance of sites in the local and regional areas and extent of forests that may provide suitable habitat (see Figures CYFA-2 and CYFA-3).

TABLE CYFA-5

Distribution of *Cypripedium fasciculatum* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	8	2
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	7	2
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	12	2
South Umpqua River (781)	-	-
Spencer Creek (865)	-	-
Trail Creek (804)	5	-
Upper Cow Creek (801)	2	1

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain two sites of *C. fasciculatum*, both of which are at least partially on BLM or NFS lands. One site is on BLM-managed lands, and one site is partially on NFS lands and private lands. The analysis area sites are in two watersheds: Rogue River-Shady Cove watershed in the Medford District and Upper Cow Creek watershed on the Umpqua National Forest. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

The site on BLM land is located on land designated as Other (Matrix) and is not within a regionally mapped reserve. The site on NFS land is located in an LSR.

Surveys for the PCGP Project did not result in any observations of the species (Siskiyou BioSurvey LLC 2008, 2011a). Two recorded observations from 1994 and 2003 in agency databases comprise the two sites in the analysis area. Within the project area, one site is at MP 104.1, and the other site is along a road west of MP 128.

Project Impacts

Analysis

The PCGP Project would affect two sites out of the 1,465 sites on BLM and NFS lands in the region, representing less than 1 percent of the sites (or two out of 1,504 total sites on all lands in the NSO range). Table CYFA-6 presents an overview of the features of the PCGP Project that would affect the *C. fasciculatum* sites. The construction corridor, associated work areas, and road improvements would affect approximately 0.5 acre within two sites (about 9 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. fasciculatum* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 0.3 acre of vegetation and soils within one site and could result in the removal of *C. fasciculatum* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.1 acre within the same site. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and disturbance to soil could negatively affect *C. fasciculatum* in adjacent areas by removing its habitat and potentially dormant individuals, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Road improvements and establishment would disturb approximately 0.1 acre within two sites and could remove habitat and extant populations or individuals of *C. fasciculatum*.

TABLE CYFA-6

Impacts to *Cypripedium fasciculatum* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.3 ac
Temporary Extra Work Area (TEWA)	1	0.1 ac
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	2	0.1 ac
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 810 acres of coniferous and mixed hardwood-coniferous forests below 7,000 feet msl, including 160 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *C. fasciculatum*. Within this impact area, about 520 acres (about 64 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 160 acres of coniferous and mixed forests below 7,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests below 7,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the two sites as a result of the PCGP Project, 32 sites of *C. fasciculatum* would remain on BLM and NFS lands in the local area, including six in reserves, and 1,463 sites, including 312 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 312 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 21 percent of the remaining *C. fasciculatum* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. fasciculatum* is a Category C (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category C species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *C. fasciculatum* has a somewhat wide distribution across five physiographic provinces and three states in the region and a moderate-high number of overall sites (1,465 on BLM and NFS lands). The species appears to be well distributed in the Klamath Mountains and eastern Cascade Range in Washington. The currently known number of sites on BLM and NFS lands is an increase of about 1,003 sites on BLM and NFS lands since 2007.
    - An estimated 21 percent of the sites (313 sites) are in reserves.

- Coniferous and mixed hardwood-coniferous forests below 7,000 feet msl (general habitat for the species) are widespread across the species' range and encompass approximately 10.3 million acres on BLM and NFS lands with an estimated 56 percent in reserves. A subcomponent of these forests likely provides habitat for *C. fasciculatum*.
- The PCGP Project would affect two of 1,465 BLM- and Forest Service-managed sites of *C. fasciculatum*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the two sites, a moderate-high number of sites (1,463 sites) would continue to be documented on BLM and NFS lands in the region. Many sites (32 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Klamath Mountains. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in an LSR, but would not change the percentage of sites in reserves. Of the remaining sites, 300 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 10 are in Congressionally Reserved areas where management activities that may adversely affect *C. fasciculatum* are unlikely. At least two other sites are in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 160 acres of coniferous and mixed hardwood-coniferous forests below 7,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 5.8 million acres (56 percent) of coniferous and mixed forests and 1.8 million acres (60 percent) of LSOG forests below 7,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *C. fasciculatum*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category C species for which pre-disturbance surveys are practical and have been conducted in many areas; thus, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during surveys.

5.1.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. fasciculatum* at two sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 1,463 sites would remain on BLM and NFS lands across the region, and 32 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. fasciculatum* at two sites, these sites are part of the large group of sites in the Klamath Mountains in Oregon and California where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. fasciculatum* would persist in the region without considering the two sites as part of the population.

- The PCGP Project would remove approximately 810 acres of coniferous and mixed forests and 160 acres of LSOG forests below 7,000 feet msl (a negligible amount of the forests). An estimated 64 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 5.8 million acres (56 percent) of coniferous and mixed forests and 1.8 million acres (60 percent) of LSOG coniferous and mixed forests below 7,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2007.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is somewhat widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. fasciculatum* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the two *C. fasciculatum* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *C. fasciculatum* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

5.2 CYPRIPEDIUM MONTANUM

Cypripedium montanum is a perennial herb in the Orchidaceae family and is commonly known as mountain lady's-slipper or moccasin slipper.

5.2.1 Regulatory Status and Ranking

The 2001 ROD identifies *C. montanum* as a Category C (uncommon) species across the NSO range. The ORBIC evaluated *C. montanum* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be not rare and apparently secure globally, but with cause for long-term concern (G4). In Oregon, it was between rare, uncommon, or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern (S3S4). The species is on the ORBIC List 4. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

5.2.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation

in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

C. montanum is a long-lived perennial orchid that can take multiple years to flower (Vance 2007). It develops a symbiotic relationship with specific mycorrhizal fungi for seed germination and to obtain nutrients (ORBIC 2004). It requires an insect vector for pollination, typically small generalist bee species (Vance 2007). Seed dispersal is typically over short distances via light air currents and over longer distances by wind, water, or animals. It may take several years of mycorrhizal-supported growth before seedlings accumulate enough stored starch to develop a stem and leaves above ground. The species can remain dormant below ground for multiple years while receiving moisture and nutrients from mycorrhizal fungi, returning as a vegetative shoot to reproduce when environmental conditions are favorable and sufficient carbohydrates have been stored.

Range

C. montanum is found in mountainous areas of western North America, from southeastern Alaska to California and eastward to Saskatchewan, Montana, Wyoming, Idaho, Utah, and Colorado (ORBIC 2004, Vance 2007). It occurs in the Pacific Northwest from Alaska to California. The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *C. montanum* from more than 400 element occurrences in western North America in 2004. In the Pacific Northwest, Oregon had the highest number of element occurrences with more than 300 (ORBIC 2004). California had an estimated 60 occurrences, and Washington had an estimated 50 occurrences. Based on 2004 information, the species had experienced a decline across its range and was considered to be highly vulnerable because of its mycorrhizal fungal associate, long dormancy, and dependency on pollination (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 868 sites on federal lands and 876 total sites on all lands in the NSO range.

For the PCGP Project, surveys for special-status plants were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted *C. montanum*, but resulted in no observations of the species. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

In the Pacific Northwest, *C. montanum* is found in diverse habitat types across varying moisture regimes, substrates, and vegetation communities (Seevers and Lang 1998), from full sun on dry eastern-facing mountain slopes to dense shade in moist valley woodlands (ORBIC 2004). The species has been found at elevations ranging from 1,500–6,500 feet msl, primarily on northern facing slopes of 25 to 30 percent (Seevers and Lang 1998). It can tolerate drier conditions than most other members of the *Cypripedium* genus and appears to be most often associated with stands of conifer trees, particularly Douglas-fir, with 60 to 80 percent canopy cover. Suitable habitat ranges from coniferous to mixed hardwood-coniferous forests. In the western Cascade Range, the plant is most often found in Douglas-fir forests with madrone, sugar pine, or ponderosa pine and to a lesser degree with grand fir, incense cedar, Pacific yew (*Taxus brevifolia*), and California black oak (*Quercus kelloggii*) (Seevers and Lang 1998). *C. montanum* may prefer specific microclimate conditions of LSOG forests, but it may not be as restricted to these conditions.

Threats

Primary threats to *C. montanum* are actions that physically destroy or alter habitat and create changes in forest structure that alter interior stand-level habitat conditions and microclimates (Seevers and Lang 1998). These actions include timber harvesting, road building, grazing, recreational activities, and other human-caused disturbances. High intensity fires also threaten many populations, especially in areas that have been subject to decades of fire suppression (ORBIC 2004). Localized threats include collection of *C. montanum* by plant collectors and trampling disturbance by mushroom collectors and medicinal plant collectors, particularly in or near campgrounds (ORBIC 2004). In 1995, lady-slipper orchids of the *Cypripedium* genus, including *C. montanum*, were rated by the World Wildlife Fund to be among the top 10 most sought plants or animals threatened by illegal trade (Seevers and Lang 1998).

Management Recommendations

As a Category C S&M species, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). Management recommendations for *C. montanum* were developed in 1998 (Seevers and Lang 1998). The guidance includes:

- Maintain or restore habitat conditions in areas with populations of *C. montanum*.
- Maintain canopy closure at 60 percent or greater.
- Maintain down logs, snags, and duff layer within the habitat area for soil moisture and mycorrhizal associates. Provide for future recruitment of coarse woody debris.
- Avoid activities that alter soil, duff, down wood, and the mycorrhizal community in the habitat area.
- Maintain/secure known sites from prescribed burns.
- Manage population sites to include an area large enough to maintain current habitat and associated microclimate, primarily temperature and moisture. The size should be determined by a field visit and should consider factors such as canopy cover, slope,

aspect, topographic position, vegetation structure (growth form, stratification, and coverage), and species composition.

- Given the long life-span of individuals, manage *C. montanum* and associated communities to be responsive to short-term (wildfire, soil disturbance) and long-term (ecological succession) environmental changes and maintain the species evolutionary potential.
- Manage for biological (mycorrhizae and pollinators) and ecological (soil temperature, moisture, and organic matter) requirements at each life stage. Each life stage may require specific mitigation. Ensure that indiscriminate insecticide spraying does not affect the populations of bees or other insects this species depends on for pollination.

5.2.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. montanum* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table CYMO-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 1,635 observations from BLM and Forest Service geodatabases were converted into 756 sites in the NSO range (region). Table CYMO-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table CYMO-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure CYMO-1 displays the regional distribution of the species across BLM and NFS lands, and Figure CYMO-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 7,000 feet on BLM and NFS lands within the currently known range of the species.

TABLE CYMO-1

Number of *Cypripedium montanum* Sites (2013)

Location*	Number of Sites
Regional Area	756
Local Area	55
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, and project areas are provided in Chapter 1.

TABLE CYMO-2

Distribution of *Cypripedium montanum* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	377	49	1
Forest Service	356	4	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	130	12	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE CYMO-3

Distribution of *Cypripedium montanum* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	134	-	-
Adaptive Management Reserves (AMR)	1	-	-
Administratively Withdrawn (AW)	36	1	-
Congressionally Reserved (CR)	**1**	**-**	**-**
Late Successional Reserve (LSR)	**133**	**-**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**32**	**6**	**-**
Managed Late Successional Area (MLSA)	21	1	-
Not Designated (ND)	3	-	-
Other (Matrix, Riparian Reserve, Other)	412	48	1
Riparian Reserve**	**3**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

C. montanum is widely distributed across nine physiographic provinces in Washington (Eastern Cascades), Oregon (Coast Range, Cascades West and East, Klamath Mountains, and Willamette Valley), and California (Klamath and Cascades) (see Figure CYMO-1). Sites are found in two general groups in the Klamath Mountains in Oregon and California and eastern Cascade Range in Washington, with several scattered sites in other parts of the region. Within each group, sites are abundant and clustered, with some scattered sites around the main clusters. The species is extremely abundant in the Klamath Mountains and is less abundant in the Cascade Range. Many opportunities for dispersal between sites within each group appear to exist based on the proximity of the sites to one another and the extent of coniferous and mixed hardwood-coniferous forests. The species appears to be well distributed in the Klamath Mountains and eastern Cascade Range in Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

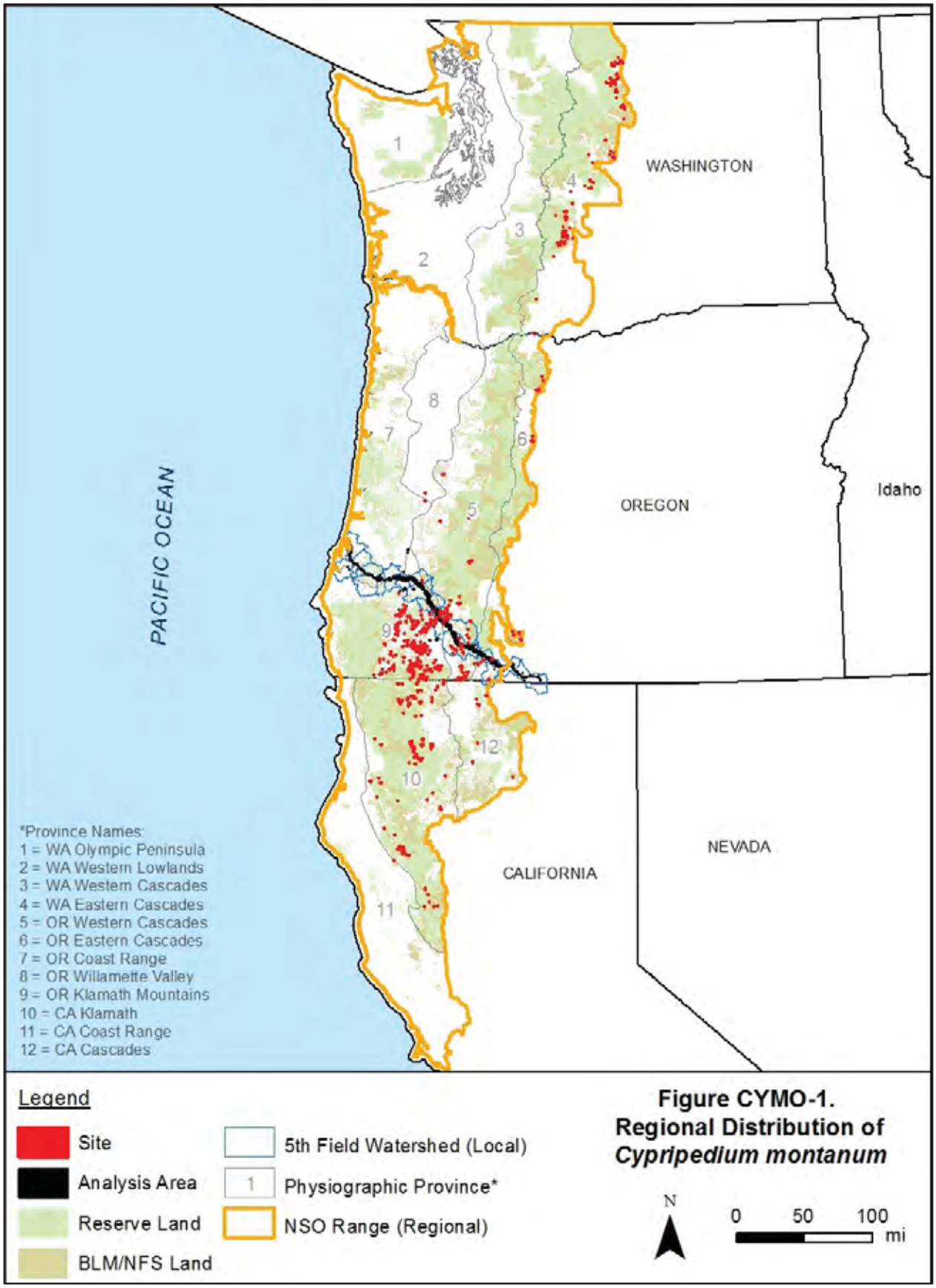


Figure CYMO-1. Regional Distribution of *Cypripedium montanum*

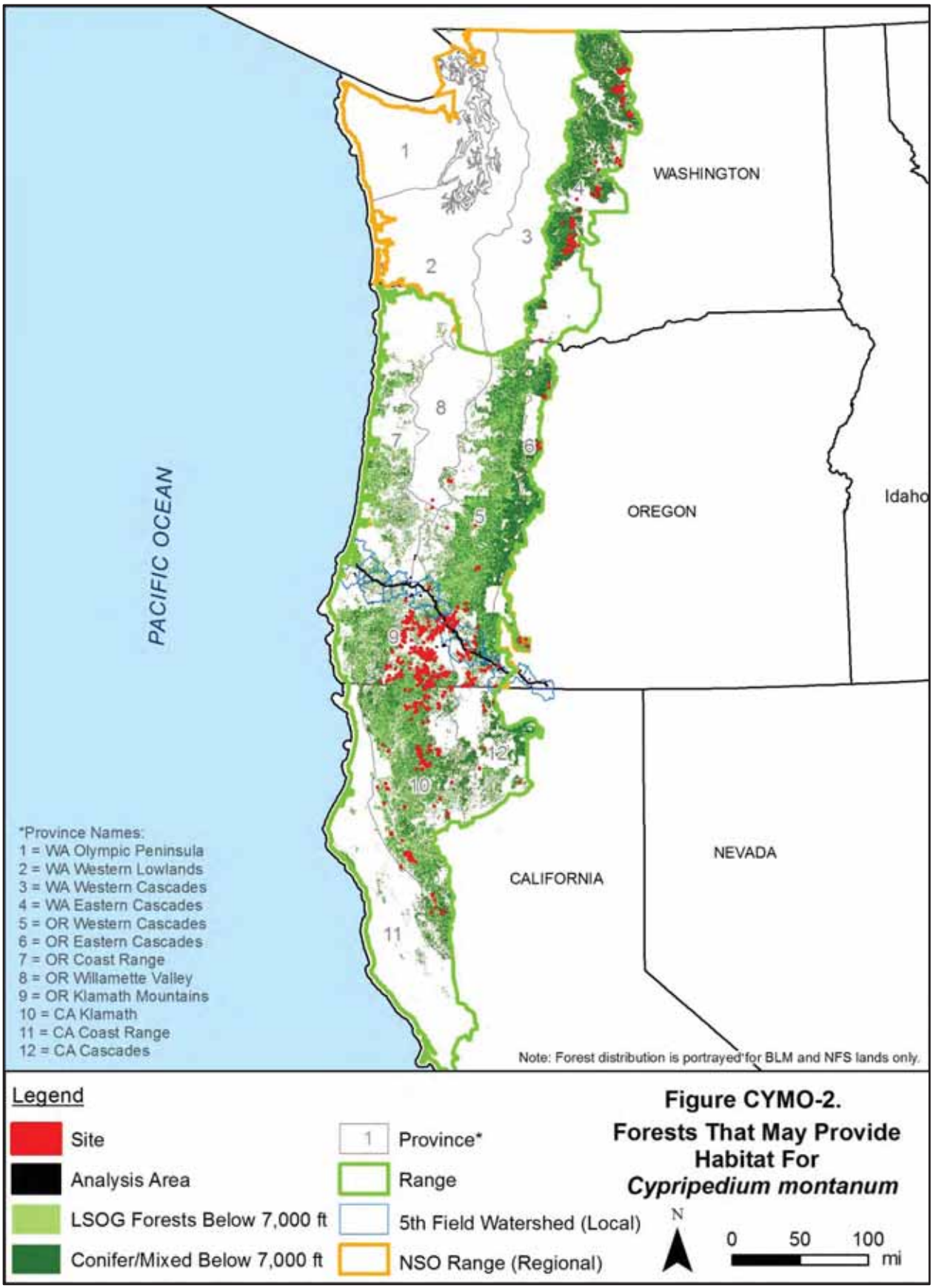


Figure CYMO-2.
Forests That May Provide Habitat For *Cypripedium montanum*

Of the 756 sites in the region, 130 sites are at least partially located on private lands, and 731 sites are at least partially on BLM and NFS lands. Sites managed by the BLM Districts that encompass the project area include five sites in the Klamath Falls Resource Area of the Lakeview District, three sites in the Roseburg District, and 365 sites in the Medford District (one site is partially on the Rogue River National Forest and one site is partially on the Umpqua National Forest). Sites managed by the National Forests that encompass the project area include 11 sites on the Winema National Forest, 73 sites on the Rogue River National Forest (one site is partially in the Medford District), and six sites on the Umpqua National Forest (one site is partially in the Medford District). The remaining 268 sites on BLM and NFS lands are in the Redding District and on the Deschutes, Gifford Pinchot, Klamath, Lassen, Mendocino, Mt. Hood, Okanogan, Shasta-Trinity, Siskiyou, Six Rivers, Wenatchee, and Willamette National Forests.

Across the NSO range, 168 sites are located on reserve lands managed by BLM and the Forest Service, including 133 at least partially in LSRs, 32 at least partially in Known Owl Activity Centers, one in a Congressionally Reserved area, and three in Riparian Reserves. This represents 23 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

C. montanum is more commonly found in LSOG forests based on available data (508 of 756 total sites are in LSOG), but it is also relatively common in non-LSOG forests and has been found in a variety of forest types. Based on current site locations, the species is found primarily in coniferous and mixed forests below about 6,700 feet msl and has been documented in part of the NSO range. Coniferous and mixed hardwood-coniferous forests below 7,000 feet msl, including the LSOG component of these forests, in the Klamath Mountains, western Cascade Range in Oregon, and Cascade Range in Washington could provide habitat for *C. montanum* and support additional sites. These forests encompass an estimated 15.8 million acres on BLM and NFS lands in the species' range, including an estimated 8.4 million acres in reserve land allocations (53 percent of the forests; Table CYMO-4). Of this acreage, an estimated 4.9 million acres are LSOG (see Figure CYMO-2), including 2.9 million acres in reserve land allocations (58 percent of the forests). These forests are widespread across the species' range.

TABLE CYMO-4

Extent of Forests that Could Provide Habitat for *Cypripedium montanum* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 7,000 feet		LSOG Forests below 7,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	15,821,420	8,405,940	4,932,140	2,871,630
Local Area	578,930	199,250	184,450	81,260
Project Area	1, 350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. montanum* is distributed across seven 5th field watersheds that overlap the project area (see Table CYMO-5 and Figure CYMO-3). The sites are scattered across the watersheds, with a few small clusters of sites. All of the sites appear to have some level of connectivity between them and others in the regional area because the sites are part of a large group of sites in the Klamath Mountains.

Of the 55 sites in the local area, 52 sites are at least partially on BLM and NFS lands, and 12 are at least partially on private lands. The sites on BLM and NFS lands are primarily located on lands designated as Other (Matrix). Of the 52 sites on BLM and NFS lands in the local area, six sites are on reserve lands, representing 12 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table CYMO-5 and on Figure CYMO-3. These sites are in the Little Butte Creek, Rogue River-Shady Cove, and Trail Creek watersheds.

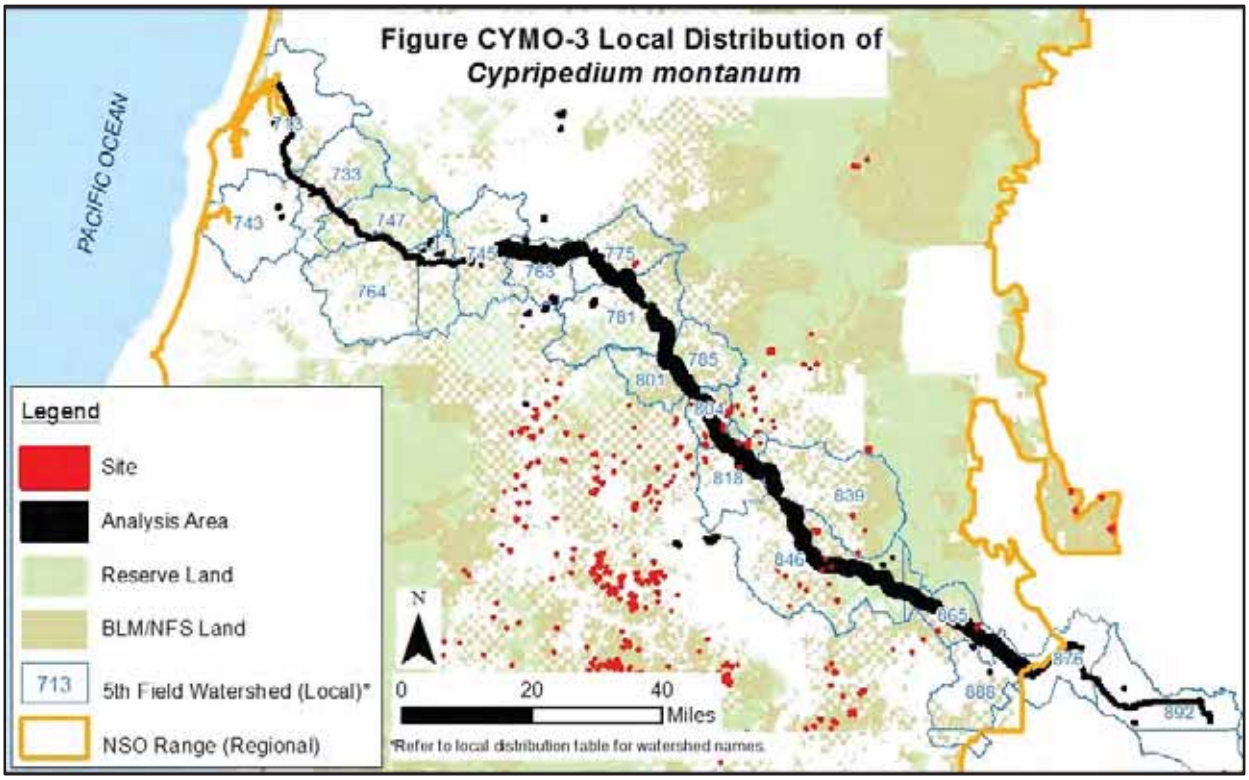
Coniferous and mixed hardwood-coniferous forests below 7,000 feet msl encompass approximately 578,930 acres on BLM and NFS lands in the local area, with 199,250 acres in reserve land allocations (34 percent of the forests). Of this acreage, an estimated 184,450 acres are LSOG, including 81,260 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the distribution and abundance of sites in the local and regional areas and extent of forests that may provide suitable habitat (see Figures CYMO-2 and CYMO-3).

TABLE CYMO-5

Distribution of *Cypripedium montanum* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	4	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	1	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	17	4
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	3	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	8	1
South Umpqua River (781)	-	-
Spencer Creek (865)	3	-
Trail Creek (804)	19	1
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *C. montanum*, which is in the Rogue River-Shady Cove watershed on BLM-managed land. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above). The site is located on land designated as Other (Matrix) and is not within a regionally mapped reserve.

Surveys for the PCGP Project did not result in any observations of the species (Siskiyou BioSurvey LLC 2008, 2011a). A recorded observation from 1979 in agency databases comprises the site in the analysis area. The site is located west of MP 128.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 731 sites on BLM and NFS lands in the region, representing less than 1 percent of the sites (or one out of 756 total sites on all lands in the NSO range). Table CYMO-6 presents an overview of the features of the PCGP Project that would affect the *C. montanum* site. Road improvements would affect approximately 0.7 acre within the site (about 26 percent of the site), but other PCGP Project features would not directly affect the site. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. montanum* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Road improvements and establishment would disturb approximately 0.7 acre within the site and could remove habitat and extant populations or individuals of *C. montanum*. The road would create an open corridor with low-growing vegetation through the site, which could modify microclimate conditions around populations or individuals adjacent to the road. The removal of forests and disturbance to soil could negatively affect *C. montanum* in adjacent areas by removing its habitat and potentially dormant individuals, potentially affecting site persistence even if the entire site is not disturbed.

TABLE CYMO-6

Impacts to *Cypripedium montanum* on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	-	-
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	1	0.7 ac
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,070 acres of coniferous and mixed hardwood-coniferous forests below 7,000 feet msl, including 220 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *C. montanum*. Within this impact area, about 720 acres (about 67 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 230 acres of coniferous and mixed hardwood-coniferous forests below 7,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests below 7,000 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, 51 sites of *C. montanum* would remain on BLM and NFS lands in the local area, including six in reserves, and 730 sites, including 168 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 168 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 23 percent of the remaining *C. montanum* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the

persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *C. montanum* is a Category C (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category C species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD has increased the availability of information on the species, as noted below:
    - *C. montanum* has a wide distribution across nine physiographic provinces and three states in the region and a moderate-high number of overall sites (731 on BLM and NFS lands). The species appears to be well distributed in the Klamath Mountains and eastern Cascade Range in Washington. The currently known number of sites on BLM and NFS lands is actually a decrease in the number of sites on BLM and NFS lands since 2007, but is still moderate-high.
    - An estimated 23 percent of the sites (168 sites) are in reserves.
- Coniferous and mixed hardwood-coniferous forests below 7,000 feet msl (general habitat for the species) are widespread across the species' range and encompass approximately 15.8 million acres on BLM and NFS lands with an estimated 53 percent in reserves. A subcomponent of these forests likely provides habitat for *C. montanum*.
- The PCGP Project would affect one of 731 BLM- and Forest Service-managed sites of *C. montanum* representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (730) would continue to be documented on BLM and NFS lands in the region with a wide distribution across the NSO range. Many sites (51 sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Klamath Mountains and Cascade Range. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 165 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests and one is in a Congressionally Reserved area where management activities that may adversely affect *C. montanum* are unlikely. At least three other sites are in Riparian Reserves where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 230 acres of coniferous and mixed hardwood-coniferous forests below 7,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 8.4 million acres (53 percent) of coniferous and mixed forests and 2.9 million acres (58 percent) of LSOG forests below 7,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *C. montanum*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category C species for which pre-disturbance surveys are practical and have been conducted in many areas, and additional sites may exist in the range of the NSO that have not been discovered.

5.2.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. montanum* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 730 sites would remain on BLM and NFS lands in the region, and 51 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. montanum* at one site, this site is part of the large group of sites in the Klamath Mountains in Oregon and California where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *C. montanum* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,070 acres of coniferous and mixed forests and 220 acres of LSOG forests below 7,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 8.4 million acres (53 percent) of coniferous and mixed forests and 2.9 million acres (58 percent) of LSOG forests below 7,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *C. montanum* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *C. montanum* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *C. montanum* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

5.3 EUCEPHALUS VIALIS

Eucephalus vialis is a perennial plant in the Asteraceae family and is commonly known as wayside aster.

5.3.1 Regulatory Status and Ranking

The 2001 ROD identifies *E. vialis* as a Category A (rare) species. The ORBIC evaluated *E. vialis* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of the *Rare, Threatened and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be rare, uncommon or threatened, but not

immediately imperiled, within its global range and in Oregon (G3, S3, respectively). The species is on the ORBIC List 1. It is considered a BLM and Forest Service Sensitive species in Oregon and is listed as threatened in Oregon.

5.3.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

E. vialis is a perennial forb that grows from a stout base to a height of about 4 feet (Vance and Larson 2005). Vegetative reproduction is common, and the plant is almost completely self-sterile, relying largely on cross-pollination of individuals for fertilization (Forest Service, BLM, and U.S. Fish and Wildlife Service 2006). Pollinators of *E. vialis* include various bees (*Bombus* sp., *Lasioglossum* sp.), the punctate blister beetle (*Epicanta puncticollis*), and the woodland skipper butterfly (*Ochlodes sylvanoides*) (Vance and Larson 2005). Seeds may be dispersed by wind, but remain close to the parent plant and may be nonviable (Newton et al. 2010). The flowering period is typically from mid-July to September.

Plant vigor and flower production appear to be greater where more light reaches plants (Vance and Larson 2005). The species is dependent on small habitat disturbances that assist reproductive success (ORBIC 2004). Low-intensity fire, historically caused by lightning, benefits the species by maintaining canopy openings that increase light infiltration, but the species can also benefit from human-caused disturbances, such as road building and some methods of timber harvesting (Vance and Larson 2005).

Range

The range of *E. vialis* is restricted to southwestern Oregon and the extreme northwest of California (Vance and Larson 2005). In 1994, its range was known to be highly fragmented, such that interactions between populations on a wide scale were considered to be unlikely to occur (Holthausen et al. 1994). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, Vance and Larson (2005) indicated that the species was likely more widely distributed under historical natural fire regimes, as fire is important to seed establishment. Its range may have been similar to the current range, with populations limited to the Pacific Northwest or western North America. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *E. vialis* from 76 element occurrences in Oregon and one element occurrence in California in 2004. Based on 2004 information, *E. vialis* was considered to be moderately vulnerable, primarily because of its moderate rate of maturity, moderate reproduction frequency, and low fecundity (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 140 sites on federal lands and 174 total sites on all lands in the NSO range.

For the PCGP Project, surveys for special-status plants were conducted between 2007–2010 in the PCGP Project area and within 50–200 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008, 2011a). These surveys targeted *E. vialis* and resulted in one observation of a population of the species in 2008, although the population was not relocated in 2010. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

E. vialis grows in low- to mid-elevation (500–3,150 feet msl) coniferous forests, including openings and near edges, on dry upland sites dominated by Douglas-fir with a hardwood component, such as oaks (*Quercus* sp.), Pacific madrone, and tanoak (*Lithocarpus densiflora*) (ORBIC 2004). It occurs within all stages of forest succession, from recent clear-cuts to mature forest (Forest Service, BLM, and U.S. Fish and Wildlife Service 2006). Preferred habitat consists of open forest conditions with widely spaced conifers, which was historically maintained by fire and are thought to be of particular importance in flowering vigor (Vance and Larson 2005). *E. vialis* may prefer specific microclimates of LSOG forests, but it does not appear to be as restricted to these conditions.

Threats

Threats to *E. vialis* include fire suppression, which leads to increased overstory with decreased sunlight infiltration and increased fuel loads that intensify fires (Forest Service, BLM, and U.S. Fish and Wildlife Service 2006). Although some populations have been known to respond positively in the first 3–6 years after certain timber harvesting practices, the plant can decline after that time period as a result of out-competition by aggressive understory species. Logging often results in detrimental soil disturbance and establishment of aggressive weed species that out-compete *E. vialis* (Vance and Larson 2005). Fragmentation of forests and non-contiguity of *E. vialis* populations also threaten the species through limited genetic exchange and have restricted movement capabilities of pollinators. Other human-related effects include roadside mowing, spraying, roadside dust, and recreational vehicle use; native ungulate browsing can also be destructive.

Management Recommendations

As a Category A S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations for *E. vialis* were developed in 1998 and updated in 2005 (Vance and Larson 2005). The guidance includes:

- Minimize browsing damage where site viability is a concern through the use of enclosures.
- Control recreation use (off highway vehicle, hiking, equestrian trail use) around sites using techniques such as gates, signs, fences, and closures.
- Avoid new wildlife and recreation developments where these actions would negatively affect individual plants or adversely modify habitat.
- Create gap and edge habitat with a 50 to 75 percent canopy cover using techniques such as prescribed fire, tree girdling (or other types of snag creation), tree falling, and selective tree harvest in populations that are in poor condition or have a decreasing trend. Consider factors such as aspect, slope, and adjacent stand structure to determine the size of the treatment area. Where increased light from the above prescriptions has led to high levels of competing under story vegetation, implement control measures such as prescribed fire, which produce conditions that allow for recruitment. Emphasis should be on fine scale disturbances. Avoid direct impact to plants during implementation of management activities. Monitor to evaluate effects of treatments. Avoid timber management activities such as regeneration harvests and salvage logging that would result in the creation of habitat conditions outside of this prescription.
- To facilitate germination, periodically reduce duff layers through the use of such tools as prescribed burning. Monitor to evaluate effects of treatment.
- Control noxious and exotic weeds using integrated noxious weed management techniques that do not negatively affect individual *E. vialis* plants or that will not adversely modify habitat.

5.3.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *E. vialis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table EUVI-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 840 observations from BLM and Forest Service geodatabases were converted into 299 sites in the NSO range (region). Table EUVI-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table EUVI-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure EUVI-1 displays the regional distribution of the species across BLM and NFS lands, and Figure EUVI-2 displays the species' regional

distribution with the extent of coniferous and mixed hardwood-coniferous forests below 6,500 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE EUVI-1

Number of *Eucephalus vialis* Sites (2013)

Location*	Number of Sites
Regional Area	299
Local Area	12
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, and project areas are provided in Chapter 1.

TABLE EUVI-2

Distribution of *Eucephalus vialis* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	232	8	1
Forest Service	57	-	-
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	67	7	1

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE EUVI-3

Distribution of *Eucephalus vialis* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	131	-	-
Adaptive Management Reserves (AMR)	3	-	-
Administratively Withdrawn (AW)	8	-	-
Congressionally Reserved (CR)	**-**	**-**	**-**
Late Successional Reserve (LSR)	**25**	**-**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**20**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	118	8	1
Riparian Reserve**	**1**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

E. vialis is somewhat widely distributed across five physiographic provinces in Oregon (Coast Range, Cascades West and East, Willamette Valley, and Klamath Mountains), and California (Klamath) (see Figure EUVI-1). Sites are found in three general groups, with the majority of sites in the Klamath Mountains. Sites within each group are generally clustered and near other sites, although they are scattered across the southern and central parts of Oregon. The sites in the Klamath Mountains in California represent the southern extent of the species in the NSO range. *E. vialis* appears to be well distributed across its range based on the abundance of sites and proximity of sites to one another.



Figure EUVI-1.
Regional Distribution of *Eucephalus vialis*

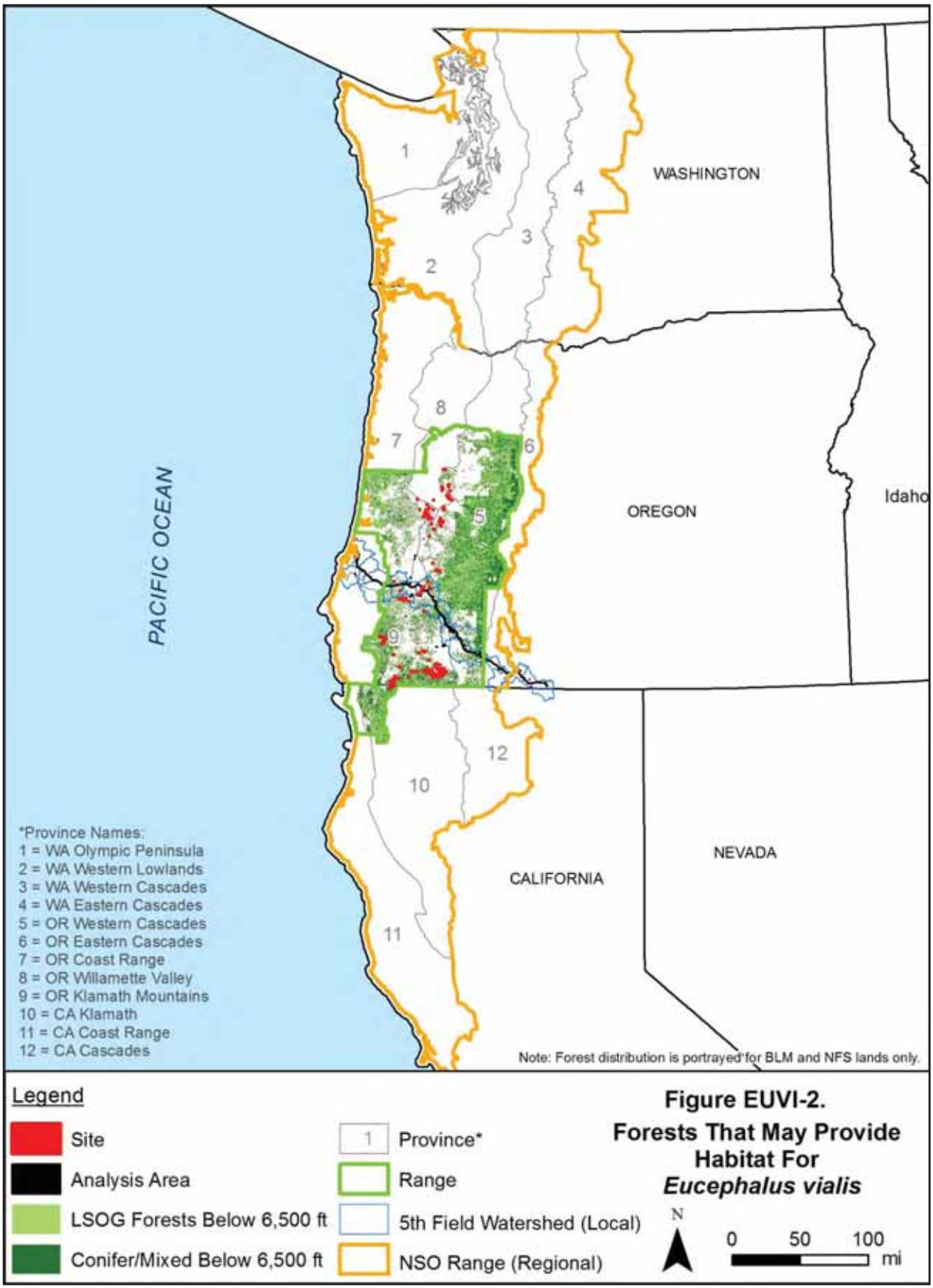


Figure EUVI-2.
Forests That May Provide Habitat For *Eucephalus vialis*

Sixty-seven of 299 sites are at least partially located on private lands, and 283 sites are at least partially on BLM and NFS lands across the region. Sites managed by the BLM Districts that encompass the project area include 149 sites in the Medford District (six sites are partially on the Rogue River National Forest) and 16 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include 57 sites on the Rogue River National Forest (six sites are partially in the Medford District). The remaining 61 sites on BLM and NFS lands are in the Eugene District and on the Siskiyou National Forest.

Across the NSO range, 46 sites are located on reserve lands managed by BLM and the Forest Service, including 25 in LSRs, 20 in Known Owl Activity Centers, and one in a Riparian Reserve. This represents 16 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

E. vialis is more commonly found in LSOG forests based on available data (193 of 299 total sites are in LSOG), but it is also relatively common in non-LSOG forests and has been found in a variety of forest types. Based on current site locations, the species is found primarily in coniferous and mixed forests below about 6,300 feet msl and has been documented in parts of Oregon and California. Coniferous and mixed hardwood-coniferous forests below 6,500 feet msl, including the LSOG component of these forests, in Linn, Douglas, Josephine, Jackson, and Lane counties in Oregon and in Del Norte County in California could provide habitat for *E. vialis* and support additional sites. These forests encompass an estimated 5.3 million acres on BLM and NFS lands in the species' range, including an estimated 2.5 million acres in reserve land allocations (46 percent of the forests; Table EUVI-4). Of this acreage, an estimated 2.2 million acres are LSOG (see Figure EUVI-2), including 1.2 million acres in reserve land allocations (54 percent of the forests). These forests are widespread across the species' range.

TABLE EUVI-4

Extent of Forests that Could Provide Habitat for *Eucephalus vialis* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests below 6,500 feet		LSOG Forests below 6,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	5,329,990	2,475,450	2,181,230	1,170,680
Local Area	401,780	126,740	124,490	46,900
Project Area	1,070	420	230	130

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *E. vialis* is found in three 5th field watersheds that overlap the project area (see Table EUVI-5 and Figure EUVI-3). The sites in the Myrtle Creek watershed are more clustered than sites in the Olalla Creek-Lookingglass Creek and South Umpqua River watersheds. Most of the sites appear to have some level of connectivity between them and others in the region, although the site in the Olalla Creek-Lookingglass Creek watershed appears to be more isolated. The sites likely have multiple opportunities for dispersal, based on the extent of coniferous and mixed hardwood-coniferous forests in the watersheds.

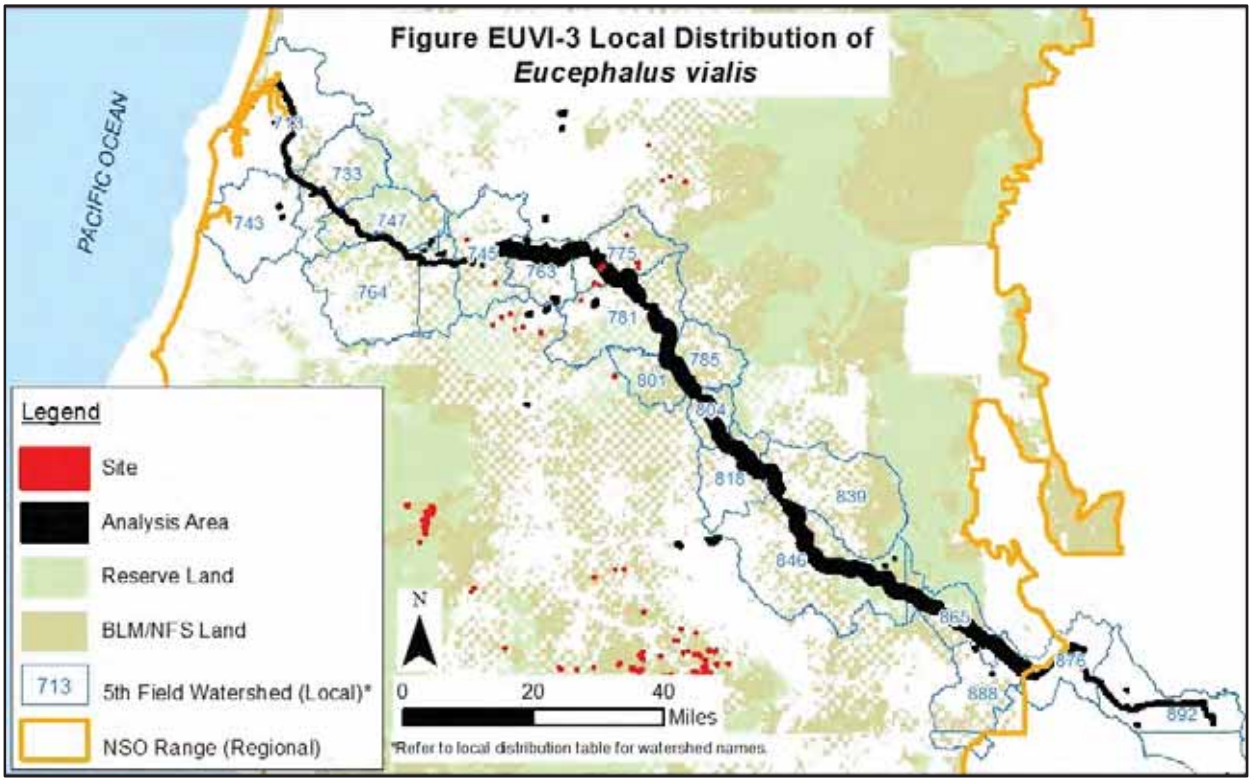
Of the 12 sites in the local area, eight are at least partially on BLM lands, and seven are at least partially on private lands. The sites on BLM lands are located on lands designated as Other (Matrix) and are not within regionally mapped reserves.

TABLE EUVI-4

Distribution of *Eucephalus vialis* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	9	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	2	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	1	-
Spencer Creek (865)	-	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Coniferous and mixed hardwood-coniferous forests encompass approximately 401,780 acres on BLM and NFS lands in the local area, with 126,740 acres in reserve land allocations (32 percent of the forests). Of this acreage, an estimated 124,490 acres are LSOG, including 46,900 acres in reserves (38 percent of the forests). Other sites may also exist in the local area where surveys

have not been completed, based on the number of sites nearby in the region, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures EUVI-2 and EUVI-3).

Analysis/Project Area Distribution

The analysis and project areas contain one site of *E. vialis*, which is partially on BLM-managed land and partially on private land. The analysis area site is in the Myrtle Creek watershed in the Roseburg District. Some sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above). The site is located on land designated as Other (Matrix).

Surveys for the PCGP Project resulted in eight observations of the species in one location (Siskiyou BioSurvey LLC 2008). These recorded observations in combination with other observations in agency databases comprise the site in the analysis area. The site is along a road west of MP 80.3.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 283 sites on BLM and NFS lands in the region, representing less than 1 percent of the sites (or one out of 299 total sites on all lands in the NSO range). Table EUVI-6 presents an overview of the features of the PCGP Project that would affect the *E. vialis* site. Road improvements would affect approximately 1.4 acres within the site (about 19 percent of the site), but other PCGP Project features would not directly affect the site. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *E. vialis* in and near the project area. This discussion presents an overview of the types of impacts that would be expected in the site based on the features of the PCGP Project and that could affect site persistence.

Road improvements and establishment would disturb approximately 1.4 acre within the site and could remove habitat and extant populations or individuals of *E. vialis*. The road would create an open corridor with low-growing vegetation through the site, which could modify microclimate conditions around populations or individuals adjacent to the road. The removal of forests and disturbance to soil could negatively affect *E. vialis* in adjacent areas by removing its habitat and potentially dormant individuals, potentially affecting site persistence even if the entire site is not disturbed, although the plant seems to prefer open forests and may benefit from some edge effects within the site.

TABLE EUVI-6

Impacts to *Eucephalus vialis* on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	-	-
Temporary Extra Work Area (TEWA)	-	-
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	1	1.4
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 830 acres of coniferous and mixed hardwood-coniferous forests below 6,500 feet msl, including 160 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *E. vialis*. Within this impact area, about 540 acres (about 65 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 170 acres of coniferous and mixed hardwood-coniferous forests below 6,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests below 6,500 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, seven sites of *E. vialis* would remain on BLM lands in the local area, with none in reserves, and 282 sites, including 46 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 46 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 16 percent of the remaining *E. vialis* on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *E. vialis* is a Category A (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category A species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *E. vialis* has a somewhat wide distribution across five physiographic provinces in Oregon and California and a moderate-high number of overall sites (283 on BLM and NFS lands). The species appears to be well distributed in its range. The currently known number of sites on BLM and NFS lands is an increase of about 143 sites on BLM and NFS lands since 2007.
    - An estimated 16 percent of the sites (46 sites) are in reserves.
- Coniferous and mixed hardwood-coniferous forests below 6,500 feet msl (general habitat for the species) are widespread across the species' range and encompass approximately

5.3 million acres on BLM and NFS lands with an estimated 46 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. A subcomponent of these forests likely provides habitat for *E. vialis*.

- The PCGP Project would affect one of 283 BLM- and Forest Service-managed sites of *E. vialis*, representing less than 1 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the single site, a moderate-high number of sites (282) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Oregon and California. Some sites (seven sites) would remain in the local vicinity of the analysis area with many other sites in the nearby Klamath Mountains. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 45 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and one site is in a Riparian Reserve where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 170 acres of coniferous and mixed hardwood-coniferous forests below 6,500 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 2.5 million acres (46 percent) of coniferous and mixed forests and 1.2 million acres (54 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *E. vialis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category A species for which pre-disturbance surveys are practical and have been conducted in many areas; thus, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during surveys, including surveys associated with the PCGP Project.

5.3.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *E. vialis* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 282 sites would remain on BLM and NFS lands across the region, and seven sites would remain on BLM lands in the local area. Although the PCGP Project would affect site persistence of *E. vialis* at one site, this site is part of a group of sites in the northern Klamath Mountains and southern Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *E. vialis* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 830 acres of coniferous and mixed forests and 160 acres of LSOG forests below 6,500 feet msl (a negligible amount of the

forests). An estimated 65 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 2.5 million acres (46 percent) of coniferous and mixed forests and 1.2 million acres (54 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is somewhat widely distributed.

The PCGP Project would not be able to avoid impacts to the *E. vialis* site in the analysis area, although some individuals within the site may persist following project implementation. Based on the above conclusions, avoidance of the *E. vialis* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *E. vialis* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term, as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

This page intentionally left blank.

6.0 MOLLUSK SPECIES

6.1 DEROCERAS HESPERIUM

Deroceras hesperium is a land slug in the Limacidae family and is commonly known as evening fieldslug. A recent study on the molecular characteristics of the species and a similar species also found in the Pacific Northwest, *D. laeve*, revealed that *D. hesperium* is likely a variant of *D. laeve* and not a distinct species (Roth, et al. 2013). Identification of *D. hesperium* in the NSO range is being reviewed, but this discussion presents information on *D. hesperium* as it has been known by that name in the NSO range because it is still on the S&M list, pending an annual species review.

6.1.1 Regulatory Status and Ranking

The 2001 ROD identifies *D. hesperium* as a Category B (rare) species. The ORBIC evaluated *D. hesperium* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010), but the species was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2010, the species was considered to be imperiled because of rarity or other factors that make it vulnerable to extinction within its global range (G2) and was critically imperiled because of its extreme rarity or because it is somehow especially vulnerable to extinction or extirpation in Oregon (S1). This species is on the ORBIC List 1. It is considered a BLM and Forest Service Sensitive Species in Oregon.

6.1.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

D. hesperium is a hermaphroditic (has both male and female organs) terrestrial gastropod slug (Duncan 2005a). It is able to self-fertilize or cross-fertilize and lays eggs in porous soils and forest duff. The slug requires high moisture environments throughout its life cycle. Food likely consists of bacteria, fungi, yeasts, and other microscopic organisms (microscopic periphyton) scraped from the moist surfaces of green and decaying vegetation, rocks, and wood. *D. hesperium* is sometimes found in association with Crater Lake tightcoil (*Pristiloma arcticum crateris*).

Range

D. hesperium is endemic to the Pacific Northwest. In Oregon, it has been found in scattered locations from the Pacific coast to the both sides of the Cascade Range (Duncan 2005a). It has also been found across western Washington to Vancouver Island, British Columbia. The

currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, Holthausen et al. (1994) indicated that the species was thought to historically have been widely distributed on the west side of the Cascade Range. Habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *D. hesperium* from an estimated seven element occurrences across the species' range in 2004. This species was only found in two areas in the NSO range: northwestern Oregon and northern Olympic Peninsula in Washington (ORBIC 2004). In 2004, *D. hesperium* was considered to be one of the least known slugs in western North America, and population trends of the species appeared to be substantially declining (ORBIC 2004). Duncan (2005a) reported 19 known sites in agency databases in 2005; these known sites were in the Klamath Range and other parts of Oregon outside the NSO range. The species was not found during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 14 sites on federal lands and 20 total sites on all lands in the NSO range.

For the PCGP Project, surveys for Category A and B S&M mollusks were conducted in 2007 in the PCGP Project area and within 100 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008). These surveys targeted *D. hesperium* and resulted in one observation of the species. *D. hesperium* has not been found in high numbers during past survey efforts, although limited mollusk surveys have been conducted across the NSO range, and more survey effort may locate additional populations of the species. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

Relatively few details are known about the specific habitat requirements of *D. hesperium* (Duncan 2005a). The species is known to occur in perennially wet meadows in forest and riparian habitats. It has been found from coastal meadows just above sea level to higher elevations near the crest of the Cascade Range. Most observations have been documented in high moisture locations in or near herbaceous vegetation, under litter, or around rock substrate. Porous soils, low-growing vegetation, rocks, and decomposing vegetation on the forest floor provide cover for hiding and escaping from predators, as well as protection against extreme temperature and humidity. Suitable habitat may be limited to within 100 feet of perennial water sources (i.e., within Riparian Reserves) except in areas where coastal fog provides continuous moisture. *D. hesperium* is not likely restricted to specific microclimate conditions of LSOG forests as much as it is restricted to high moisture habitats.

Threats

Primary threats to *D. hesperium* are those that result in degradation or destruction of occupied habitat through activities that compact the soil, reduce litter cover, alter available moisture by changing shade and water inputs, or impact food sources (Duncan 2005a). These activities

include removal of standing trees and woody debris on the forest floor for firewood, spring water diversions, livestock grazing, camping, heavy equipment operations, and fire. Development of wet meadow habitat for agriculture, urbanization, and forest management presents a threat to the species (Duncan 2005a). The slug's habitat is also susceptible to ingrowth of tree and shrub species in historically herbaceous habitats. Winter recreational activities, such as snowmobiling and skiing, can negatively alter microsite conditions by compacting snow and causing it to lose its insulative properties, possible resulting in freezing of hibernation habitat.

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *D. hesperium* in 1998 and updated in 2005 (Duncan 2005a). This guidance includes: minimizing alterations in microsite characteristics, including management of areas large enough to moderate fluctuations in humidity and temperature; maintaining existing cover by preserving dead and downed woody debris; protecting occupied rockslides and talus areas from road construction, quarrying, and other activities; maintaining the canopy closure of trees within the habitat area to moderate fluctuations of temperature and humidity on the site; maintaining the hardwood tree component (i.e., maples, cottonwood, red alder, aspen) and native plant diversity to provide a constant supply of logs, leaves, and leaf mold; maintaining riparian areas according to S&M ROD guidance and, if necessary, increasing Riparian Reserve widths; avoiding burning within occupied habitats and managing burns to minimize adverse effects of fire; avoiding activities that would lower the water table at the site, thus reducing soil moisture below that required by the species, or possibly altering vegetative communities; protecting known sites from grazing; and avoiding activities that would cause soil compaction.

6.1.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *D. hesperium* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table DEHE-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 40 observations from BLM and Forest Service geodatabases were converted into 34 sites in the NSO range (region). Table DEHE-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table DEHE-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure DEHE-1 displays the regional distribution of the

species across BLM and NFS lands, and Figure DEHE-2 displays the species' regional distribution with the extent of all forest types and LSOG forests below 6,000 feet msl on BLM and NFS lands, including mapped drainages within these forests, within the currently known range of the species.

TABLE DEHE-1

Number of *Deroceras hesperium* Sites (2013)

Location*	Number of Sites
Regional Area	34
Local Area	13
Analysis Area (Project Area)	1 (1)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE DEHE -2

Distribution of *Deroceras hesperium* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	18	3	-
Forest Service	8	8	1
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	10	2	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE DEHE -3

Distribution of *Deroceras hesperium* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	-	-	-
Adaptive Management Reserves (AMR)	1	-	-
Administratively Withdrawn (AW)	2	-	-
Congressionally Reserved (CR)	**-**	**-**	**-**
Late Successional Reserve (LSR)	**7**	**1**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**2**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	14	12	1
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Bolded allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

D. hesperium has a somewhat limited distribution across three physiographic provinces in Oregon (Coast Range, Cascades East and West) (see Figure DEHE-1). Sites are found in four general areas in Oregon, including a relatively large cluster of sites in the southern Cascade Range, a small cluster of sites in the southern Coast Range, a scattered group of sites in the northern Cascade Range, and an isolated site in the northern Coast Range. The species appears to have a limited distribution outside the Cascade and Coast Ranges based on the lower number of sites and scattered nature of most sites. *D. hesperium* does not appear to be well distributed within its range in the NSO range.



Figure DEHE-1. Regional Distribution of *Deroceras hesperium*

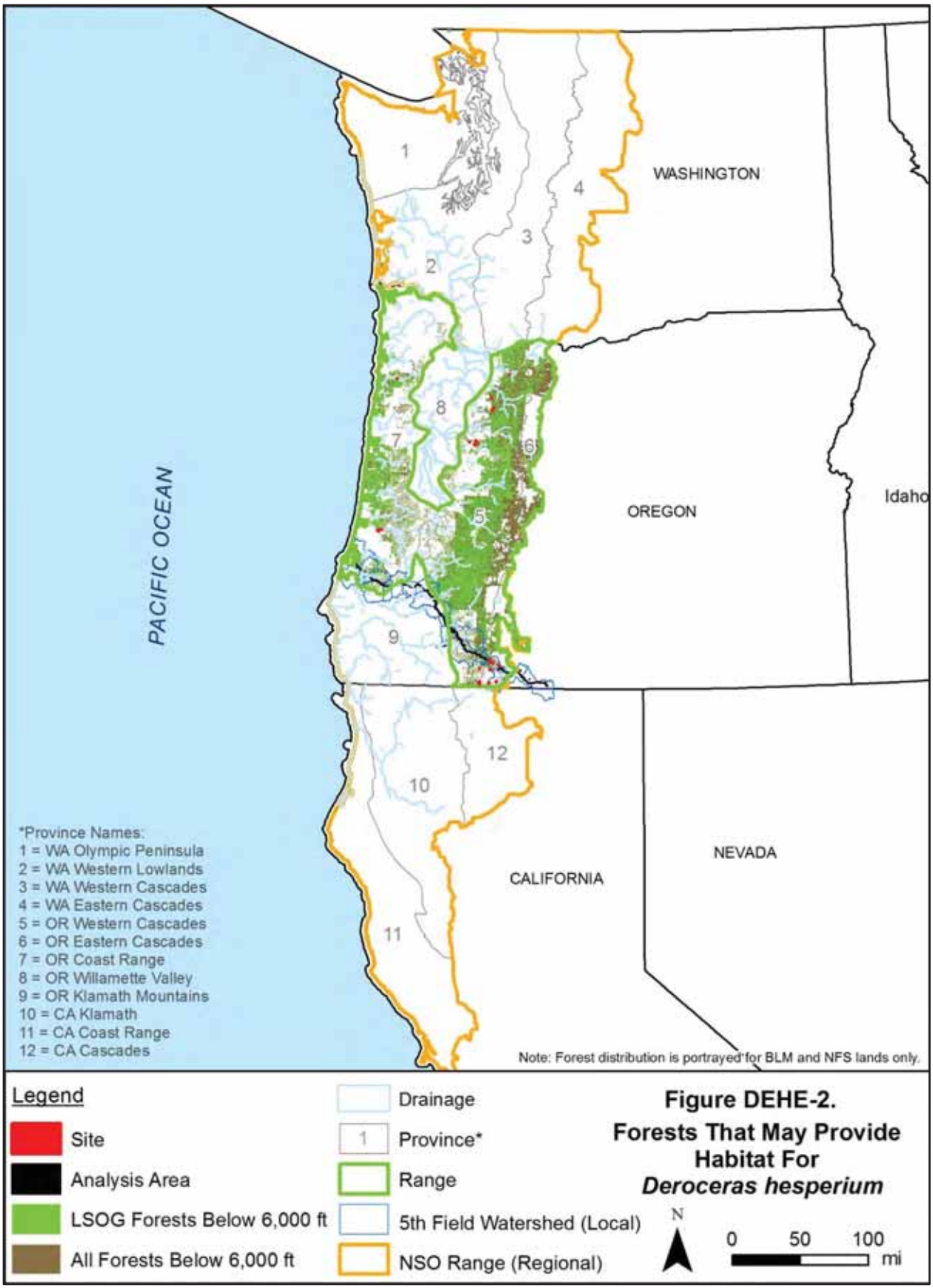


Figure DEHE-2.
Forests That May Provide Habitat For *Deroceras hesperium*

Ten of 34 sites are located on private or state lands (at least partially), and 26 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include five sites in the Klamath Falls Resource Area of the Lakeview District, one site in the Coos Bay District, and two sites in the Medford District. Sites managed by the National Forests that encompass the project area include eight sites on the Winema National Forest. Sites managed by other BLM Districts include 11 sites in the Salem District.

Across the NSO range, nine sites are located on reserve lands managed by BLM and the Forest Service, including seven in LSRs and two in Known Owl Activity Centers. This represents 35 percent of the total BLM- and Forest Service-managed sites in the region. Other sites may also be associated with Riparian Reserves that have not been mapped at the regional scale, as defined in the respective BLM and Forest Service land management plans. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

D. hesperium is less common in LSOG forests based on available data (13 of 34 total sites are in LSOG) and is more likely restricted to moist conditions associated with riparian areas (i.e., Riparian Reserves). Based on current site locations, the species is primarily found in coniferous, mixed hardwood-coniferous forests and to a lesser extent in hardwood forests below about 5,300 feet msl in the Cascade and Coast Ranges in Oregon. Coniferous, mixed hardwood-coniferous, and hardwood forests within this range could provide habitat for *D. hesperium* and support additional sites. These forests encompass an estimated 6.6 million acres on BLM and NFS lands in Oregon, including an estimated 3.2 million acres in reserve land allocations (48 percent of the forests; Table DEHE-4). Of this acreage, an estimated 2.5 million acres are LSOG (see Figure DEHE-2), including 1.4 million acres in reserve land allocations (55 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl are widespread across the species' range, moist riparian areas are much less common.

TABLE DEHE-4

Extent of Forests that Could Provide Habitat for *Deroceras hesperium* on BLM and NFS Lands*

Location	All Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	6,624,830	3,181,230	2,513,390	1,378,370
Local Area	425,180	131,930	129,110	56,260
Project Area	830	310	170	90

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for Oregon only, which is the extent of the species' currently known range.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *D. hesperium* is found in two 5th field watersheds (Klamath River-John C. Boyle Reservoir and Spencer Creek) that overlap the project area (see Table DEHE-5 and Figure DEHE-3). The sites are in the eastern Cascade Range in the eastern portion of the local area. The 13 local sites are part of a large group of sites in the southern Cascade Range in Oregon, but they appear to be isolated from other sites in the region (the nearest regional sites are more than 100 miles to the northwest in the Coast Range). Multiple avenues of connectivity appear to be

available between sites in the Cascade Range based on the extent of coniferous, mixed, and hardwood forests and drainages within these forests.

Of the 13 sites in the local area, three are on BLM lands in the Lakeview District, eight are on NFS lands on the Winema National Forest, and two are on private lands. The BLM- and Forest Service-managed sites are primarily located on lands designated as Other (Matrix); these sites may be in Riparian Reserves, as defined in the Lakeview District and Winema National Forest land and resource management plans, because of the species' preference for moist habitats along or near drainages. One site is in an LSR in the Spencer Creek watershed, representing 9 percent of the 11 sites on BLM and NFS lands (Table DEHE-5).

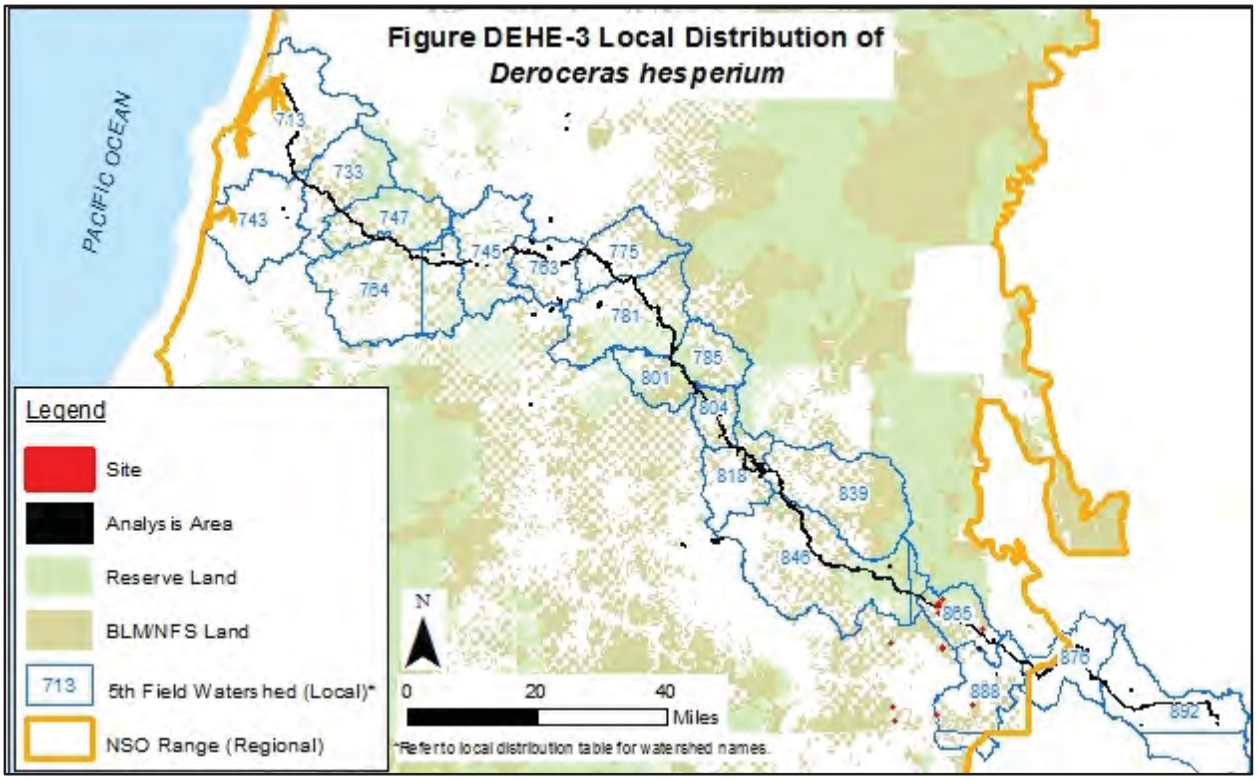
Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 425,180 acres on BLM and NFS lands in the local area, including 131,930 acres in reserve land allocations (31 percent of the forests). Of this acreage, an estimated 129,110 acres are LSOG, including 56,260 acres in reserve land allocations (44 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, particularly in the Cascade Range, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures DEHE-2 and DEHE-3).

TABLE DEHE-5

Distribution of *Deroceras hesperium* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	2	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	-	-
Spencer Creek (865)	11	1
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain one site of *D. hesperium*. This site is on NFS land designated as Other (Matrix) on the Winema National Forest. It is part of a large group of sites in the southern Cascade Range, as described in the Local Distribution discussion above.

Although surveys for the PCGP Project resulted in one observation of *D. hesperium* in the survey area (Siskiyou BioSurvey LLC 2008), the observation is outside the analysis area, and a recorded observation from 2010 in agency records comprises the site in the analysis area. The site is located near MP 171.1.

Project Impacts

Analysis

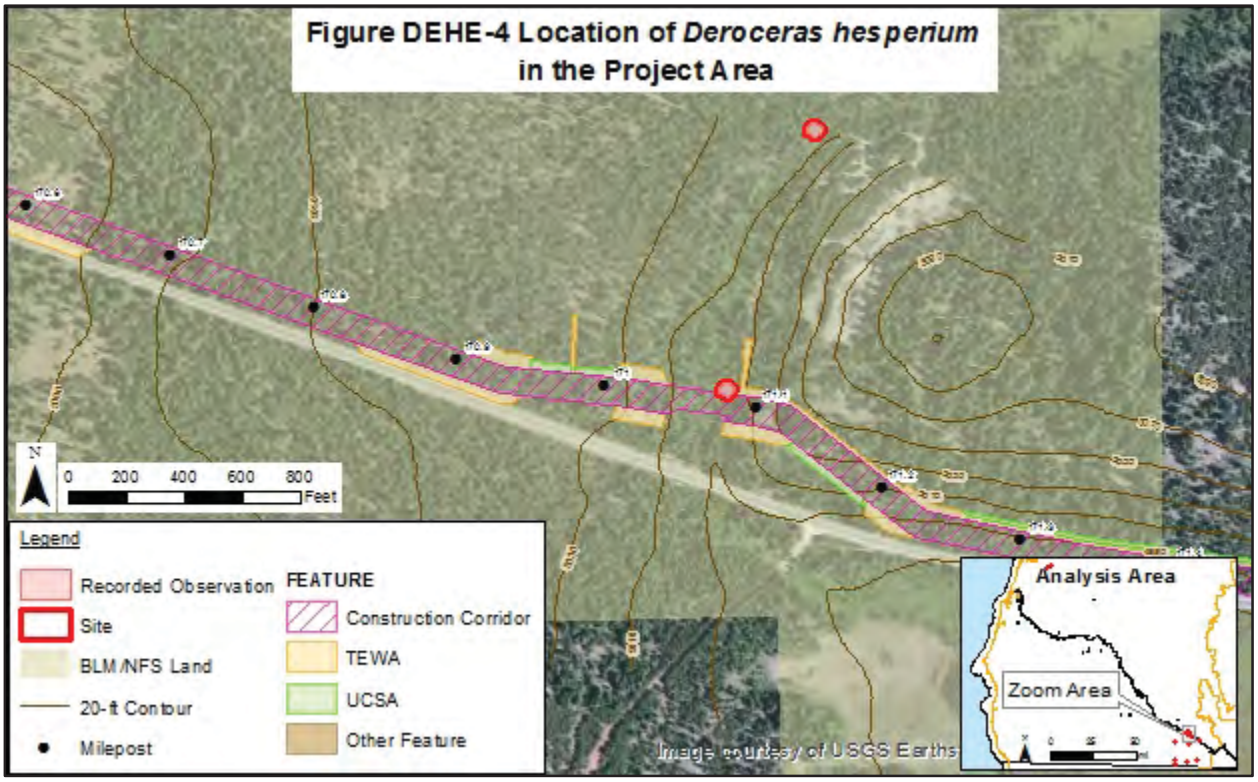
The PCGP Project would affect one site out of the 26 sites on BLM- and Forest Service-managed lands in the region, representing approximately 4 percent of the sites (or one out of 34 total sites on all lands in the NSO range). Table DEHE-6 presents an overview of the features of the PCGP Project that would affect the *D. hesperium* site. The construction corridor and associated work areas would affect approximately 0.02 acre (25 percent) of the site (the site is approximately 0.08 acre), and the corridor would cross through the southern portion of the site (see Figure DEHE-4). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *D. hesperium* in and near the project area. Due to the limited distribution of the species, the effects on one site could potentially alter the distribution of the species in the NSO range. This discussion presents a detailed analysis of the features of the PCGP Project that could affect site persistence.

TABLE DEHE-6

Impacts to *Deroceras hesperium* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.02 ac
Temporary Extra Work Area (TEWA)	1	<0.01 ac
Uncleared Storage Area (UCSA)	-	-
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because the site would be subject to impacts from multiple project activities.



The PCGP Project would result in ground disturbance and vegetation removal across the southern and eastern portions of the site near MP 171.1. The recorded observation of the species is on the northern side of the project area, and individuals could be directly affected by activities within the corridor (see Figure DEHE-4).

Establishment of the construction corridor would disturb vegetation and soils around the recorded observation within the site and could result in injury or mortality to individuals. The area within the site is forested in a relatively level area, and a dirt road is located just east of the site where a TEWA would be located. The establishment of the corridor and a TEWA could modify microclimate conditions around the recorded observation. The removal of forests and disturbance to soil and understory components would negatively affect *D. hesperium* by removing its habitat and affecting humidity, temperatures, and refugia in the understory of the habitat, affecting site persistence. Nearby suitable habitat could still be used by the species, but the habitat affected by the PCGP Project is no longer expected to be suitable. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor

would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

Based on this analysis, *D. hesperium* is not likely to persist at the site following project implementation. This site is one of 11 sites on BLM and NFS lands in the local area and is part of a large cluster of sites in the southern Cascade Range in Oregon. It may contribute to the distribution of the species within the local area and nearby portions of the Cascade Range. However, if site persistence is not maintained, *D. hesperium* would still be found in the southern Cascade Range in Oregon, and nearby suitable habitat within the mountain range would still provide opportunities for the species to be found in the general vicinity based on the distribution of other sites in nearby portions of the local and regional areas.

Across the project area, the PCGP Project would remove an estimated 710 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 130 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *D. hesperium*. Within this impact area, about 450 acres (about 63 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, but these areas would not likely provide habitat for the species during the life of the PCGP Project, unless they are restored to moist riparian habitat. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 150 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of forests below 6,000 feet msl in the species' range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, 10 sites of *D. hesperium* would remain on BLM and NFS lands in the local area, with one site in a reserve, and 25 sites, including nine in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions, pending an annual species review if the species is removed from the S&M list. The nine sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 36 percent of the remaining *D. hesperium* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *D. hesperium* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information,

however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:

  - *D. hesperium* has a somewhat limited distribution across three physiographic provinces and one state in the region and a moderate-high number of overall sites (26 on BLM and NFS lands). *D. hesperium* does not appear to be well distributed in any part of its range because sites are scattered despite the distribution of potentially suitable habitat. The currently known number of sites on BLM and NFS lands is an increase of 12 sites on BLM and NFS lands since 2007.
  - An estimated 35 percent of the sites (nine sites) are in reserves. More sites are likely located in Riparian Reserves based on the species' habitat preferences.

- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the species' range and encompass approximately 6.6 million acres on BLM and NFS lands with an estimated 48 percent in reserves. Moist riparian areas within these forests are less common. A subcomponent of these forests likely provides habitat for *D. hesperium*.
- The PCGP Project would affect one of 26 BLM- and Forest Service-managed sites of *D. hesperium*, representing approximately 4 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (25) would continue to be documented on BLM and NFS lands in the region with a somewhat limited distribution across the NSO range. Several sites (10 sites) would remain in the local vicinity of the analysis area with several other sites in the southern Cascade Range in Oregon. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites, nine are in LSRs where management actions are restricted to those activities that benefit LSOG forests. Other sites are likely in Riparian Reserves based on the species' habitat requirements, which afford additional protections to the sites.
- The PCGP Project would result in a permanent loss of an estimated 150 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total acreage in Oregon). An estimated 3.2 million acres (48 percent) of coniferous, mixed, and hardwood forests and 1.4 million acres (55 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range.
- The remaining forests may support additional populations of *D. hesperium*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

6.1.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *D. hesperium* at one site; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 25 sites would remain on BLM and NFS lands across the region, and 10 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *D. hesperium* at one site, the site is part of a large group of sites in the southern Cascade Range in Oregon. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *D. hesperium* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 710 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 130 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 63 percent of the forests would be restored to similar conditions or shrublands, although they may not provide habitat for the species, and a permanent unforested corridor would remain across the project area. An estimated 3.2 million acres (48 percent) of coniferous, mixed, and hardwood forests and 1.4 million acres (55 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future, pending an annual species review if the species is removed from the S&M list. Although a single natural disturbance event or combination of events could affect a significant portion of sites in one of the three groups of sites in the Oregon Cascade or Coast Range, the sites are scattered across the region and are less likely to be collectively affected by a single event.

The PCGP Project would not be able to avoid impacts to the *D. hesperium* site in the analysis area. Based on the above conclusions, avoidance of the *D. hesperium* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for the *D. hesperium* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term (or until the species is removed from the S&M list), as specified by the agency responsible for management of the site. The monitoring plan shall be approved by the BLM and Forest Service.

6.2 MONADENIA CHACEANA

Monadenia chaceana is a land snail in the Bradybaenidae family and is commonly known as Chace sideband or Siskiyou sideband.

6.2.1 Regulatory Status and Ranking

The 2001 ROD identifies *M. chaceana* as a Category B (rare) species. The ORBIC evaluated *M. chaceana* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of *Rare, Threatened and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be between imperiled because of rarity or other factors that make it vulnerable to extinction and rare, uncommon or threatened, but not immediately imperiled, within its global range and in Oregon (G2G3, S2S3, respectively). The species is on the ORBIC List 3. It is considered a BLM and Forest Service Sensitive Species in Oregon.

6.2.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

Like other species in the genus *Monadenia*, *M. chaceana* is a hermaphroditic terrestrial gastropod and requires high moisture content throughout its life cycle (Duncan 2005b). Eggs are laid in loose soil, and the life span of the species is thought to be approximately 6 years. It becomes dormant during summer and winter and is normally crepuscular (active during dawn and dusk) during spring and fall. Dormant periods are spent in refugia deep within the interstitial space between rocks. The snail likely assists in dispersal of fungal spores and hyphae through its feces. Individuals that inhabit talus slopes also use the surrounding forest habitat during moist, cool weather to forage for food.

Range

M. chaceana is endemic to the Pacific Northwest, where it has only been found in southwest Oregon and far northern California, primarily in Siskiyou County (Duncan 2005b). The known range of the species in 2004 encompassed approximately 100–400 square miles (ORBIC 2004). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *M. chaceana* from an estimated 33 element occurrences across the species' range in 2004. This species was only found in two areas in the NSO range: southern Oregon and Siskiyou County, California (ORBIC 2004). In 2004, *M. chaceana* was thought to

be rare because it was only known from two population areas (ORBIC 2004). The species was found in two locations during Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 206 sites on federal lands and 223 total sites on all lands in the NSO range.

For the PCGP Project, surveys for Category A and B S&M mollusks were conducted in 2007 in the PCGP Project area and within 100 feet on either side of the construction corridor (Siskiyou BioSurvey LLC 2008). These surveys targeted *M. chaceana* and resulted in 12 observations of the species. Based on the increased number of sites since 2004 with increased surveys, it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range, particularly in southern Oregon and northern California where most observations have been reported. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

M. chaceana is typically found in shaded areas in dry coniferous, mixed hardwood-coniferous, and hardwood forests (Duncan 2005b). It has been found in the lower reaches of major drainages, in talus and rock slides, under rocks and woody debris in moist conifer forests, in caves, and in shrubby areas in riparian corridors (ORBIC 2004). Favorable microsite conditions include stable rock formations and lower talus slopes with availability of subsurface water and large interstitial spaces between rocks (Duncan 2005b). In mesic habitats, the snail may use hollow cavities in living hardwoods, large woody debris, dense ground cover, bark, sword fern root masses, or rodent burrows for aestivation and refugia from predation, desiccation, or fire. *M. chaceana* is not likely restricted to specific microclimate conditions of LSOG forests as much as it is restricted to moist forests with suitable rock substrate.

Threats

Threats to *M. chaceana* include habitat alteration and fragmentation and activities that increase temperature, decrease moisture, or decrease food supplies (Duncan 2005b). Timber harvest resulting in less than 40 percent canopy closure is considered to adversely affect the species, particularly where residual habitat is additionally affected by prescribed fire. Prescribed burns threaten the species because they are typically conducted in the spring and fall when *M. chaceana* is active (USDA and USDI 2007). Wildfires are less of a threat because they typically occur in summer months when *M. chaceana* undergoes aestivation. Other threats include herbicide use, recreation development, quarry development, road construction, timber harvest and monoculture, and disturbances that alter hydrologic patterns or refugia habitat (ORBIC 2004).

Management Recommendations

As a Category B S&M species, the direction from the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). Management recommendations were developed for *M. chaceana* in 1998 and updated in 2005 (Duncan 2005b). This guidance includes: maintaining a food supply of leaf and needle litter and fungi within a cool moist environment during fall and spring active periods, providing stable refuge sites used during dormant periods in summer and winter, maintaining undisturbed talus and rock

substrates, and managing the surrounding vegetative cover sufficient to maintain suitable environmental conditions and provide coarse woody debris and uncompacted forest litter.

6.2.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *M. chaceana* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table MOCH-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 313 observations from BLM and Forest Service geodatabases were converted into 258 sites in the NSO range (region). Table MOCH-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table MOCH-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure MOCH-1 displays the regional distribution of the species across BLM and NFS lands, and Figure MOCH-2 displays the species' regional distribution with the extent of all forest types and LSOG forests below 6,500 feet msl on BLM and NFS lands, including mapped drainages within these forests within the currently known range of the species.

TABLE MOCH-1

Number of *Monadenia chaceana* Sites (2013)

Location*	Number of Sites
Regional Area	258
Local Area	98
Analysis Area (Project Area)	5 (2)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE MOCH -2

Distribution of *Monadenia chaceana* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	121	76	5
Forest Service	125	21	-
NPS	1	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	13	2	-

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.



Figure MOCH-1.
Regional Distribution of *Monadenia chaceana*

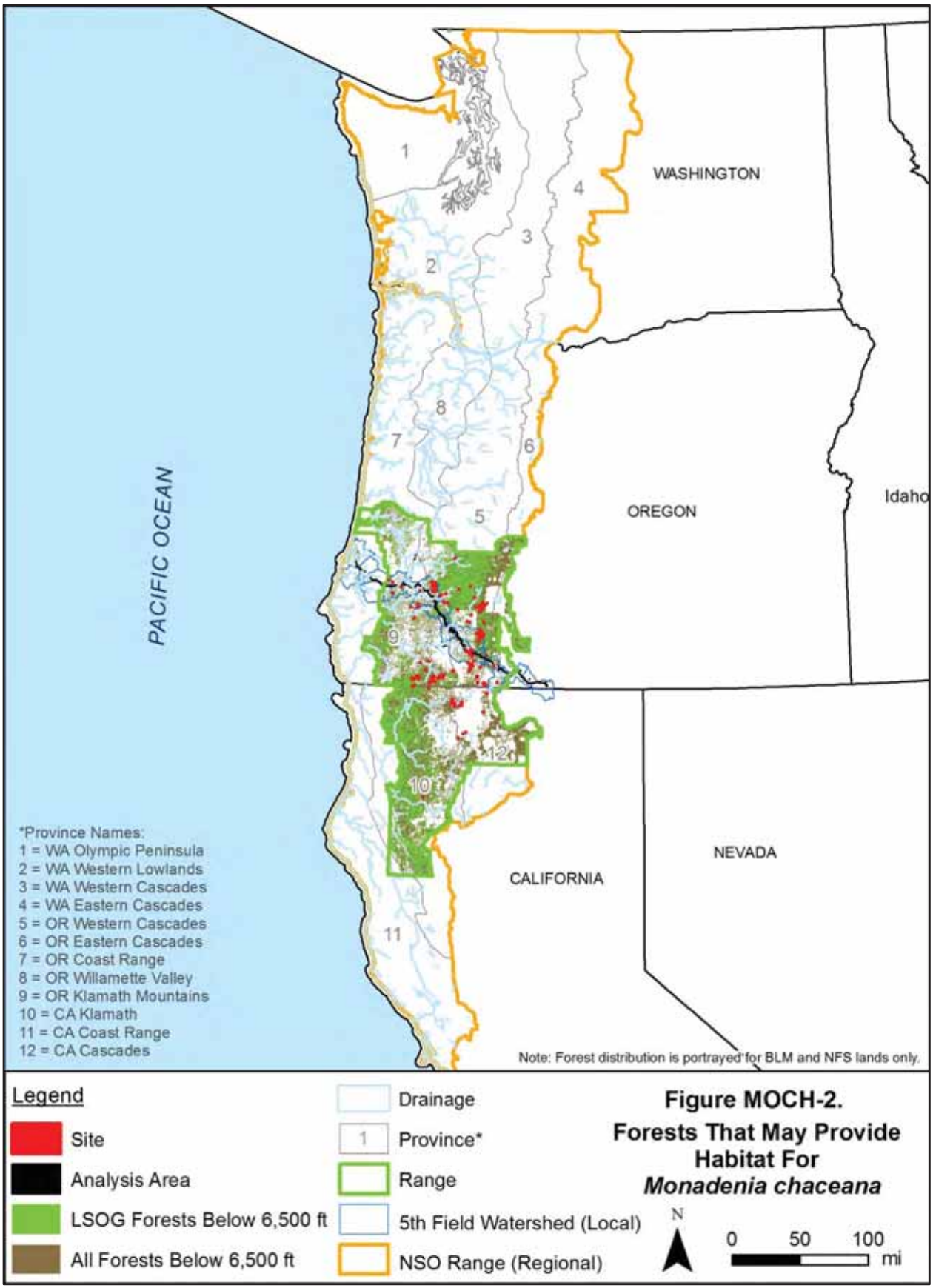


Figure MOCH-2.
Forests That May Provide Habitat For *Monadenia chaceana*

TABLE MOCH -3

Distribution of *Monadenia chaceana* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	57	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	17	-	-
Congressionally Reserved (CR)	**2**	**1**	**-**
Late Successional Reserve (LSR)	**24**	**12**	**-**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**8**	**-**	**-**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	3	-	-
Other (Matrix, Riparian Reserve, Other)	138	87	5
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).

Regional Distribution

M. chaceana has a somewhat wide distribution across six physiographic provinces in Oregon (Coast Range, Klamath Mountains, and Cascades East and West) and California (Klamath and Cascades) (see Figure MOCH-1). Sites are primarily found in a large group of several clusters in the eastern Klamath Mountains and southern Cascade Range in Oregon and extreme northern California. An apparently isolated site is found further south in the Klamath Mountains in California. *M. chaceana* appears to be well distributed in its range in southern Oregon and extreme northern California.

Thirteen of 258 sites are located on private lands (at least partially); one site is on NPS land (Crater Lake National Park); and 246 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 13 sites in the Klamath Falls Resource Area of the Lakeview District, 62 sites in the Medford District, and 40 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include 95 sites on the Rogue River National Forest and five sites on the Umpqua National Forest. Sites managed by other BLM Districts and National Forests include six sites in the Redding District and 25 sites on the Klamath National Forest.

Across the NSO range, 34 sites are located on reserve lands managed by BLM and the Forest Service, including 24 in LSRs, eight in Known Owl Activity Centers, and two in Congressionally Reserved areas. This represents 14 percent of the total BLM- and Forest Service-managed sites in the region. Other sites may also be associated with Riparian Reserves that have not been mapped at the regional scale, as defined in the respective BLM and Forest Service land management plans. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, also likely receives some degree of protection based on National Park management.

M. chaceana is less common in LSOG forests based on available data (101 of 258 total sites are in LSOG) and is relatively common in non-LSOG forests. Based on current site locations, the species is found in coniferous, mixed hardwood-coniferous, and hardwood forests between about 1,500–6,300 feet msl in parts of Oregon and California. Coniferous, mixed hardwood-

coniferous, and hardwood forests in Douglas, Jackson, Josephine, Klamath, Siskiyou, and Trinity counties could provide habitat for *M. chaceana* and support additional sites. These forests encompass an estimated 6.8 million acres on BLM and NFS lands in the species' range, including an estimated 3.1 million acres in reserve land allocations (45 percent of the forests; Table MOCH-4). Of this acreage, an estimated 2.2 million acres are LSOG (see Figure MOCH-2), including 1.2 million acres in reserve land allocations (55 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl are widespread across the species' range, the specific habitat requirements of the species are likely less common.

TABLE MOCH-4

Extent of Forests that Could Provide Habitat for *Monadenia chaceana* on BLM and NFS Lands*

Location	All Forests below 6,500 feet		LSOG Forests below 6,500 feet	
	Total	Reserves	Total	Reserves
Regional Area	6,806,740	3,062,520	2,186,240	1,204,690
Local Area	491,200	147,820	135,390	51,550
Project Area	1,310	450	270	140

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *M. chaceana* is distributed across nine 5th field watersheds that overlap the project area (see Table MOCH-5 and Figure MOCH-3). The sites are scattered across the local area in the Coast Range, Klamath Mountains, and Cascade Range. Most sites appear clustered and near one another, but sites in the Olalla Creek-Lookingglass Creek watershed appear more isolated near the western portion of the local area. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous, mixed, and hardwood forests. Many sites are located in the nearby Klamath Mountains and Cascade Range.

Of the 98 sites in the local area, 97 are on BLM or NFS lands, including 76 on BLM lands and 21 on NFS lands. These sites are located on lands designated as Other (Matrix), Congressionally Reserved, and LSR. Two sites are at least partially on private lands. Of the 98 sites in the local area, 13 sites are on reserve lands, representing 13 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table MOCH-5 and on Figure MOCH-3. The sites in reserves are in the Big Butte Creek, Little Butte Creek, and Olalla Creek-Lookingglass Creek watersheds.

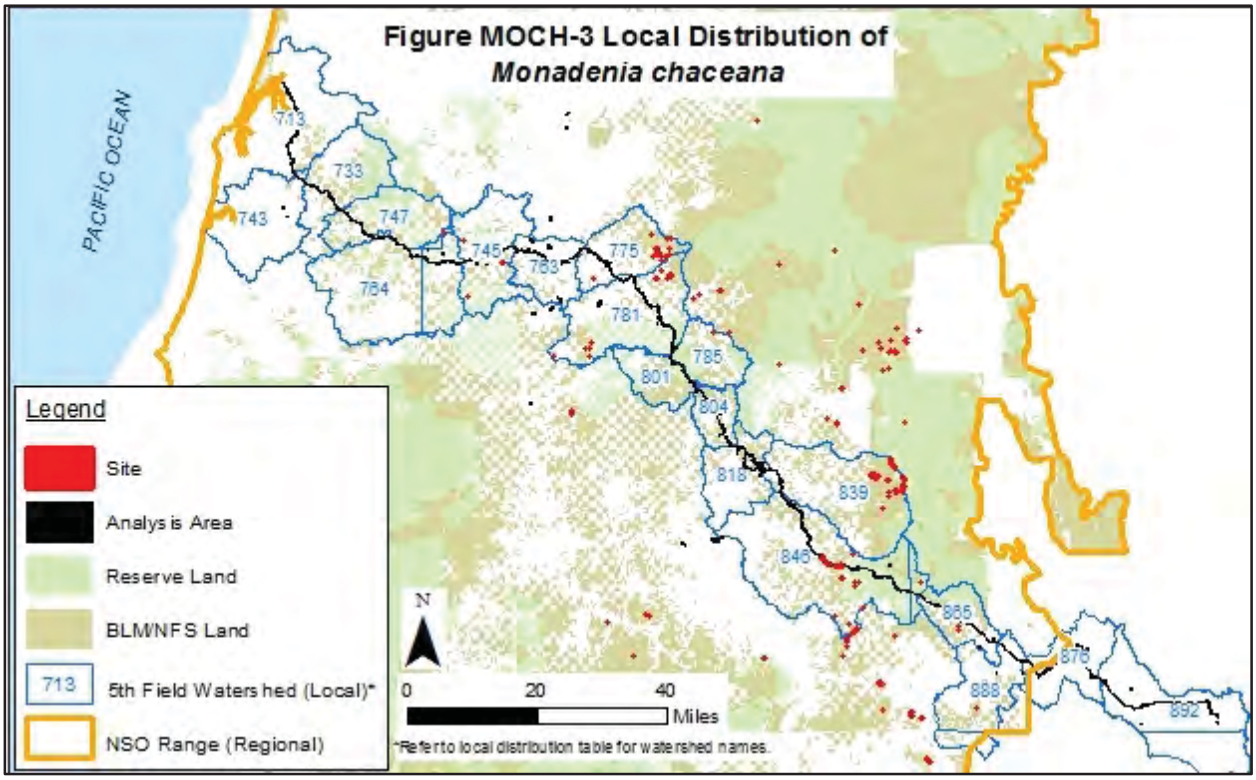
Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl encompass approximately 491,200 acres on BLM and NFS lands in the local area, with 147,820 acres in reserve land allocations (30 percent of the forests). Of this acreage, an estimated 135,390 acres are LSOG, including 51,550 acres in reserves (38 percent of the forests). Other sites may also exist in the local area, particularly in the Klamath Mountains and Cascade Range, where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures MOCH-2 and MOCH-3).

TABLE MOCH-5

Distribution of *Monadenia chaceana* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	15	7
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	1	-
Elk Creek-South Umpqua (785)	1	-
Klamath River-John C Boyle Reservoir (888)	1	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	41	4
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	22	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	3	2
Rogue River-Shady Cove (818)	-	-
South Umpqua River (781)	12	-
Spencer Creek (865)	2	-
Trail Creek (804)	-	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis area contains five sites of *M. chaceana*, and the project area contains two sites. All of these sites are on BLM lands designated as Other (Matrix) in the Medford District. The analysis area sites are found in the Little Butte Creek watershed in the eastern portion of the analysis area. Many sites are also located within the immediate vicinity of the analysis area in the Cascade Range and Klamath Mountains (see Local and Regional Distribution discussions above).

Surveys for the PCGP Project resulted in 12 total observations of the species in or near the project area (Siskiyou BioSurvey LLC 2008). An estimated three of these recorded observations in combination with agency records comprise the five sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, two sites are between MPs 149.6 and 151.

Project Impacts

Analysis

The PCGP Project would affect five sites out of the 246 sites on BLM- and Forest Service-managed lands in the region, representing approximately 2 percent of the sites (or five out of 258 total sites on all lands in the NSO range). Table MOCH-6 presents an overview of the features of the PCGP Project that would affect the *M. chaceana* sites. The construction corridor and associated work and storage areas would affect about 0.1 acre within two sites (about 25 percent of the sites), and three sites could be indirectly affected near the project area. This discussion presents an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor and a TEWA would disturb less than 0.1 acre of vegetation and soils within one site and could result in injury or mortality to *M. chaceana* individuals. The establishment of the corridor and TEWA could modify microclimate conditions in suitable habitat adjacent to the corridor and could also result in indirect effects on the three sites near the project area. The removal of forests and understory components could negatively affect *M. chaceana* in adjacent areas by removing its habitat, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.1 acre of understory habitat in one site, which could remove logs or woody debris, potentially making the habitat unsuitable for the species or injuring individuals.

TABLE MOCH-6

Impacts to *Monadenia chaceana* Sites on BLM and NFS Lands in the Project Area

Project Activity	Number of Sites Affected	Area of Disturbance within Sites
Construction Corridor	1	0.02 ac
Temporary Extra Work Area (TEWA)	1	0.01 ac
Uncleared Storage Area (UCSA)	1	0.07 ac
Roads (TMP)	-	-
Other Minimal Disturbance Activity	-	-

ac = acres
Note: Site counts are not additive because one site would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,030 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl, including 190 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *M. chaceana*. Within this impact area, about 660 acres (about 64 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-

term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCPG Project. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 210 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl. This loss of forests represents less than 1 percent of the total estimated area of forests below 6,500 feet msl across the species' range.

Discussion

Assuming site persistence cannot be maintained at the five sites as a result of the PCGP Project, 92 sites of *M. chaceana* would remain on BLM and NFS lands in the local area, including 13 in reserves, and 241 sites, including 34 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 34 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 14 percent of the remaining *M. chaceana* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *M. chaceana* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *M. chaceana* has a somewhat wide distribution across six physiographic provinces and two states in the region and a moderate-high number of overall sites (246 on BLM and NFS lands). The species appears to be well distributed in its range in southern Oregon and extreme northern California. The currently known number of sites on BLM and NFS lands is an increase of 40 sites on BLM and NFS lands since 2007, with many sites documented during the PCGP Project surveys.
    - An estimated 14 percent of the sites (34 sites) are in reserves.
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl (general habitat for the species) are widely distributed across the species' range and encompass approximately 6.8 million acres on BLM and NFS lands with an estimated 45 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range also contains coniferous,

mixed, and hardwood forests, but few sites are located in the mountain range. A subcomponent of these forests likely provides habitat for *M. chaceana*.

- The PCGP Project would affect five of 246 BLM- and Forest Service-managed sites of *M. chaceana*, representing approximately 2 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the five sites in the analysis area, a moderate-high number of sites (241) would continue to be documented on BLM and NFS lands in the region with a somewhat wide and scattered distribution across Oregon and California. Many sites (92 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across nine 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be about the same (14 percent). Of the remaining sites, 32 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and two are at least partially in Congressionally Reserved areas where management activities that may adversely affect *M. chaceana* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 210 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,500 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 3.1 million acres (45 percent) of all forests and 1.2 million acres (55 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *M. chaceana*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO, particularly in the Klamath Mountains and Cascade Range, that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

6.2.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *M. chaceana* at five sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 241 sites would remain on BLM and NFS lands across the region, and 92 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *M. chaceana* at five sites, these sites are part of a group of sites in the Cascade Range in southern Oregon where the species is locally abundant and well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *M. chaceana* would persist in the region without considering the five sites as part of the population.

- The PCGP Project would remove approximately 1,030 acres of all forests and 190 acres of LSOG forests below 6,500 feet msl (a negligible amount of the forests). An estimated 64 percent of the forests would be restored to similar conditions or shrublands, but a permanent unforested corridor would remain across the project area. An estimated 3.1 million acres (45 percent) of all forests and 1.2 million acres (55 percent) of LSOG forests below 6,500 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in a portion of southern Oregon, many sites are found in the area and are less likely to be collectively affected by a single event.

The PCGP Project would not be able to avoid impacts to all *M. chaceana* sites in the analysis area, although some individuals within the sites could persist following project implementation. Based on the above conclusions, avoidance of the five *M. chaceana* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *M. chaceana* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

This page intentionally left blank.

7.0 VERTEBRATE SPECIES

7.1 ARBORIMUS LONGICAUDUS

Arborimus longicaudus is a small arboreal rodent in the Muridae family and is commonly known as red tree vole. The species has also been known as *Phenacomys longicaudus* (Oregon red tree vole).

7.1.1 Regulatory Status and Ranking

The 2001 ROD identifies *A. longicaudus* as a Category C (uncommon) species. The ORBIC evaluated *A. longicaudus* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be between rare, uncommon or threatened, but not immediately imperiled, and not rare and apparently secure, but with cause for long-term concern, within its global range (G3G4). In Oregon, it was rare, uncommon or threatened, but not immediately imperiled (S3). The species is on the ORBIC List 4. It is considered a BLM and Forest Service Sensitive species in the North Oregon Coast Distinct Population Segment where it is a candidate for listing under the Endangered Species Act.

7.1.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

A. longicaudus is a small microtine rodent that is described as one of the most arboreal mammals in the Pacific Northwest (Forest Service and BLM 2001). Individuals occupy small home ranges and exhibit weak dispersal ability. The species lives in tree canopies and seldom comes to the forest floor. Coniferous tree canopies provide nesting habitat, climatic buffering, refuge from predators, dispersal routes, forage, and drinking water. *A. longicaudus* uses Douglas-fir needles for nest building materials and as its primary food source, which it makes palatable by stripping the resin ducts from each needle (U.S. Fish and Wildlife Service 2013). The rodent is a primary prey item of the NSO and is also preyed on by northern saw-whet owl (*Aegolius acadicus*), raccoon (*Procyon lotor*), ringtail (*Bassariscus astutus*), and members of the weasel family (Mustelidae) (U.S. Fish and Wildlife Service 2013).

Range

A. longicaudus is widespread in mesic and xeric coniferous forests in western Oregon and northwestern California (USDA and USDI 2007, U.S. Fish and Wildlife Service 2011). Its current range extends from Del Norte County, California in the south to the Columbia River in Oregon and from the Pacific coast eastward to just east of the crest of the Cascade Range (U.S.

Fish and Wildlife Service 2011). The red tree vole has primarily been found in Oregon (ORBIC 2004, Hayes 1996). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range may have been similar to the current range, with populations limited to parts of Oregon and California. The species was likely found further north of the Columbia River and further east of the Cascade Range crest (U.S. Fish and Wildlife Service 2011). It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed under Threats below, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

The ORBIC (2004) reported *A. longicaudus* from an estimated 81–300 element occurrences across Oregon and California in 2004. Most occurrences were in Oregon (81–300) with fewer (1–5) in California (ORBIC 2004). In 2004, *A. longicaudus* was considered to be moderately vulnerable, primarily because of its relatively slow reproduction frequency, high age of maturity, and/or moderate fecundity (ORBIC 2004). Population trends throughout its range were unknown, although extirpations had been reported in some localities, and the species' distribution was reduced as a result of removal of preferred habitat. In 2007, the species was widespread and rather common in some regions of Oregon, but populations had substantially declined where landscape disturbances, such as logging and fire, resulted in loss of mature forests (USDA and USDI 2007). The species was found in 80 locations during Random Multi-Species surveys across the NSO range (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 1,032 sites on federal lands and 1,039 total sites on all lands in the NSO range.

Protocol surveys are required for *A. longicaudus* and were conducted across approximately 825 acres of suitable habitat in the PCGP Project area between October 2010 and June 2012. These surveys resulted in the identification of 1,324 nest trees, with some trees having multiple nests. A total of 2,736 nests were encountered, which included 1,046 confirmed active nests and 1,677 inactive nests. These observations have increased the number of sites documented in BLM and Forest Service records, and more survey effort would be expected to locate more nest sites and trees. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

A. longicaudus inhabits moist coniferous and mixed hardwood-coniferous forests containing Douglas-fir, grand fir, Sitka spruce, western hemlock, and white fir (Johnson and George 1991, Manning and Maguire 1999, U.S. Fish and Wildlife Service 2011) and has been found from sea level to 5,500 feet msl (Huff et al. 2012). The species has been found in greater abundance and frequency in old-growth forests than in younger forests, with age-associated forest characteristics being important habitat components (Aubrey et al. 1991). Old-growth Douglas-fir trees provide optimal habitat for *A. longicaudus* (Carey 1991). Although *A. longicaudus* has been found to utilize younger forests, data suggest that younger forests may be population sinks rather than population sources (Carey 1991). Younger forests in early seral conditions are considered low quality, transitional habitats (U.S. Fish and Wildlife Service 2011). *A. longicaudus* seems to

prefer specific microclimate conditions of LSOG forests, although it is occasionally found in younger forests.

Threats

A. longicaudus exhibits a very high sensitivity to forest disturbance, has low dispersal capability and reproductive potential, and occupies an extremely small home range. It is threatened by logging, fire, and other management activities that isolate remaining populations by fragmentation of forest habitats that prevent gene flow and negatively affect genetic diversity in the metapopulation (Holthausen et al. 1994). Because of the species' limited dispersal capabilities, connectivity between LSOG habitat is considered important to metapopulation dynamics. Populations inhabiting younger forests may go extinct if they do not reproduce successfully each year (Forest Service and BLM 2001). These threats continue to affect populations of *A. longicaudus* in the NSO range by isolating nest sites and reducing suitable habitat based on information presented by U.S. Fish and Wildlife Service (2011).

Management Recommendations

As a Category C S&M species, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence. Management recommendations were updated for *A. longicaudus* in 2000 (Forest Service and BLM 2001). The specific objectives for the management recommendations were derived from the 1994 ROD standards and guidelines for the species that stated "management standards will be developed to manage habitat for the species on sites where they are located." These management objectives are to:

- maintain the physical integrity of the habitat at active and undetermined sites;
- maintain red tree vole populations at sites where they currently occur; and
- prevent the inadvertent loss of red tree voles at sites where the species is assumed to occur but were not detected due to incomplete surveys.

The direction includes guidance for establishing Habitat Areas for purposes of managing the species and its habitat in accordance with the 1994 ROD. Any management that occurs within a Habitat Area should not remove or modify nest trees, the canopy structure of the stand, or remove any of the dominant, codominant, or intermediate crowns. This includes activities that may isolate nest trees or alter the microclimate within the stand. Some activities may be appropriate if they maintain or improve, and do not degrade (short- or long-term), the habitat condition in the Habitat Area.

7.1.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *A. longicaudus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table ARLO-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that encompass the project area), analysis (100-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). More than 10,000 observations from BLM and Forest Service geodatabases were converted into 3,909 sites in the NSO range (region). The sites in the analysis area were further modified to generate Habitat Areas for the red tree vole as defined in the Management Recommendations for the species (Forest Service and BLM 2001), which resulted in 56 Habitat Areas from 103 sites. Table ARLO-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table ARLO-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure ARLO-1 displays the regional distribution of the species across BLM and NFS lands, and Figure ARLO-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands within the currently known range of the species.

TABLE ARLO-1

Number of *Arborimus longicaudus* Sites (2013)

Location*	Number of Sites
Regional Area	3,909
Local Area	575
Analysis Area (Project Area)	103 (97)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE ARLO-2

Distribution of *Arborimus longicaudus* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	2,938	517	66
Forest Service	977	70	47
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	708	136	32

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

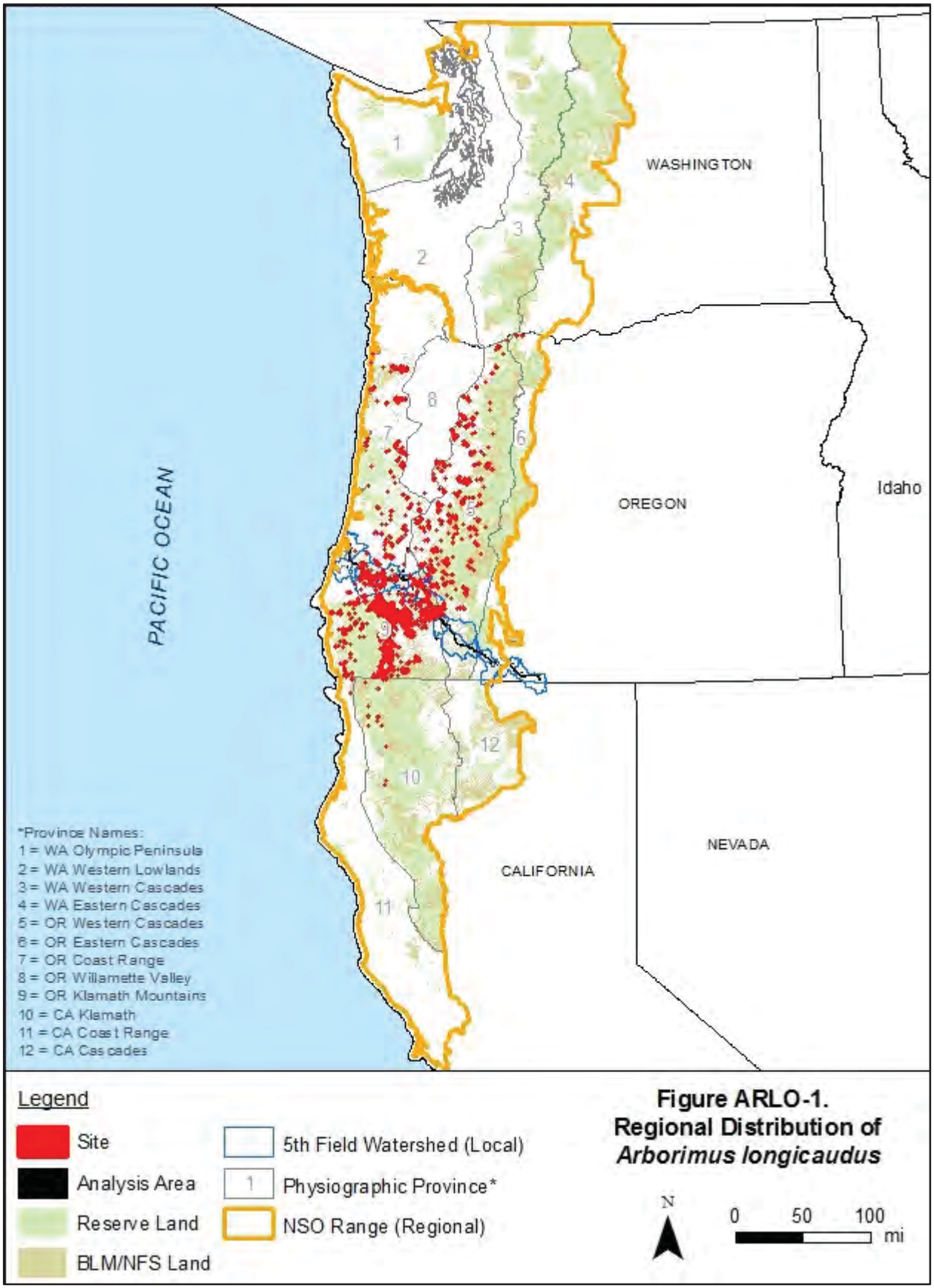


Figure ARLO-1.
Regional Distribution of *Arborimus longicaudus*

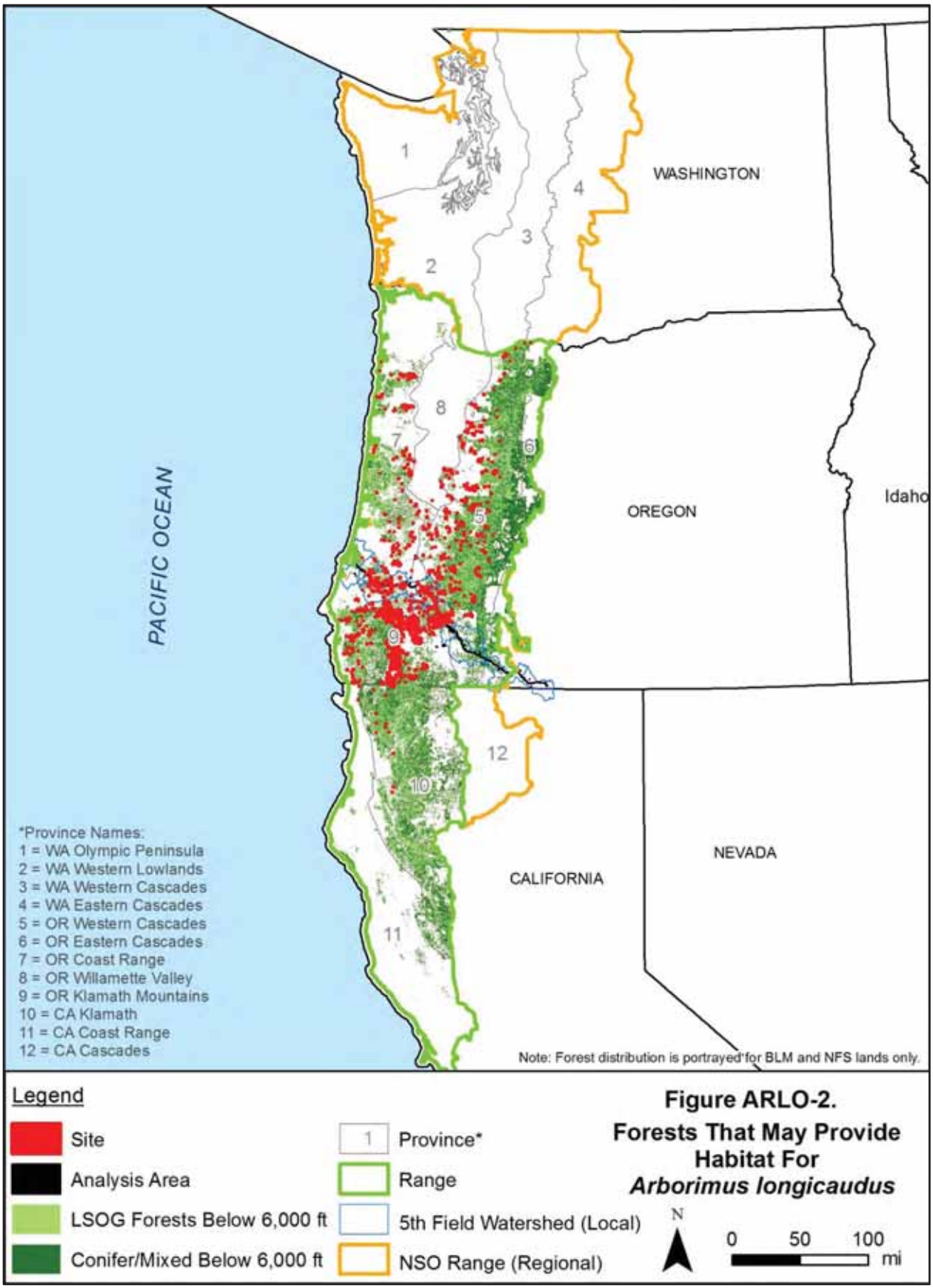


Figure ARLO-2.
Forests That May Provide Habitat For *Arborimus longicaudus*

TABLE ARLO-3

Distribution of *Arborimus longicaudus* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	333	2	-
Adaptive Management Reserves (AMR)	96	-	-
Administratively Withdrawn (AW)	50	1	-
Congressionally Reserved (CR)	**11**	**-**	**-**
Late Successional Reserve (LSR)	**502**	**90**	**33**
Marbled Murrelet Area (LSR3)	**55**	**41**	**8**
Northern Spotted Owl Activity Center (LSR4)*	**112**	**33**	**4**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	2,949	480	74
Riparian Reserve**	**3**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).
**Sites in riparian reserves are also in the "Other" land allocation, but are shown separately for identification of sites in reserve areas. The number of sites in riparian reserves is underrepresented because it is based on regional data using the National Hydrography Dataset, and individual Districts and National Forests establish these reserves at the project or local level (such data is not available for the region).

Regional Distribution

A. longicaudus is somewhat widely distributed across seven physiographic provinces in Oregon (Willamette Valley, Coast Range, Cascades East and West, and Klamath Mountain) and California (Klamath and Coast) (see Figure ARLO-1). Most sites are found in the Klamath Mountains in Oregon, where sites are abundant and close together in large clusters or groups. Sites in the western Cascade Range in Oregon are more scattered, but are also relatively abundant with many clusters of sites. Sites in other areas of Oregon and California are scattered and less abundant. *A. longicaudus* appears to be well distributed within its range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain ranges.

Of the 3,909 sites in the region, 708 sites are located on private, state, or other lands (at least partially), and 3,886 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include 183 sites in the Coos Bay District, 1,920 sites in the Medford District, and 345 sites in the Roseburg District. Sites managed by the National Forests that encompass the project area include 541 sites on the Rogue River National Forest and 217 sites on the Umpqua National Forest. The remaining 730 sites (note that some sites are on both BLM and NFS lands) on BLM and NFS lands are in the Eugene and Salem Districts and on the Klamath, Mt. Hood, Siskiyou, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 673 sites are located on reserve lands managed by BLM and the Forest Service, including 502 in LSRs (at least partially), 55 in Marbled Murrelet Areas, 112 in Known Owl Activity Centers (at least partially), 11 in Congressionally Reserved areas, and three in Riparian Reserves. This represents 17 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

A. longicaudus is primarily found in LSOG forests based on available data (3,625 of 3,909 total sites are in LSOG) and seems to prefer specific microclimates of LSOG forests, although it is occasionally found in younger forests. Based on current site locations, the species is primarily found in coniferous and mixed hardwood-coniferous forests below about 5,300 feet msl in the Klamath Mountains and Coast Range of Oregon and California and the Cascade Range of Oregon. LSOG coniferous and mixed hardwood-coniferous forests in this range could provide habitat for *A. longicaudus* and support additional sites. These forests encompass an estimated 4.4 million acres on BLM and NFS lands in the species' range (see Figure ARLO-2 and Table ARLO-4), including 2.6 million acres in reserve land allocations (58 percent of the forests). LSOG coniferous and mixed forests below 6,000 feet msl are somewhat widely distributed across Oregon and northern California, but connectivity between the forests may be limited in some areas, restricting the species' distribution. Younger coniferous and mixed forests may provide habitat for the species as they mature and develop suitable habitat conditions over time, and these forests are more widespread across Oregon and California (see Figure ARLO-2 and Table ARLO-4).

TABLE ARLO-4

Extent of Forests that Could Provide Habitat for *Arborimus longicaudus* on BLM and NFS Lands*

Location	Coniferous and Mixed Forests below 6,000 feet		LSOG Forests below 6,000 feet	
	Total	Reserves	Total	Reserves
Regional Area	11,671,740	5,964,490	4,404,360	2,555,250
Local Area	567,840	192,010	182,040	79,250
Project Area	1,350	490	300	150

Data Source: GNN vegetation data from Moeur et al. 2011
Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.
*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *A. longicaudus* is distributed across 12 5th field watersheds that overlap the project area (see Table ARLO-5 and Figure ARLO-3). The sites are distributed across the western Cascade Range, Klamath Mountains, and Coast Range in the local area, with many clusters of sites. Many other sites are located nearby in the same mountain ranges and may offer opportunities for dispersal or connectivity between sites across LSOG coniferous and mixed forests.

Of the 575 sites in the local area, 136 sites are on private or other lands (at least partially), and 569 sites are on BLM and NFS lands (at least partially). The sites on BLM and NFS lands are primarily located on lands designated as Other (Matrix) or LSR. Of the 569 sites in the local area on BLM and NFS lands, 160 sites are on reserve lands, representing 28 percent of the sites. The distribution of these reserve sites across the watersheds is depicted in Table ARLO-5 and on Figure ARLO-3. The sites in reserves are distributed across most of the watersheds.

LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 182,040 acres on BLM and NFS lands in the local area, with 79,250 acres in reserve land allocations (44 percent of the forests). Other sites may also exist throughout the local area where surveys have not been completed, based on the number and distribution of sites

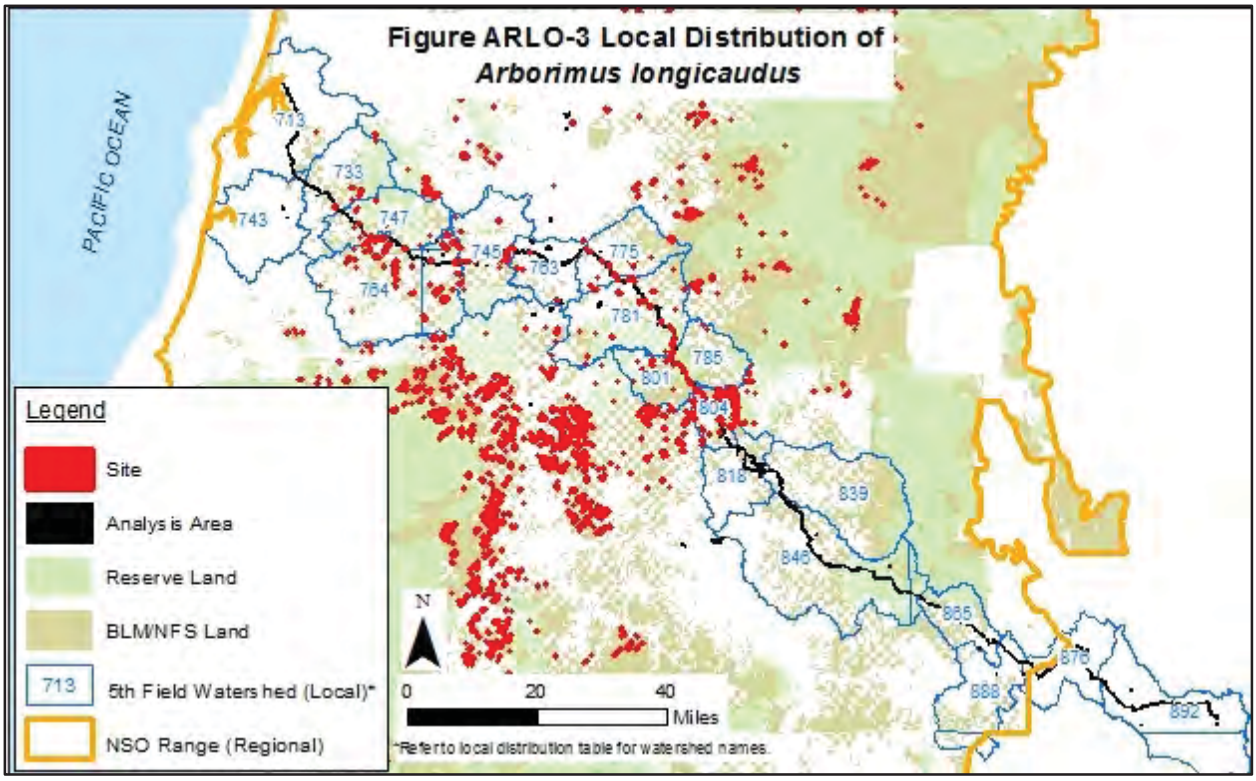
in the local and nearby regional areas and the extent of forests that may provide suitable habitat (see Figures ARLO-2 and ARLO-3).

TABLE ARLO-5

Distribution of *Arborimus longicaudus* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	-	-
Coos Bay Frontal (713)	1	-
East Fork Coquille River (747)	22*	11
Elk Creek-South Umpqua (785)	28*	15
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	-	-
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	144*	52
Middle South Umpqua River (763)	9*	-
Myrtle Creek (775)	33*	2
North Fork Coquille River (733)	9	1
Olalla Creek-Lookingglass Creek (745)	33*	13
Rogue River-Shady Cove (818)	4*	3
South Umpqua River (781)	69*	39
Spencer Creek (865)	-	-
Trail Creek (804)	217*	31
Upper Cow Creek (801)	45*	15

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011
*Note: Site counts are not additive because some sites occur in multiple watersheds and the counts overlap.



Analysis/Project Area Distribution

The analysis area contains 103 sites of *A. longicaudus*, and the project area contains 97 sites. All of the sites are at least partially on BLM or NFS lands, including 66 sites on BLM lands and 47 sites on NFS lands. Most of the sites are on land designated as Other (Matrix), and 43 sites are in reserves. Thirty-two sites are partially on private lands. The analysis area sites are distributed across 10 5th field watersheds, and many other sites are located in the vicinity of the sites (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 1,046 total observations of active nests of the species in 70 locations in or near the project area (Siskiyou BioSurvey LLC 2008, 2012b). All of these recorded observations in combination with other observations in agency databases comprise the 103 sites in the analysis area. Within the project area, the 97 sites are between MPs 27.1 and 116.8.

Project Impacts

Analysis

The PCGP Project would affect 103 sites out of the 3,886 sites on BLM- and Forest Service-managed lands in the region, representing approximately 3 percent of the sites (or 103 out of 3,909 total sites on all lands in the NSO range). The 103 sites were converted into 56 Habitat Areas, which were used for the analysis of impacts to the species. Table ARLO-6 presents an overview of the features of the PCGP Project that would affect the *A. longicaudus* Habitat Areas. The construction corridor, associated work and storage areas, and TMP would affect approximately 386 acres within the Habitat Areas (about 18 percent of the Habitat Areas). This discussion presents an overview of the types of impacts that would be expected in the Habitat Areas based on the features of the PCGP Project and that could affect site persistence.

Vegetation removal and grading activities in the construction corridor would disturb about 203.5 acres of vegetation and soil within 52 Habitat Areas and could result in the removal of trees that support *A. longicaudus* nests or cause injury or mortality to individuals. Disturbance in the TEWAs would result in similar impacts on about 46.2 acres within 46 Habitat Areas, and road improvements and establishment would result in similar impacts on about 8.9 acres within nine Habitat Areas. The establishment of the corridor, TEWAs, and roads could modify microclimate conditions around nests or potential nest trees adjacent to these areas. The removal of forests and potential nest trees could negatively affect *A. longicaudus* in adjacent areas by removing its habitat and opening the tree canopy, potentially affecting site persistence at the Habitat Areas even if the entire Habitat Area is not disturbed. In particular, modification of shading and habitat conditions as a result of the corridor, TEWAs, and roads could make entire Habitat Areas no longer suitable for the species because of the preference for closed canopy habitats. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 131.9 acres of understory habitat in 31 Habitat Areas, but these activities would be limited to understory disturbance and are less likely to affect *A. longicaudus* in the canopies of trees. Hydrostatic testing on about 0.4 acre within six Habitat

Areas is also not likely to affect *A. longicaudus* because it would be done after the pipeline is installed and would not affect trees.

TABLE ARLO-6

Impacts to *Arborimus longicaudus* Habitat Areas on BLM and NFS Lands in the Project Area

Project Activity	Number of Habitat Areas Affected	Area of Disturbance within Habitat Areas
Construction Corridor	52	203.5 ac
Temporary Extra Work Area (TEWA)	46	46.2 ac
Uncleared Storage Area (UCSA)	31	131.9 ac
Roads (TMP)	9	8.9 ac
Other Minimal Disturbance Activity	6	0.4 ac

ac = acres
Note: Counts are not additive because some Habitat Areas would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 220 acres of LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. These impacts would result in a reduction of habitat that may be suitable for *A. longicaudus*. Within this impact area, about 160 acres (about 73 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, but the restored areas would not return to LSOG conditions for more than 80 years and would not likely provide habitat for the species during the life of the PCGP Project. A permanent unforested corridor would also remain across the project area and would not provide habitat for the species. The permanent loss of LSOG coniferous and mixed forests below 6,000 feet msl represents less than 1 percent of the total estimated area of these forests across the species' range.

Discussion

Assuming site persistence cannot be maintained at the 56 Habitat Areas or 103 sites as a result of the PCGP Project, 466 sites of *A. longicaudus* would remain on BLM and NFS lands in the local area, including 117 in reserves, and 3,783 sites, including 630 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 630 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 17 percent of the remaining *A. longicaudus* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *A. longicaudus* is a Category C (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category C species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New

information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:

  - *A. longicaudus* has a somewhat wide distribution across seven physiographic provinces and two states in the region and a moderate-high number of overall sites (3,886 on BLM and NFS lands). The species appears to be well distributed in its range in Oregon. The currently known number of sites on BLM and NFS lands is an increase of 2,854 sites on BLM and NFS lands since 2007, with many sites documented during the PCGP Project surveys.
  - An estimated 17 percent of the sites (673 sites) are in reserves.

- LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are somewhat widely distributed across the species' range and encompass approximately 4.4 million acres on BLM and NFS lands with an estimated 58 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain LSOG forests, and many sites are located in the Coast Range. A subcomponent of these forests likely provides habitat for *A. longicaudus*.
- The PCGP Project would affect 103 of 3,886 BLM- and Forest Service-managed sites of *A. longicaudus*, representing approximately 3 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the 103 sites (56 Habitat Areas), a moderate-high number of sites (3,783) would continue to be documented on BLM and NFS lands in the region with a somewhat wide distribution across Oregon and California. Many sites (466 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across 12 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at 43 sites in reserves, but the percentage of sites in reserves would remain the same (17 percent). Of the remaining sites, 624 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 11 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *A. longicaudus* are unlikely. Three sites are at least partially in Riparian Reserves, where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources.
- The PCGP Project would result in a permanent loss of an estimated 220 acres of LSOG coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total acreage in the species' range). An estimated 2.6 million acres (58 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the species' range.
- The remaining forests could support additional populations of *A. longicaudus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category C species for which pre-disturbance surveys are practical and have been conducted in parts of the NSO range, and

it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during pre-disturbance and other surveys, including surveys associated with the PCGP Project.

7.1.1 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *A. longicaudus* at 103 sites or 56 Habitat Areas; however, the remaining sites would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 3,783 sites would remain on BLM and NFS lands across the region, and 466 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *A. longicaudus* at 103 sites or 56 Habitat Areas, these sites are part of the many sites in the Klamath Mountains and western Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *A. longicaudus* would persist in the region without considering the 103 sites as part of the population.
- The PCGP Project would remove approximately 220 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 73 percent of the forests would be restored to similar conditions or shrublands, but they would not likely provide habitat for the species during the life of the PCGP Project. An estimated 2.6 million acres (58 percent) of LSOG coniferous and mixed forests below 6,000 feet msl would remain in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2007.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is somewhat widely distributed.

The PCGP Project would not be able to avoid all *A. longicaudus* sites or Habitat Areas in the analysis area, although some individuals or nests within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 103 *A. longicaudus* sites or 56 Habitat Areas is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the land management plans that apply to affected sites would waive implementation of Management Recommendations for *A. longicaudus* sites and Habitat Areas affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

7.2 STRIX NEBULOSA

Strix nebulosa is a forest owl in the Strigidae family and is commonly known as great gray owl. Two subspecies are recognized: *Strix nebulosa nebulosa* in North America and *Strix nebulosa lapponica* in Asia and Europe. A third subspecies, *Strix nebulosa yosemitensis*, has been

proposed as an isolated population restricted to the Yosemite region of the central Sierra Nevada Mountains (Williams 2012).

7.2.1 Regulatory Status and Ranking

The 2001 ROD identifies *S. nebulosa* as a Category C (uncommon) species. The ORBIC evaluated *S. nebulosa* in its 2004 *Survey and Manage Assessment* for BLM and Forest Service (ORBIC 2004) and again in its most recent update of *Rare, Threatened and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be widespread, abundant, and secure within its global range (G5) and rare, uncommon or threatened, but not immediately imperiled, in Oregon (S3). The species is on the ORBIC List 4. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

7.2.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to the initial PCGP Project analysis (i.e., December 2012). Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are presented in the following section. This information is used to support the persistence evaluation in the following section and is updated with more recent information specifically used for the persistence evaluation.

Life History

S. nebulosa is nocturnal and highly elusive. The species tends to be long lived and has relatively low rates of reproduction and adult mortality (Williams 2012). Individuals in the wild are estimated to live between 10–20 years and begin breeding at three years of age. They are solitary in fall and early winter and become somewhat gregarious in the early spring. Adult males establish breeding territory in the autumn or winter by vocalizing in the vicinity of their nest, most often nocturnally. The owl demonstrates a strong fidelity to breeding and wintering areas (Bull et al. 1988), but individuals do not necessarily use the same nest year after year (Williams 2012). The owl does not build its own nests, but instead uses existing stick nests constructed by other raptors and large corvids. It also utilizes trees with large mistletoe clumps, depressions in the broken tops of large trees, or even artificial nesting platforms (Williams 2012, Quintana-Coyer et al. 2004). The nesting period is from March 1 through July 31 (Williams 2012).

The owl preys primarily on woodland and meadow rodents and to a lesser degree on other small mammal species, birds, and insects (Bull and Henjum 1990). Where other prey is scarce, even frogs may be consumed (Ulev 2007). In the western United States, *S. nebulosa* often preys on California vole (*Microtus californicus*), mole species (*Scapanus* spp.), and Botta's pocket gopher (*Thomomys bottae*). Conversely, adults and owlets are preyed upon by great horned owl (*Bubo virginianus*), raven (*Corvus corax*), northern goshawk (*Accipiter gentilis*), golden eagle (*Aquila chrysaetos*), and American marten (*Martes americana*) (Ulev 2007).

Range

S. nebulosa ranges across the boreal forests of North America, Europe, and Asia (ORBIC 2004). In North America, its range extends from Quebec to Alaska, southward through the alpine and

subalpine forests of the Cascade Mountains in Washington and Oregon, the northern Sierra Nevada Mountains in California, the northern Rocky Mountains, and portions of northern Minnesota, Michigan, and Wisconsin (Williams 2012, Quintana-Coyer et al. 2004). The northern limit of its range extends to the treeline, and the southern limit extends into other forest types (Williams 2012). The currently known range of the species within the NSO range based on 2013 data is presented below under the Species Distribution discussion.

Although information on the species' historic range is not known, its range was likely similar to the current range, with populations widely distributed across North America, Europe, and Asia. Regional and local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed under Threats below.

Population Status

The ORBIC (2004) reported *S. nebulosa* from more than 300 element occurrences worldwide in 2004. In the Pacific Northwest, most occurrences were from Oregon (21–300), with fewer in California (6–20) and Washington (1–5) (ORBIC 2004). The ORBIC estimated that 4–12 of the occurrences in Oregon were in protected areas in 2004. In Oregon, *S. nebulosa* was considered rare to uncommon in 2004, but populations were stable to relatively stable (ORBIC 2004). Within the NSO range, the population trend of *S. nebulosa* has been decreasing (USDA and USDI 2007). The species was not included in the Random Multi-Species surveys across the NSO range in 2001–2004 (USDA and USDI 2007). In the 2007 Final SEIS, the Forest Service and BLM reported 118 sites on federal lands and 131 total sites on all lands.

Protocol surveys were conducted for *S. nebulosa* in 2007–2008 and 2010–2011 in suitable habitat in and near the PCGP Project area. Approximately 4,440 acres were surveyed in 2007–2008 (Siskiyou BioSurvey LLC 2008), and two proposed re-routes, including suitable habitat within 0.25-mile, were surveyed in 2010–2011 (Siskiyou BioSurvey LLC 2011c). In 2007, 18 detections of the species were recorded, including two pairs and one resident owl. In 2008, 31 detections of the species were recorded, including 13 clusters, three pairs, and one resident owl. In 2010–2011, two great gray owls were heard, but more details on the owls were not recorded, and they were assumed to be individual detections, not pairs. The current estimated number of sites and distribution of the species based on 2013 data are presented below under the Species Distribution discussion.

Habitat

S. nebulosa has been found in coniferous and mixed hardwood-coniferous forests up to approximately 6,000 feet msl (Williams 2012, Quintana-Coyer et al. 2004). The owl is typically found in mature coniferous forest composed primarily of pine (*Pinus* spp.), fir (*Abies* spp.), and spruce (*Picea* spp.) and nests in large, undisturbed forest stands (Williams 2012). It has a close association with habitat edges, particularly the interface between mature forest and meadows where snags are present and adjacent clearings are generally larger than 10 acres (Williams 2012, Quintana-Coyer et al. 2004). Natural forest openings along the edges of meadows, bogs, and other open areas serve as foraging habitat, where individuals perch on low branches and watch for prey species (Ulev 2007). LSOG forests, selectively logged forests, and clearcuts also provide foraging habitat (Williams 2012). Habitats composed of large open areas with few or no trees or with high shrub density tend to be avoided (Duncan 1997).

In the Siskiyou Mountains in southwestern Oregon, *S. nebulosa* has been reported nesting most frequently in LSOG forest stands composed primarily of Douglas fir located near forest edges (Quintana-Coyer et al. 2004). It tends to select oak (*Quercus* spp.), Pacific madrone (*Arbutus menziesii*), and LSOG Douglas-fir forests adjacent to Oregon white oak (*Quercus garryana*) woodlands and chaparral (Williams 2012). In the central and southern Cascade Range in Oregon, the species most often use lodgepole (*Pinus contorta*) and ponderosa pine (*Pinus ponderosa*) forests (Williams 2012, Bull and Henjum 1992).

Threats

Loss of habitat availability and quality through timber harvesting, including non-clearcut methods, is the greatest threat to the species. Removal of large diameter trees results in loss of dense canopy that the species requires for nesting and roosting and the snags required for foraging (Williams 2012). Changes in forest stand dynamics can also indirectly affect nest availability by reducing or destroying nesting habitat for northern goshawks and other raptors whose nests are later used by *S. nebulosa*. Regenerating timber harvest also threatens the species because the densely growing young trees shade out the grasses and other understory vegetation used by rodents (Williams 2012). Forest fire suppression has led to intrusion of small conifer trees into meadows and other open areas, reducing foraging habitat in already small meadow areas. Because the species is at risk from predation by great horned owl in large open areas, clear cutting does not necessarily improve foraging habitat (Duncan 1997).

Management Recommendations

As a Category C S&M species, the direction from the 2001 ROD is to manage high-priority sites to provide a reasonable assurance of species persistence. The *Conservation Assessment for Great Gray Owl (Strix nebulosa)* provides management considerations for the species (Williams 2012). The guidance includes retaining sufficient landscape-level habitat features; protecting and maintaining existing nest sites; minimizing disturbance around nest sites during the breeding season; and providing artificial nest structures. Habitat features that should be retained include open areas for foraging adjacent to stands of mature or old-growth trees for nesting and roosting; irregular borders to increase forest edge area; forested corridors between cut areas; forested stands around nest sites or potential nest sites; and hunting perches (large trees, large snags, or artificial platforms) in harvest patches.

7.2.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *S. nebulosa* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and Forest Service (Oregon/Washington regional offices) and converted into sites according to the methodology described in Chapter 1. Table STNE-1 presents the total number of sites in the regional (NSO range), local (19 5th field watersheds that

encompass the project area), analysis (0.25- to 1-mile spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 376 observations from BLM and Forest Service geodatabases were converted into 230 sites in the NSO range (region); only observations with reproducing status confirmed were converted. Table STNE-2 presents the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table STNE-3 presents the total number of sites within each land use allocation defined in the 1994 ROD across the regional, local, and analysis areas. Figure STNE-1 displays the regional distribution of the species across BLM and NFS lands, and Figure STNE-2 displays the species' regional distribution with the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests on BLM and NFS lands within the currently known range of the species.

TABLE STNE-1

Number of *Strix nebulosa* Sites (2013)

Location*	Number of Sites
Regional Area	230
Local Area	115
Analysis Area (Project Area)	11 (0)

Data Source: Processed BLM and Forest Service GIS data, Nov. 8, 2013
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

TABLE STNE-2

Distribution of *Strix nebulosa* Across Federal, Private, and Other Lands

Land Ownership	Regional Sites	Local Sites	Analysis Area Sites
BLM	174	96	8
Forest Service	43	11	1
NPS	-	-	-
Fish and Wildlife Service	-	-	-
Other (Private, State, etc.)	20	13	3

Data Source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE STNE-3

Distribution of *Strix nebulosa* Across 1994 ROD Land Allocations

Land Allocation	Regional Sites	Local Sites	Analysis Area Sites
Adaptive Management Area (AMA)	27	-	-
Adaptive Management Reserves (AMR)	-	-	-
Administratively Withdrawn (AW)	8	-	-
Congressionally Reserved (CR)	**-**	**-**	**-**
Late Successional Reserve (LSR)	**4**	**1**	**1**
Marbled Murrelet Area (LSR3)	**-**	**-**	**-**
Northern Spotted Owl Activity Center (LSR4)*	**12**	**6**	**4**
Managed Late Successional Area (MLSA)	-	-	-
Not Designated (ND)	-	-	-
Other (Matrix, Riparian Reserve, Other)	171	103	5
Riparian Reserve	**-**	**-**	**-**

Data Sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
*Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center (KOAC).



Figure STNE-1. Regional Distribution of *Strix nebulosa*

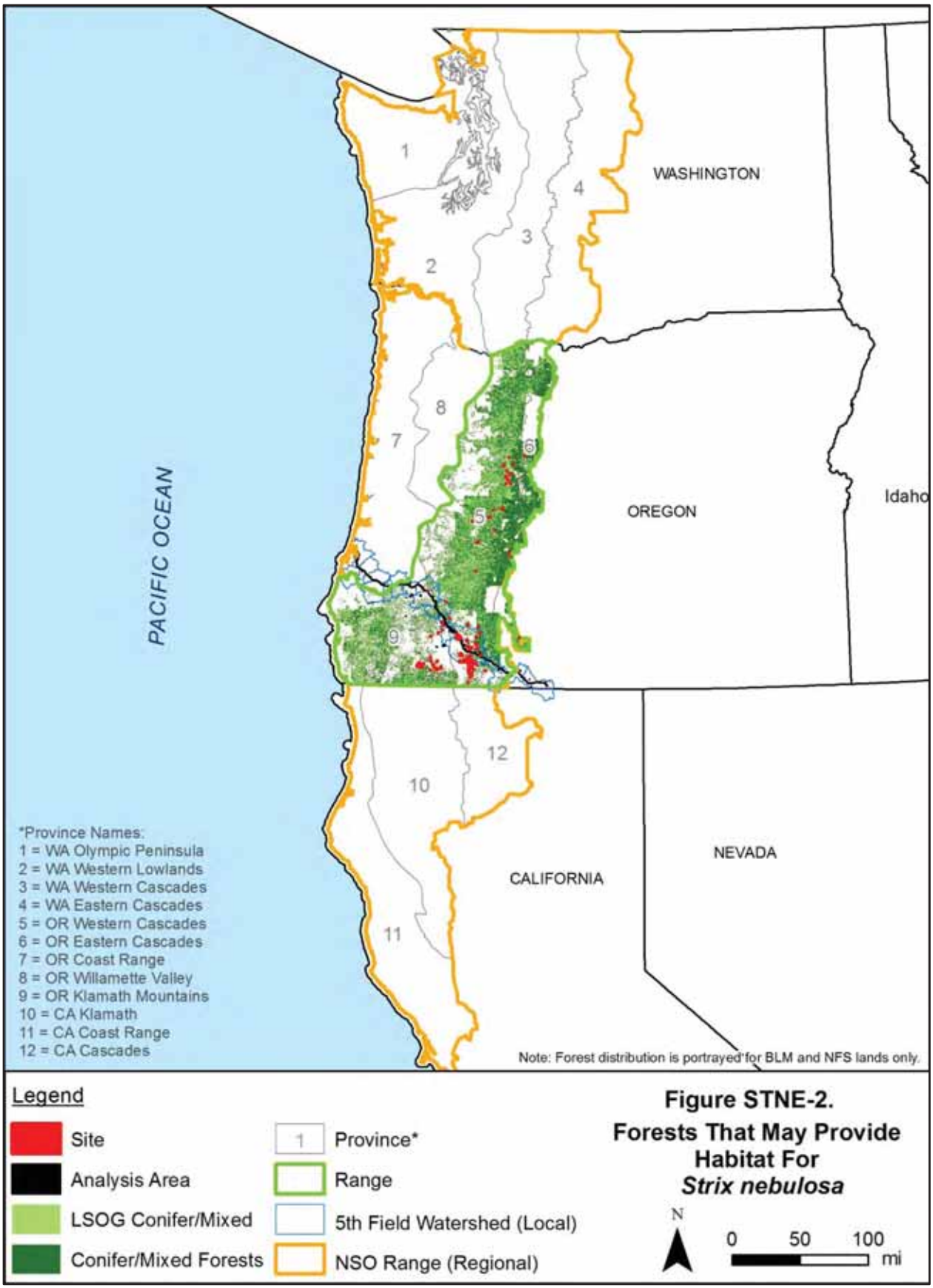


Figure STNE-2.
Forests That May Provide Habitat For *Strix nebulosa*

Regional Distribution

S. nebulosa has a somewhat limited distribution across three physiographic provinces in Oregon (Cascades West and East and Klamath Mountains) (see Figure STNE-1). Most sites are found in a large group in the southern Cascade Range and eastern Klamath Mountains. Other sites are scattered across the northern Cascade Range in Oregon. *S. nebulosa* appears to be well distributed in its range in the eastern Klamath Mountains and western Cascade Range in Oregon based on the relative abundance of sites and proximity of sites to one another in the mountain ranges.

Twenty of 230 sites are located on private lands (at least partially), and 217 sites are on BLM and NFS lands across the region (at least partially). Sites managed by the BLM Districts that encompass the project area include three sites in the Klamath Falls Resource Area of the Lakeview District, 170 sites in the Medford District, and one site in the Roseburg District. Sites managed by the National Forests that encompass the project area include one site on the Winema National Forest, 12 sites on the Rogue River National Forest, and two sites on the Umpqua National Forest. The remaining 28 sites on BLM and NFS lands are on the Deschutes and Willamette National Forests.

Across the NSO range, 16 sites are located on reserve lands managed by BLM and the Forest Service, including four in LSRs and 12 in Known Owl Activity Centers. This represents 7 percent of the total BLM- and Forest Service-managed sites in the region. The remaining BLM- and Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

S. nebulosa is less common in LSOG forests based on available data (110 of 230 total sites are in LSOG), but it is fairly common in younger forests with suitable nesting trees and nearby meadows or open areas for foraging. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests across a wide elevation range, but is only found in the Cascade Range and Klamath Mountains in Oregon. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, within this range could provide habitat for *S. nebulosa* and support additional sites. These forests encompass an estimated 7.2 million acres on BLM and NFS lands in the species' range, including an estimated 3.4 million acres in reserve land allocations (48 percent of the forests; Table STNE-4). Of this acreage, an estimated 2.6 million acres are LSOG (see Figure STNE-2), including 1.4 million acres in reserve land allocations (53 percent of the forests). Coniferous and mixed hardwood-coniferous forests are widespread across Oregon, and LSOG forests are somewhat widespread

TABLE STNE-4

Extent of Forests that Could Provide Habitat for *Strix nebulosa* on BLM and NFS Lands*

Location	Coniferous/Mixed Forests		LSOG Coniferous/Mixed Forests	
	Total	Reserves	Total	Reserves
Regional Area	7,198,200	3,433,650	2,580,280	1,374,080
Local Area	453,290	141,660	134,380	51,560
Project Area	1,170	430	260	140

Data Source: GNN vegetation data from Moeur et al. 2011

Note: Areas are presented in acres. Regional area estimates are for a portion of the NSO range, as noted in the text, which is where the species is known to or may occur.

*The acreage estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *S. nebulosa* is distributed across five 5th field watersheds that overlap the project area (see Table STNE-5 and Figure STNE-3). The sites are primarily in the Cascade Range as part of the larger group of regional sites, with a few scattered sites in the Klamath Mountains. Many regional sites are located within 30 miles to the south and southeast.

Of the 115 sites in the local area, 107 sites are on BLM and NFS lands. These sites are located on lands designated as Other (Matrix) and LSR. Thirteen sites are at least partially on private lands. Of the 107 sites in the local area on BLM and NFS lands, seven sites are on reserve lands, representing 7 percent of the sites. These sites are in LSRs in the Big Butte and Little Butte Creek watersheds.

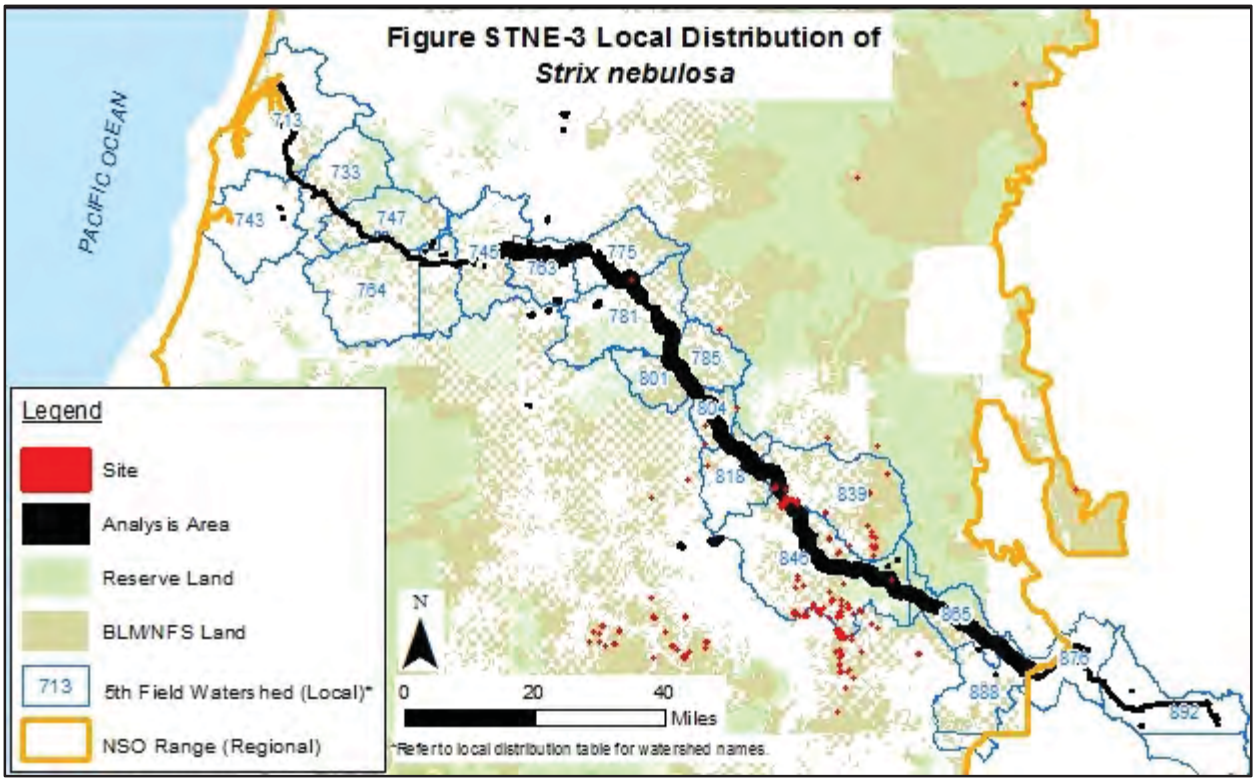
Coniferous and mixed hardwood-coniferous forests encompass approximately 453,290 acres on BLM and NFS lands in the local area, including 141,660 acres in reserve land allocations (31 percent of the forests). Of this acreage, an estimated 134,380 acres are LSOG, including 51,560 acres in reserve land allocations (38 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, particularly in the Cascade Range and Klamath Mountains, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures STNE-2 and STNE-3).

TABLE STNE-5

Distribution of *Strix nebulosa* in Local 5th Field Watersheds

Watershed (HUC5 ID)	Number of Sites	Number of Sites on Reserve Lands
Big Butte Creek (839)	37	6
Coos Bay Frontal (713)	-	-
East Fork Coquille River (747)	-	-
Elk Creek-South Umpqua (785)	-	-
Klamath River-John C Boyle Reservoir (888)	-	-
Lake Ewauna-Upper Klamath River (876)	-	-
Little Butte Creek (846)	74	1
Lower Coquille River (743)	-	-
Lower Lost River (892)	-	-
Middle Fork Coquille River (764)	-	-
Middle South Umpqua River (763)	-	-
Myrtle Creek (775)	-	-
North Fork Coquille River (733)	-	-
Olalla Creek-Lookingglass Creek (745)	-	-
Rogue River-Shady Cove (818)	1	-
South Umpqua River (781)	1	-
Spencer Creek (865)	-	-
Trail Creek (804)	2	-
Upper Cow Creek (801)	-	-

Data Sources: Processed BLM and Forest Service GIS data, Nov. 8, 2013; HUC5 Watershed layer, Aug. 23, 2011



Analysis/Project Area Distribution

The analysis area contains 11 sites of *S. nebulosa*, but none are located in the project area. The analysis area sites are distributed across three 5th field watersheds, with one site in the South Umpqua River watershed in the Klamath Mountains, four sites in the Little Butte Creek watershed in the Cascade Range, and six sites in the Big Butte Creek watershed in the Cascade Range. Many sites are also located within the vicinity of the analysis area (see Local Distribution discussion above), and the analysis area sites are part of a large group of sites in southern Oregon.

Eight sites are on BLM-managed lands in the Medford and Roseburg Districts, including five sites at least partially on lands designated as Other (Matrix) and four sites at least partially in Known Owl Activity Centers (at least partially). One site is on Forest Service-managed lands designated as LSR on the Rogue River National Forest. One site is partially on private land and partially on BLM land. Two other sites are on private lands in the analysis area, but these sites are not managed by BLM or the Forest Service.

Surveys for the PCGP Project resulted in 51 detections of the species near the project area (Siskiyou BioSurvey LLC 2008, 2011c). An estimated four of these recorded observations in combination with 11 other observations in agency databases comprise the 11 sites in the analysis area; the other detections are in sites outside the analysis area or are not considered sites (e.g., not active breeding pairs). One site is west of MP 86.6, six sites are near MP 134, one site is east of MP 136.9, and one site is east of MP 162.4. Two other sites on private lands are west of MP 137.3.

Project Impacts

Analysis

The PCGP Project could affect nine sites out of the 217 sites on BLM- and Forest Service-managed lands in the region, representing approximately 4 percent of the sites (or 11 sites on all lands out of 230 total sites on all lands in the NSO range). Two sites are on private lands and are not subject to BLM or Forest Service management; therefore, they are not considered in this analysis. The sites on BLM- and Forest Service-managed lands could be indirectly affected by activities within the project area, but no direct impacts are anticipated (e.g., removal of active nest trees or nests). Table STNE-6 presents an overview of the anticipated effects to each site. This discussion presents an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project and that could affect site persistence.

TABLE STNE-6

Overview of Impacts to *Strix nebulosa* Sites

Site Location	Source of Impacts	Distance to Disturbance	Individuals Likely to Persist?
West of MP 86.6 (1 site)	Corridor, TEWA, UCSAs, Blasting	920 feet (0.17 mile)	No
West of MP 133.7-134.3 (5 sites)	Blasting	2,900-5,200 feet (0.55-0.99 mile)	No
East of MP 134.6 (1 site)	Blasting	4,320 feet (0.8 mile)	No
East of MP 136.8 (1 site)	Corridor, TEWAs, UCSAs	1,080 feet (0.21 mile)	No
East of MP 162.4 (1 site)	Corridor, TEWAs, UCSAs, Blasting	1,300 feet (0.24 mile)	No

Notes: MP = milepost; TEWA = Temporary Extra Work Area; UCSA = Uncleared Storage Area

Of the nine sites in the analysis area, three sites may be subject to indirect effects from construction activities in the corridor and associated work and storage areas, and eight sites may be subject to indirect effects from potential blasting along the corridor. All sites are located more than 900 feet from the edge of the construction corridor, and the intensity of potential disturbances would decrease with distance from the project area (e.g., high noise levels would attenuate with increased distance from the source). In addition, the area around each nest site and between the nest sites and the project area is heavily forested, which would mask noise levels and reduce disturbance-related effects associated with the PCGP Project.

Activities within the corridor and TEWAs would result in extensive noise disturbance during vegetation clearing, grading, and pipeline installation. These activities would take place within a 0.25-mile radius of three of the sites, and although they would be more than 300 feet away from the nest sites, disturbance during the nesting season could result in nest abandonment and loss of young. Blasting may be necessary along segments of the corridor that contain hard, non-rippable bedrock (e.g., volcanic and metavolcanic rocks) and could result in noise levels up to 92 decibels at 200 feet from the source (Michael Minor & Associates 2008). Helicopter use could also result in high noise levels of 92 decibels up to 700 feet from the helicopter. These activities would also result in disturbance to nesting owls if implemented during the nesting season, which could lead to nest abandonment and loss of young. Impacts to nest sites during the nesting season could result in nest failure, which would affect the persistence of great gray owl in the nine sites.

Across the project area, the PCGP Project would remove an estimated 920 acres of coniferous and mixed hardwood-coniferous forests, including 180 acres of LSOG forests. These impacts would result in a reduction of nesting habitat that may be suitable for *S. nebulosa*. Within this impact area, about 600 acres (about 65 percent) of the forests would be restored to forests or

shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential nesting habitat, although some of the restored areas may provide foraging habitat for the species. A permanent unforested corridor would remain across the project area, resulting in a permanent loss of about 190 acres of coniferous and mixed forests. The corridor could, however, provide a foraging area for the owl. The loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed hardwood-coniferous forests across the species' range.

Discussion

Assuming site persistence cannot be maintained at the nine sites as a result of the PCGP Project, 98 sites of *S. nebulosa* would remain on BLM and NFS lands in the local area, including two in reserves, and 208 sites, including 11 in reserves, would remain on BLM and NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 11 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 5 percent of the remaining *S. nebulosa* sites on BLM and NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states "instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision" (Standards and Guidelines, pg. 4). The BLM and Forest Service have embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *S. nebulosa* is a Category C (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category C species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, however, since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
    - *S. nebulosa* has a somewhat limited distribution across three physiographic provinces and one state in the region, but a moderate-high number of overall sites (217 on BLM and NFS lands). The species appears to be well distributed in the western Cascade Range and eastern Klamath Mountains in Oregon, but it has a more scattered distribution in other parts of its range in Oregon. The currently known number of sites on BLM and NFS lands is an increase of 99 sites on BLM and NFS lands since 2007, with some sites documented during the PCGP Project surveys.
    - An estimated 7 percent of the sites (16 sites) are in reserves.
- Coniferous and mixed hardwood-coniferous forests (general habitat for the species) are widely distributed across the species' range and encompass approximately 7.2 million acres on BLM and NFS lands with an estimated 47 percent in reserves. A subcomponent of these forests likely provides habitat for *S. nebulosa*.

- The PCGP Project would affect nine of 217 BLM- and Forest Service-managed sites of *S. nebulosa*, representing approximately 5 percent of the sites on BLM and NFS lands in the NSO range. Assuming site persistence cannot be maintained at the nine sites, a moderate-high number of sites (208) would continue to be documented on BLM and NFS lands in the region with a somewhat limited distribution across Oregon. Many sites (98 sites) would remain in the local vicinity of the analysis area; these sites would be distributed across four 5th field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at five sites in reserves, and the percentage of sites in reserves would remain about the same (5 percent). Of the remaining sites, 11 are in LSRs where management actions are restricted to those activities that benefit LSOG forests.
- The PCGP Project would result in a permanent loss of an estimated 190 acres of coniferous and mixed hardwood-coniferous forests (less than 1 percent of the total acreage in the species' range). An estimated 3.4 million acres (48 percent) of the forests and 1.4 million acres (53 percent) of LSOG forests would remain in reserves in the species' range.
- The remaining forests could support additional populations of *S. nebulosa*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category C species for which pre-disturbance surveys are practical and have been conducted in parts of the NSO range, and it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during pre-disturbance and other surveys, including surveys associated with the PCGP Project.

7.2.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *S. nebulosa* at nine sites; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 208 sites would remain on BLM and NFS lands across the region, and 98 sites would remain on BLM and NFS lands in the local area. Although the PCGP Project would affect site persistence of *S. nebulosa* at nine sites, these sites are part of the many sites in the Klamath Mountains and Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *S. nebulosa* would persist in the region without considering the nine sites as part of the population.
- The PCGP Project would remove approximately 920 acres of coniferous and mixed hardwood-coniferous forests and 180 acres of LSOG forests (a negligible amount of the forests). An estimated 65 percent of the forests would be restored to similar conditions or shrublands, and a permanent unforested corridor would remain across the project area, which could provide foraging habitat for the owl. An estimated 3.4 million acres (48 percent) of the forests and 1.4 million acres (53 percent) of LSOG forests would remain

in reserves in the species' range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 2007.

- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is relatively common, despite a somewhat limited distribution.

The PCGP Project would not be able to avoid indirect impacts to all *S. nebulosa* sites in the analysis area, although some nest sites within the sites may persist following project implementation. Based on the above conclusions, avoidance of impacts to the nine *S. nebulosa* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term, as specified by the agency responsible for management of the sites. The monitoring plan shall be approved by the BLM and Forest Service.

8.0 REFERENCES

Agnello, C., Carbone, M., and J. Harnisch. 2011. Contribution to the knowledge of *Plectania milleri* (Ascomycota, Pezizales), a Northwestern American species. *Ascomycete.org*: 3(3): 47-54.

Ammirati, J. and S. Trudell. 2009. Mushrooms of the Pacific Northwest. Timber Press Field Guides. Timber Press. Portland, Oregon. pp.288–9.

Arora, D. 1986. Mushrooms Demystified. Ten Speed Press. Berkeley, California.

Atlas of Living Australia. 2012. Atlas of Living Australia: *Ramaria rubrievanescens*. Available online at: http://bie.ala.org.au/species/Ramaria+rubrievanescens. Accessed February 2013.

Aubry, K.B., M.J. Crites, and S.D. West. 1991. Regional patterns of small mammal abundance and community composition in Oregon and Washington. In *Wildlife and Vegetation of Unmanaged Douglas-Fir Forests*. U.S. Department of Agriculture, Forest Service. PNW-GTR-285, Portland, Oregon. pp. 285–294.

Biswell, B., Blow, M., Breckel, R., Finley, L., and J. Lint. 2002. Survey protocol for the red tree vole, *Arborimus longicaudus* (= *Phenacomys longicaudus* in the Record of Decision of the Northwest Forest Plan). Version 2.1, Revision, October 2002.

Bull, E. and M. Henjum. 1990. Ecology of the great gray owl. Gen. Tech. Rep. PNW-GTR-265. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 39 pp.

Bull, E., Henjum, M., and R. Rohweder. 1988. Home range and dispersal of great gray owls in northeastern Oregon. *Journal of Raptor Research*. 22(4): 101-106.

Carey, A.B. 1991. The biology of arboreal rodents in Douglas-fir forest. Gen. Tech. Report GTR-276. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 46 pp.

Castellano, M.A. and T. O'Dell. 1997. Management recommendations for survey and manage fungi. Version 2.0. September. Available online at: http://www.blm.gov/or/plans/surveyandmanage/MR/Fungi/default.htm. Accessed February 2013.

Castellano, M., Cazares, E., Fondrick, B., and T. Dreisbach. 2003. Handbook to additional fungal species of concern in the Northwest Forest Plan. Gen. Tech. Rep. PNW-GTR-572. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 144 pp.

Castellano, M.A., Smith, J.E., O'Dell, T., Cazares, E., and S. Nugent. 1999. Handbook to strategy 1 fungal taxa from the Northwest Forest Plan. Gen. Tech. Rep. PNW-GTR-476. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 195 pp.

Cha, J.Y., Lee, S.Y., Chun, K.W., Lee, S.Y. and Ohga, S. 2010. A new record of a snowbank fungus, *Mycena overholtsii*, from Japan. J. Fac. Agr., Kyushu Univ., 55: 77-78.

Cripps, C. 2009. Snowbank fungi revisited. Fungi. 2(1): 47-53.

Cushman, K. and R. Huff. 2007. Conservation assessment for fungi included in Forest Service Regions 5 and 6 Sensitive and BLM California, Oregon and Washington Special Status Species Programs. USDA Forest Service Regions 5 and 6, Oregon and Washington; USDI Bureau of Land Management, California, Oregon and Washington. July.

Derr, C., Helliwell, R., Ruchty, A., Hoover, L., Geiser, L., Lebo, D., and J. Davis. 2003. Survey protocols for survey & manage Category A & C lichens in the Northwest Forest Plan area. Version 2.1.

Duncan, J.R. 1997. Great gray owls (*Strix nebulosa nebulosa*) and forest management in North America: a review and recommendations. Journal of Raptor Research, 31(2): 160-166

Duncan, N.C. 2005a. Conservation assessment for *Deroceras hesperium*, evening fieldslug. Prepared for the Pacific Northwest Key Council. USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington. Originally issued as Management Recommendations by Thomas E. Burke in 1998.

Duncan, N.C. 2005b. Conservation assessment for *Monadenia (Shastelix) chaceana*, Chace sideband. USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington. Originally issued as Management Recommendations by Ted R. Weasma, in 1998.

Duncan, N.C., Burke, T., Dowlan, S., and P. Hohenlohe. 2003. Survey protocol for survey and manage terrestrial mollusk species from the Northwest Forest Plan. Version 3.0.

Edge Environmental. 2011. PCGP Project Survey and Manage Species Persistence Analyses. Prepared for Pacific Connector. July.

Edge Environmental. 2013. PCGP Project Survey and Manage Species Persistence Analyses: *Chaenotheca chrysocephala*. Prepared for Pacific Connector. February.

Exeter, R.L., Norvell, L., and E. Cazares. 2006. *Ramaria* of the Pacific Northwestern United States. USDI BLM/OR/WA/PT-06/050-1792. Salem, Oregon. 157 pp.

Forest Ecosystem Management Assessment Team (FEMAT). 1993. Forest Ecosystem Management: An Ecological, Economic, and Social Assessment, Report of the Forest Ecosystem Management Assessment Team. July.

Fremont-Winema National Forests. 2010. Fremont-Winema 2009-10 Fungi Survey.

Glejdura, S., Kunca, V., and V. Kucera. 2011. *Plectania melastoma* (Sarcosomataceae, Pezizales) in Slovakia. *Catathelasma*: 13: 19-24.

Gordon, M. 2012. *Phaeocollybia* persistence in project areas. Prepared for completion of BLM contract L11PX02048. Molecular Solutions LLC. May 18, 2012.

Grebenc, T., Martín, M.P., and H. Kraigher. 2009. Ribosomal ITS diversity among the European species of the genus Hydnum (Hydnaceae). Anales del Jardín Botánico de Madrid 66S1, pp. 121–132.

Gulden, G. and K. Shalchian-Tabrizi. 2005. *Galerina* Earle: A polyphyletic genus in the consortium of dark-spored agarics. *Mycologia.* 97(4): 823-837.

Hayes, J.P. 1996. *Arboriums longicaudus*. Mammalian Species. 532: 1–5.

Helliwell, R. 2007. Species Fact Sheet: *Dendriscocaulon intricatulum*. March.

Helliwell, R. 2013. Status of *Cypripedium fasciculatum*. Personal communication with North State Resources, Forest Service, and BLM. April 15, 2013.

Hibler, C., Smith, J.E., Dreisbach, T., Castellano, M., Fondrick, B., and C. Mayrsohn. 2001a. 2001 Species review process, step 2 worksheet. Fungi species: GAVI8, GYPU2, NINU, PHOL. May 9, 2001.

Hibler, C., Smith, J.E., Dreisbach, T., Castellano, M., Fondrick, B., and C. Mayrsohn. 2001b. 2001 Species review process, step 2 worksheet. Fungi species: *Gyromitra esculenta*, *Gyromitra infula*, *Gyromitra melaleucoides*, and *Gyromitra montana*. May 9, 2001.

Hibler, C., Smith, J.E., Dreisbach, T., Castellano, M., Fondrick, B., and C. Mayrsohn. 2001c. 2001 Species review process, step 2 worksheet. Fungi species: HYUM, SAIM, TRHE, COCA43. May 9, 2001.

Hibler, C., Smith, J.E., Dreisbach, T., Castellano, M., Fondrick, B., and C. Mayrsohn. 2001d. 2001 Species review process, step 2 worksheet. Fungi species: MYMO2, MYOV, CHCY4, COBA11. May 9, 2001.

Hibler, C., Smith, J.E., Dreisbach, T., Castellano, M., Fondrick, B., and C. Mayrsohn. 2001e. 2001 Species review process, step 2 worksheet. Fungi species: RAAR7, RAAU3, RACE4, RARU5, RARU6, RAST5. May 9, 2001.

Holthausen, R.S., Anthony, R., Aubry, K., Burnett, K., Fredricks, N., Furnish, J., Lesher, R., Meslow, E.C., Raphael, M., Rosentreter, R., and E.E. Starkey. 1994. Appendix J2: results of additional species analysis. Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl. U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management. February.

Horak, E. 1977. Further additions towards a monograph of *Phaeocollybia.* Sydowia 29: 28-70.

Huff, R. 2010a. Species fact sheet: *Chaenotheca subroscida*. Interagency Special Status/Sensitive Species Program (ISSSSP). U.S. Forest Service and U.S. Bureau of Land Management. Available online at: http://www.fs.fed.us/r6/sfpnw/issssp/species-index/flora-lichens.shtml. Account last updated May 2010. Accessed February 2013.

Huff, R. 2010b. Species fact sheet: *Leptogium teretiusculum*. Interagency Special Status/Sensitive Species Program (ISSSSP). U.S. Forest Service and U.S. Bureau of Land Management. Available online at: http://www.fs.fed.us/r6/sfpnw/issssp/species-index/flora-lichens.shtml. Account last updated November 2010. Accessed February 2013.

Huff, R., Van Norman, K., Hughes, C., Davis, R., and K. Mellen-Mclean. 2012. Survey protocol for the red tree vole, version 3.0. Portland, OR. U.S. Department of the Interior, Bureau of Land Management, Oregon/Washington, and U.S. Department of Agriculture, Forest Service Regions 5 and 6. 52 p. Available online at: http://www.blm.gov/or/plans/surveyandmanage/files/sp-RedTreeVole-v3-0-2012-11.pdf. Accessed February 2013.

Johnson, M.L. and S.B. George. 1991. Species limits within the *Arborimus longicaudus* species-complex (Mammalia: Rodentia) with a description of a new species in California. Contributions in Science #429. Natural History Museum of Los Angeles County. 15pp.

Lesher, R.D., Derr, C.C., and L.H. Geiser. 2003. Natural history and management considerations for Northwest Forest Plan survey and manage lichens based on information as of the year 2000. USDA Forest Service Pacific Northwest Region Natural Resources Technical Paper, Portland, OR, R6-NR-S&M-TP-03-03. 211 p.

Lichthardt, J. 2003. Conservation Strategy for clustered lady's-slipper orchid (*Cypripedium fasciculatum*) in the U.S. Forest Service Region 1. Prepared for: Idaho Panhandle National Forests.

Manning, T. and C. Maguire. 1999. A new elevation record for the red tree vole in Oregon: Implications for National Forest management. American Midland Naturalist, 142(2): 421-423.

Martin, E., McCune, B., and J. Hutchinson. 2002. Distribution and Morphological Variation of *Leptogium cellulosum* and *L. teretiusculum* in the Pacific Northwest. *The Bryologist*. 105(3): 358-362.

Michael Minor & Associates. 2008. Blasting and helicopter noise analysis & mitigation plan. Construction Support Noise Analysis: Coos Bay to Malin, Oregon. Prepared for Pacific Connector Gas Pipeline, L.P. February.

Miller, A. 2004. Trial key to the Mycenoid species in the Pacific Northwest. Rev. ed. Pacific Northwest Key Council.

Moeur, M., Ohmann, J.L., Kennedy, R.E., Cohen, W.B., Gregory, M.J., Yang, Z., Roberts, H.M., Spies, T.A., and M. Fiorella. 2011. Northwest Forest Plan–the first 15 years (1994–2008): status and trends of late-successional and old-growth forests. Gen. Tech. Rep. PNW-GTR-853. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 48 p.

Molina, R. 2008. Protecting rare, little known, old-growth forest-associated fungi in the Pacific Northwest USA: A case study in fungal conservation. Mycological Research. 112: 613-638.

Molina, R. and J. Trappe. 1994. Biology of the ectomycorrhizal genus, *Rhizopogon. New Phytologist*, 126(4): 653-675.

Newton, R.E., Stanley, A.G., Thorpe, A.S., and T.N. Kaye. 2010. Experimental habitat manipulation of wayside aster (*Eucephalus vialis*). Institute for Applied Ecology, Corvallis, Oregon, USDI Bureau of Land Management, Eugene District, and National Fish and Wildlife Foundation. vi + 45.

Norvell, L.L. 1998. The biology and taxonomy of Pacific Northwest species of *Phaeocollybia* Heim (Agaricales, Cortinariaceae). Seattle, WA: University of Washington. 391 p. Ph.D. dissertation.

Norvell, L.L., and R.L. Exeter. 2008. *Phaeocollybia* of Pacific Northwest North America. USDI BLM/OR/WA/GI-08/100-1792. Salem, Oregon. 228 pp.

Oregon Biodiversity Information Center. 2001. Rare, threatened, and endangered plants and animals of Oregon. Oregon Natural Heritage Program, Portland, Oregon. 94 pp. February. Available online at: http://orbic.pdx.edu/documents/2001tebook.pdf. Accessed January 2014.

Oregon Biodiversity Information Center. 2004. Survey and manage assessment species reports from 2004. Portland State University. Available online at: http://orbic.pdx.edu/rare-manage.html. Accessed February 2013.

Oregon Biodiversity Information Center. 2007. Rare, threatened, and endangered species of Oregon. Oregon Natural Heritage Information Center, Oregon State University, Portland, Oregon. 100 pp. March. Available online at: http://orbic.pdx.edu/documents/2007_t&e_book.pdf. Accessed January 2014.

Oregon Biodiversity Information Center. 2010. Rare, threatened, and endangered species of Oregon. Portland State University. Available online at: http://orbic.pdx.edu/documents/2010-rte-book.pdf. Accessed February 2013.

Oregon Biodiversity Information Center. 2013. Rare, Threatened and Endangered Species of Oregon. Institute for Natural Resources, Portland State University, Portland, Oregon. 111 pp. Available online at: http://orbic.pdx.edu/documents/2013-rte-book.pdf. Accessed January 2014.

Pfister, D.H. 1980. "Peziza" melaleucoides: A species of *Gyromitra* from the western United States. *Mycologia.* 72(3): 614-619.

Ponzetti, J. and E. Wittmann. 2006. Species fact sheet: *Usnea longissima*. Interagency Special Status/Sensitive Species Program (ISSSSP). U.S. Forest Service and U.S. Bureau of Land Management. Available online at: http://www.fs.fed.us/r6/sfpnw/issssp/species-

index/flora-lichens.shtml. Account last updated September 18, 2006. Accessed February 2013.

Quintana-Coyer, D.L., Gerhardt, R.P., Broyles, M.D., Dillon, J.A., Friesen, C.A., Godwin, S.A., Kamrath, S.D., and K.L. Garvey. 2004. Survey protocol for the great gray owl within the range of the Northwest Forest Plan. Version 3.0, January 12, 2004. Prepared for the USDA Forest Service and USDI Bureau of Land Management.

Rolstad J., Gjerde, I., Storaunet, K.O., and E. Rolstad. 2001. Epiphytic lichens in Norwegian coastal spruce forest: historic logging and present forest structure. Ecological Applications 11(2):421 - 436.

Roth, B., Jadin, R., and R. Guralnick. 2013. The taxonomic status of *Deroceras hesperium* Pilsbry, 1944 (Gastropoda: Pulmonata: Agriolimacidae), a species of conservation concern in Oregon, USA. Zootaxa 3691(4): 453-460.

Rikkinen, J. 2003. Calicioid lichens and fungi in the forests and woodlands of western Oregon. *Acta Bot. Fennica*. 175: 1–41.

Seevers, J. and F. Lang. 1998. Management Recommendations for Mountain Lady's-slipper (*Cypripedium montanum* Douglas ex Lindley). Version 2.0. U.S. Bureau of Land Management. Available online at: http://www.blm.gov/or/plans/surveyandmanage/MR/VascularPlants/section10.htm. Accessed February 2013.

Shohet, C., Bautista, S., and D. Perez. 2008. Brief life history narratives for botanical, wildlife, and fish species of local interest. Gifford Pinchot National Forest, Columbia River Gorge National Scenic Area, Washington side. Appendix C to the Invasive Plant Treatment Final Environmental Impact Statement. March.

Siskiyou BioSurvey LLC. 2008. 2008 Biological survey report (botanical, northern spotted owl, great gray owl, mollusks, marbled murrelet, and red tree vole) for the Pacific Connector Gas Pipeline Project, Southwest Oregon. Prepared for Pacific Connector Gas Pipeline, LP and Edge Environmental, Inc. November.

Siskiyou BioSurvey LLC. 2011a. 2010 Botanical survey report for the Pacific Connector Gas Pipeline Project. Prepared for Pacific Connector Gas Pipeline, LP and Edge Environmental, Inc. March.

Siskiyou BioSurvey LLC. 2011b. 2010 Terrestrial mollusk survey report for the Pacific Connector Gas Pipeline Project. Prepared for Pacific Connector Gas Pipeline, LP and Edge Environmental, Inc. April.

Siskiyou BioSurvey LLC. 2011c. Summary report - 2010 & 2011 for the Pacific Connector Gas Pipeline great gray owl surveys. July 30, 2011.

Siskiyou BioSurvey LLC. 2012a. Final report 2010–2012 fungi surveys for the Pacific Connector Gas Pipeline Project. Prepared for Williams Pacific Gas Operator, LLC and Edge Environmental, Inc. August 6, 2012.

Siskiyou BioSurvey LLC. 2012b. Interim report two: 2010-2012 red tree vole surveys for the Pacific Connector Gas Pipeline Project. Prepared for Williams Pacific Gas Operator, LLC and Edge Environmental, Inc. October 31, 2012.

Smith, A.H. and J.M. Trappe. 1972. The higher fungi of Oregon's Cascade Head Experimental Forest and vicinity—I. The genus *Phaeocollybia* (Agaricales) and notes and descriptions of other species in the Agaricales. *Mycologia* 64:1138-1153.

Species Fungorum. 2013. CABI databases. Available online at: http://www.speciesfungorum.org. Accessed November 20, 2013.

States, J.S. and W.S. Gaud. 1997. Ecology of hypogeous fungi associated with ponderosa pine. I. Patterns of distribution and sporocarp production in some Arizona forests. *Mycotaxon*, 89: 712-721.

Stein, M. 2004. Conservation assessment for *Bryoria spiralifera* Brodo & D. Hawhsw. Available online at: http://www.fs.fed.us/r6/sfpnw/issssp/species-index/flora-lichens.shtml. Accessed February 2013.

Stone, D. 2007. Species fact sheet: *Peltigera pacifica*. Interagency Special Status/Sensitive Species Program (ISSSSP). U.S. Forest Service and U.S. Bureau of Land Management. Available online at: http://www.fs.fed.us/r6/sfpnw/issssp/species-index/flora-lichens.shtml. Account last updated December 31, 2007. Accessed February 2013.

Stone, D. 2012a. Species fact sheet: *Chaenotheca chrysocephala*. Interagency Special Status/Sensitive Species Program (ISSSSP). U.S. Forest Service and U.S. Bureau of Land Management. Available online at: http://www.fs.fed.us/r6/sfpnw/issssp/species-index/flora-lichens.shtml. Account last updated June 2012. Accessed February 2013.

Stone, D. 2012b. Species fact sheet: *Chaenotheca ferruginea*. Interagency Special Status/Sensitive Species Program (ISSSSP). U.S. Forest Service and U.S. Bureau of Land Management. Available online at: http://www.fs.fed.us/r6/sfpnw/issssp/species-index/flora-lichens.shtml. Account last updated February 2012. Accessed February 2013.

Stone, D. 2012c. Species fact sheet: *Chaenotheca furfuracea*. Interagency Special Status/Sensitive Species Program (ISSSSP). U.S. Forest Service and U.S. Bureau of Land Management. Available online at: http://www.fs.fed.us/r6/sfpnw/issssp/species-index/flora-lichens.shtml. Account last updated February 2012. Accessed February 2013.

Stone, D. 2012d. Species fact sheet: *Fuscopannaria saubinetii*. Interagency Special Status/Sensitive Species Program (ISSSSP). U.S. Forest Service and U.S. Bureau of Land Management. Available online at: http://www.fs.fed.us/r6/sfpnw/issssp/species-index/flora-lichens.shtml. Account last updated February 2012. Accessed February 2013.

Strittholt, J.R., Dellasala, D.A., and H. Jiang. 2006. Status of mature and old-growth forests in the Pacific Northwest. *Conservation Biology*. Vol. 20, No. 2: 363-374.

Tedersoo, L., Hansen, K., Perry, B., and R. Kjoller. 2006. Molecular and morphological diversity of pezizalean ectomycorrhiza. *New Phytologist.* 170: 581-596.

The Fungi of California. 2010. The Fungi of California, Species Index. Available online at: http://www.mykoweb.com/CAF/species_index.html. Accessed February 2013.

Trappe, M.J. 2004. Habitat and host associations of *Craterellus tubaeformis* in northwestern Oregon. *Mycologia*. 96(3): 498-509.

Trappe, Matt. Pers. Comm. 2013. Fungi records and background information for select fungi. Personal communication with Leslie Perry, North State Resources.

Ulev, E.D. 2007. *Strix nebulosa*. Fire Effects Information System, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Available online at: http://www.fs.fed.us/database/feis/. Accessed February 2013.

U.S. Department of Agriculture (USDA) and U.S. Department of the Interior (USDI). 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, including Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. April 13, 1994.

U.S. Department of Agriculture (USDA) and U.S. Department of the Interior (USDI). 2000. Final Supplemental Environmental Impact Statement for Amendment to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines. November.

U.S. Department of Agriculture (USDA) and U.S. Department of the Interior (USDI). 2001. Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines. U.S. Department of Agriculture, Forest Service, and U.S. Department of the Interior, Bureau of Land Management. January.

U.S. Department of Agriculture (USDA) and U.S. Department of the Interior (USDI). 2007. Final Supplement to the 2004 Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines. Volume 1 – Chapters and Text. June.

U.S. Department of Agriculture, Forest Service (Forest Service) and U.S. Department of the Interior, Bureau of Land Management (BLM). 2001. Management Recommendations for the Oregon Red Tree Vole, *Arborimus longicaudus* (*Phenacomys longicaudus* in the Record of Decision for the Northwest Forest Plan). Version 2.0.

U.S. Department of Agriculture, Forest Service (Forest Service) and U.S. Department of the Interior, Bureau of Land Management (BLM). 2002. Survey and Manage Management Recommendation Amendments for Fuel Hazard Reduction Treatments Around At-Risk Communities. Group 1 – Certain Fungi, Lichens, Bryophytes, Vascular Plants. July.

U.S. Fish and Wildlife Service. 2013. Species profile for red tree vole (*Arborimus longicaudus*). Last updated 2/4/2013. Available online at: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0J3. Accessed February 2013.

U.S. Fish and Wildlife Service. 2011. U.S. Fish and Wildlife Service species assessment and listing priority assignment form: *Arborimus longicaudus*. Region 1 (Pacific Region). Information current as of 10/27/11. Available online at: http://ecos.fws.gov/docs/candidate/assessments/2013/r1/A0J3_V02.pdf.

U.S. Forest Service (Forest Service) and U.S. Bureau of Land Management (BLM). 1996. Draft Management Recommendations for green bug moss *Buxbaumia viridis* (DC.) Moug. & Nestl. Version 1.1, November 1, 1996.

U.S. Forest Service (Forest Service), U.S. Bureau of Land Management (BLM), and U.S. Fish and Wildlife Service. 2006. Interagency conservation agreement for *Eucephalus vialis* (wayside aster). December.

Van Norman, K. and R. Huff. 2012. Survey & manage Category B fungi equivalent-effort survey protocol. Version 1.0. Portland, OR. U.S. Department of Interior, Bureau of Land Management, Oregon, Washington, and California, and U.S. Department of Agriculture, Forest Service, Regions 5 and 6. 22 pp.

University of Washington Herbarium. 2013. Consortium of Pacific Northwest Herbaria: Pacific Northwest Fungi. Available online at: http://www.pnwherbaria.org/m/datasets/fungi/index.htm. Last updated June 10, 2013. Accessed November 19, 2013.

Van Norman, K., J. Lippert, D. Rivers-Pankratz, R. Holmes, and C. Mayrsohn. 2008. Sporocarp survey protocol for macrofungi. Version 1.0. Portland, OR. Interagency Special Status/Sensitive Species Program. U.S. Department of Interior, Bureau of Land Management, Oregon/Washington and U.S. Department of Agriculture, Forest Service, Region 6. 16 pp.

Vance, N. 2005. Conservation assessment for *Cypripedium fasciculatum* Kellogg *ex* S. Watson. USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington. Originally issued as Management Recommendations by J. Seevers and F. Lang in 1998.

Vance, N.C. 2007. *Cypripedium montanum* Douglas ex Lindley (mountain lady's slipper): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Available online at: http://www.fs.fed.us/r2/projects/scp/assessments/cypripediummontanum.pdf. Accessed February 2013.

Vance, N.C. and Larson, L.S. 2005. Conservation assessment for *Eucephalus vialis* [Bradshaw] Blake. USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington. Available online at:

http://www.blm.gov/or/plans/surveyandmanage/files/ca-va-eucephalus-vialis-2005-01-29.pdf. Accessed February 2013.

Whitaker, L., Henderson, J., Holmes, R., Hoover, L., Lesher, R., Lippert, J., Olson, E., Potash, L., Seevers, J., Stein, M., and N. Wogen. 1998. Survey protocols for survey and manage strategy 2 vascular plants. Version 2.0. December.

Williams, E.J. 2012. Conservation assessment for great gray owl (*S. nebulosa*). USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington. Klamath Bird Observatory. April.

ATTACHMENT A

Survey and Manage Species List

Table A-1. 2001 Survey and Manage Species List

Species	Category	Evaluated in Document?
Fungi		
Acanthophysium farlowii	B	No
Albatrellus avellaneus	B	No
Albatrellus caeruleoporus	B	No
Albatrellus ellisii	**B**	**Yes**
Albatrellus flettii	**B**	**Yes**
Alpova alexsmithii	B	No
Alpova olivaceotinctus	B	No
Arcangeliella camphorata	B	No
Arcangeliella crassa	**B**	**Yes**
Arcangeliella lactarioides	B	No
Asterophora lycoperdoides	B	No
Asterophora parasitica	B	No
Baeospora myriadophylla	B	No
Balsamia nigrens	B	No
Boletus haematinus	B	No
Boletus pulcherrimus	**B**	**Yes**
Bondarzewia mesenterica	**B**	**Yes**
Bridgeoporus nobilissimus	A	No
Cantharellus subalbidus	**D**	**Yes**
Catathelasma ventricosa	B	No
Chalciporus piperatus	D	No
Chamonixia caespitosa	B	No
Choiromyces alveolatus	**B**	**Yes**
Choiromyces venosus	B	No
Chromosera cyanophylla (Mycena lilacifolia)	**B**	**Yes**
Chroogomphus loculatus	B	No
Chrysomphalina grossula	B	No
Clavariadelphus ligula	**B**	**Yes**
Clavariadelphus occidentalis	**B**	**Yes**
Clavariadelphus sachalinensis	**B**	**Yes**
Clavariadelphus subfastigiatus	B	No
Clavariadelphus truncatus	**B**	**Yes**
Clavulina castanopes var. lignicola	B	No

Species	Category	Evaluated in Document?
Clitocybe senilis	B	No
Clitocybe subditopoda	B	No
Collybia bakerensis	**B**	**Yes**
Collybia racemosa	**B**	**Yes**
Cordyceps capitata	B	No
Cordyceps ophioglossoides	B	No
Cortinarius barlowensis	B	No
Cortinarius boulderensis	B	No
Cortinarius cyanites	B	No
Cortinarius depauperatus	B	No
Cortinarius magnivelatus	B	No
Cortinarius olympianus	**B**	**Yes**
Cortinarius speciosissimus	B	No
Cortinarius tabularis	B	No
Cortinarius umidicola	B	No
Cortinarius valgus	B	No
Cortinarius variipes	B	No
Cortinarius verrucisporus	B	No
Cortinarius wiebeae	B	No
Craterellus tubaeformis	**D**	**Yes**
Cudonia monticola	B	No
Cyphellostereum laeve	B	No
Dermocybe humboldtensis	B	No
Destuntzia fusca	B	No
Destuntzia rubra	B	No
Dichostereum boreale	B	No
Elaphomyces anthracinus	B	No
Elaphomyces subviscidus	B	No
Endogone acrogena	B	No
Endogone oregonensis	B	No
Entoloma nitidum	B	No
Fayodia bisphaerigera	B	No
Fevansia aurantiaca	B	No
Galerina atkinsonia	B	No

Species	Category	Evaluated in Document?
Galerina cerina	B	No
Galerina heterocystis	E	No
Galerina sphagnicola	E	No
Galerina vittaeformis	**B**	**Yes**
Gastroboletus imbellus	B	No
Gastroboletus ruber	B	No
Gastroboletus subalpinus	**B**	**Yes**
Gastroboletus turbinatus	B	No
Gastroboletus vividus	B	No
Gastrosuillus amaranthii	E	No
Gastrosuillus umbrinus	B	No
Gautieria magnicellaris	B	No
Gautieria otthii	B	No
Gelatinodiscus flavidus	B	No
Glomus radiatus	B	No
Gomphus bonarii	B	No
Gomphus clavatus	**B**	**Yes**
Turbinellus (Gomphus) floccosus (CA)	F	No
Gomphus kauffmanii	**B**	**Yes**
Gymnomyces abietis	**B**	**Yes**
Gymnomyces nondistincta	B	No
Gymnopilus punctifolius	B	No
Gyromitra californica	B	No
Gyromitra esculenta	**F**	**Yes**
Gyromitra infula	**B**	**Yes**
Gyromitra melaleucoides	**B**	**Yes**
Gyromitra montana	**F**	**Yes**
Hebeloma olympianum	B	No
Helvella crassitunicata	B	No
Helvella elastica	B	No
Helvella maculata	**B**	**Yes**
Hydnotrya inordinata	B	No
Hydnotrya subnix	B	No
Hydnum umbilicatum	**B**	**Yes**

Species	Category	Evaluated in Document?
Hydropus marginellus	B	No
Hygrophorus caeruleus	**B**	**Yes**
Hygrophorus karstenii	B	No
Hygrophorus vernalis	B	No
Hypomyces luteovirens	B	No
Leucogaster citrinus	**B**	**Yes**
Leucogaster microsporus	B	No
Macowanites chlorinosmus	B	No
Macowanites lymanensis	B	No
Macowanites mollis	B	No
Marasmius applanatipes	B	No
Martellia fragrans	B	No
Martellia idahoensis	B	No
Mycena hudsoniana	B	No
Mycena monticola	B	No
Mycena overholtsii	**B**	**Yes**
Mycena quinaultensis	B	No
Mycena tenax	B	No
Mythicomyces corneipes	B	No
Neolentinus adhaerens	B	No
Neolentinus kauffmanii	B	No
Neournula pouchetii	**B**	**Yes**
Nivatogastrium nubigenum	**B**	**Yes**
Octaviania cyanescens	B	No
Octaviania macrospora	B	No
Octavianina papyracea	B	No
Otidea leporina	B	No
Otidea onotica	**F**	**Yes**
Otidea smithii	B	No
Phaeocollybia attenuata	**D**	**Yes**
Phaeocollybia californica	B	No
Phaeocollybia dissiliens	B	No
Phaeocollybia fallax	**D**	**Yes**
Phaeocollybia gregaria	B	No

Species	Category	Evaluated in Document?
Phaeocollybia kauffmanii	**D**	**Yes**
Phaeocollybia olivacea	**B**	**Yes**
Phaeocollybia oregonensis	B	No
Phaeocollybia piceae	**B**	**Yes**
Phaeocollybia pseudofestiva	B	No
Phaeocollybia scatesiae	**B**	**Yes**
Phaeocollybia sipei	**B**	**Yes**
Phaeocollybia spadicea	**B**	**Yes**
Phellodon atratus	B	No
Pholiota albivelata	B	No
Pithya vulgaris	**D**	**Yes**
Plectania melastoma	**F**	**Yes**
Plectania milleri	**B**	**Yes**
Podostroma alutaceum	B	No
Polyozellus multiplex	**B**	**Yes**
Pseudaleuria quinaultiana	B	No
Ramaria abietina	B	No
Ramaria amyloidea	B	No
Ramaria araiospora	**B**	**Yes**
Ramaria aurantiisiccescens	B	No
Ramaria botryis var. aurantiiramosa	B	No
Ramaria celerivirescens	**B**	**Yes**
Ramaria claviramulata	B	No
Ramaria concolor f. marrii	B	No
Ramaria concolor f. tsugina	B	No
Ramaria conjunctipes var. sparsiramosa	B	No
Ramaria coulterae	B	No
Ramaria cyaneigranosa	B	No
Ramaria gelatiniaurantia	B	No
Ramaria gracilis	B	No
Ramaria hilaris var. olympiana	B	No
Ramaria largentii	B	No
Ramaria lorithamnus	B	No
Ramaria maculatipes	B	No

Species	Category	Evaluated in Document?
Ramaria rainierensis	B	No
Ramaria rubella var. blanda	B	No
Ramaria rubribrunnescens	B	No
Ramaria rubrievanescens	**B**	**Yes**
Ramaria rubripermanens	**B**	**Yes**
Ramaria spinulosa var. diminutiva	B	No
Ramaria stuntzii	**B**	**Yes**
Ramaria suecica	B	No
Ramaria thiersii	B	No
Ramaria verlotensis	B	No
Rhizopogon abietis	B	No
Rhizopogon atroviolaceus	B	No
Rhizopogon brunneiniger	B	No
Rhizopogon chamaleontinus	B	No
Rhizopogon ellipsosporus	B	No
Rhizopogon evadens var. subalpinus	B	No
Rhizopogon exiguus	B	No
Rhizopogon flavofibrillosus	B	No
Rhizopogon inquinatus	B	No
Rhizopogon truncatus	**D**	**Yes**
Rhodocybe speciosa	B	No
Rickenella swartzii	B	No
Russula mustelina	B	No
Sarcodon fuscoindicus	B	No
Sarcodon imbricatus	**B**	**Yes**
Sarcosoma latahense	B	No
Sarcosoma mexicanum (WA, CA, and Curry and Josephine Counties, OR)	F	No
Sarcosphaera coronaria (S. exima)	**B**	**Yes**
Sedecula pulvinata	**B**	**Yes**
Sowerbyella rhenana	B	No
Sparassis crispa	**D**	**Yes**
Spathularia flavida	**B**	**Yes**
Stagnicola perplexa	B	No
Thaxterogaster pavelekii	B	No

Species	Category	Evaluated in Document?
Tremiscus (Guepinia) helvelloides	**B**	**Yes**
Tricholoma venenatum	B	No
Tricholomopsis fulvescens	B	No
Tuber asa	B	No
Tuber pacificum	B	No
Tylopilus porphyrosporus	D	No
Lichens		
Bryoria pseudocapillaris	B	No
Bryoria spiralifera	B	No
Bryoria subcana	B	No
***Bryoria tortuosa* (WA Olympic Peninsula, Western Lowlands, and Western Cascades; OR Western Cascades, Coast Range, Willamette Valley; and CA Coast Range)**	**A**	**Yes**
***Bryoria tortuosa* (WA Eastern Cascades; OR Eastern Cascades and Klamath; CA Klamath and Cascades)**	**D[1]**	**Yes**
Buellia oidalea	E	No
Calicium abietinum	B	No
Calicium adspersum	E	No
Calicium glaucellum	**F**	**Yes**
Calicium viride	**F**	**Yes**
Cetrelia cetrarioides	E	No
Chaenotheca chrysocephala	**B**	**Yes**
Chaenotheca ferruginea	**B**	**Yes**
Chaenotheca furfuracea	**F**	**Yes**
Chaenotheca subroscida	**E**	**Yes**
Chaenothecopsis pusilla	E	No
Cladonia norvegica	B	No
Collema nigrescens (WA and OR, outside OR Klamath)	F	No
Dendriscocaulon intricatulum	**B**	**Yes**
Dermatocarpon luridum	B	No
Fuscopannaria (Pannaria) saubinetii	**F**	**Yes**
Heterodermia sitchensis	E	No
Hypogymnia duplicata	A	No
Hypogymnia oceanica	F	No
Hypogymnia vittata	E	No

Species	Category	Evaluated in Document?
Hypotrachyna revoluta	E	No
Leptogium burnetiae var. hirsutum	A	No
Leptogium cyanescens	A	No
Leptogium rivale	B	No
Leptogium teretiusculum	**E**	**Yes**
Lobaria linita	A	No
Lobaria oregana (CA)	A	No
Microcalicium arenarium	B	No
Nephroma bellum	F	No
Nephroma isidiosum	E	No
Nephroma occultum	B	No
Niebla cephalota	A	No
Pannaria rubiginosa	E	No
Peltigera pacifica	**E**	**Yes**
Platismatia lacunosa	C	No
Pseudocyphellaria perpetua (sp. 1)	B	No
Pseudocyphellaria rainierensis	A	No
Pyrrhospora quernea	E	No
Ramalina pollinaria	E	No
Ramalina thrausta	**A**	**Yes**
Stenocybe clavata	E	No
Teloschistes flavicans	A	No
Tholurna dissimilis (south of the Columbia River)	B	No
Usnea hesperina	B	No
***Usnea longissima* (Curry, Josephine, and Jackson Counties, OR; CA)**	**A**	**Yes**
Usnea longissima (Outside Curry, Josephine, and Jackson Counties, OR; WA)	F	No
Mosses and Liverworts		
Brotherella roellii	E	No
Buxbaumia viridis	**D[1]**	**Yes**
Diplophyllum albicans	D	No
Diplophyllum plicatum	B	No
Encalypta brevicolla var. crumiana	B	No
Herbertus aduncus	B	No

Species	Category	Evaluated in Document?
Iwatsukiella leucotricha	B	No
Kurzia makinoana	B	No
Marsupella emarginata var. aquatica	B	No
Orthodontium gracile	B	No
Ptilidium californicum (CA)	A	No
Racomitrium aquaticum	B	No
Rhizomnium nudum	B	No
Schistostega pennata	A	No
Tetraphis geniculata	A	No
Tritomaria exsectiformis	B	No
Tritomaria quinquedentata	B	No
Vascular Plants		
Arceuthobium tsugense mertensianae (WA)	F	No
Bensoniella oregana (CA)	A	No
Botrychium minganense (OR and CA)	A	No
Botrychium montanum	A	No
Coptis asplenifolia	A	No
Coptis trifolia	A	No
Corydalis aquae-gelidae	C	No
Cypripedium fasciculatum	**C**	**Yes**
Cypripedium montanum	**C**	**Yes**
Eucephalus vialis	**A**	**Yes**
Galium kamtschaticum (WA Western Cascades (south of Snoqualmie Pass), Olympic Peninsula, and Eastern Cascades; OR Western Cascades)	A	No
Platanthera orbiculata var. orbiculata	C	No
Mollusks		
Ancotrema voyanum	E[3,4]	No
Cryptomastix devia	A	No
Cryptomastix hendersoni	A	No
Deroceras hesperium	**B[4]**	**Yes**
Fluminicola n. sp. 1	A[2]	No
Fluminicola n. sp. 2	A	No
Fluminicola n. sp. 3	A[2]	No
Fluminicola n. sp. 11	A[2]	No

Species	Category	Evaluated in Document?
Fluminicola n. sp. 14	A	No
Fluminicola n. sp. 15	A	No
Fluminicola n. sp. 16	A	No
Fluminicola n. sp. 17	A	No
Fluminicola n. sp. 18	A	No
Fluminicola n. sp. 19	A[2]	No
Fluminicola n. sp. 20	A[2]	No
Fluminicola seminalis	A[2]	No
Helminthoglypta hertleini	B[4]	No
Helminthoglypta talmadgei	A	No
Hemphillia burringtoni	A	No
Hemphillia glandulosa	C	No
Hemphillia malonei	C	No
Hemphillia pantherina	B[4]	No
Juga (o) n. sp. 2	A	No
Juga (o) n. sp. 3	A	No
Lyogyrus n. sp. 1	A	No
Lyogyrus n. sp. 2	A	No
Lyogyrus n. sp. 3	A	No
Megomphix hemphilli (North of south boundary of Lincoln, Benton, and Linn Counties, OR)	A	No
Megomphix hemphilli (South of south boundary of Lincoln, Benton, and Linn Counties, OR)	F[5]	No
Monadenia chaceana	**B[4]**	**Yes**
Monadenia churchi	F[5]	No
Monadenia fidelis minor	A	No
Monadenia fidelis klamathica	B[3,4]	No
Mondadenia fidelis ochromphalus	B[3,4]	No
Monadenia troglodytes troglodytes	A	No
Monadenia troglodytes wintu	A	No
Oreohelix n. sp.	A	No
Pristiloma arcticum crateris	B[2,4]	No
Prophysaon coeruleum (CA and WA)	A	No
Trilobopsis roperi	A	No
Trilobopsis tehamana	A	No

Species	Category	Evaluated in Document?
Vertigo n. sp.	A	No
Vespericola pressleyi	A	No
Vespericola shasta	A	No
Vorticifex klamathensis sinitsini	E	No
Vorticifex n. sp. 1	E	No
Vertebrates		
***Arborimus longicaudus* (Mesic, North Mesic and Xeric Zones)**	**C**	**Yes**
Hydromantes shastae	A	No
Plethodon elongatus	D[1]	No
Plethodon larselli	A	No
Plethodon stormi	C	No
Plethodon vandykei (Cascade population)	A	No
Strix nebulosa	**C**	**Yes**
Others		
Canopy herbivores (south range)	F	No
Coarse wood chewers (south range)	F	No
Litter and soil dwelling species (south range)	F	No
Understory and forest gap herbivores (south range)	F	No

Source: U.S. Forest Service and U.S. Bureau of Land Management Survey and Manage Species List, 2001 Record of Decision

Notes:

[1] Although Pre-Disturbance Surveys are deemed practical for this species, continuing pre-disturbance surveys is not necessary in order to meet management objectives.

[2] For these species, until Management Recommendations are written, the following language will be considered part of the Management Recommendation: "Known and newly discovered sites of these species will be protected from grazing by all practical steps to ensure that the local population of the species will not be impacted."

[3] For these species, until Management Recommendations are written, the language "known and newly discovered sites of these species will be protected from grazing by all practical steps to ensure that the local population of the species will not be impacted" is the Management Recommendation and no other recommendations are imposed at this time.

[4] Based upon direction contained in the ROD, equivalent-effort pre-disturbance surveys are required for these mollusk species.

[5] Based upon direction contained in the ROD, these two mollusk species require management of sites unknown as of 9/30/99.

ATTACHMENT B

Glossary

Glossary

Note: Most of these terms are incorporated from the 1994 ROD, 2001 ROD, or 2007 Final SEIS and adapted or expanded as appropriate to fit this report. New terms or modifications from previous agency glossary terms are underlined.

Analysis Area – The spatial buffer used in GIS to identify potentially affected sites.

- Analysis Area buffer for fungi, mollusks, lichens, bryophytes and vascular plants is 50 meters.
- Analysis Area buffer for great gray owls is ¼ mile from the project area except where blasting may take place; the buffer around potential blasting areas is 1 mile.
- Analysis Area buffer for red tree voles is 100 meters.

The intent is to ensure that recorded observations of species that could be indirectly affected by the PCGP Project are considered as part of the group of potentially affected sites in the analysis. As an example, using this definition for fungi, bryophytes, lichens and vascular plants, any observation that is within 100 meters of the project area would fall within a site evaluated in the analysis. This is consistent with other definitions of indirect effects for the PCGP Project.

Bryophytes – Plants of the phylum Bryophyta, including mosses, liverworts, and hornworts; characterized by the lack of true roots, stems, and leaves (USDA and USDI 1994).

Bureau of Land Management (BLM) – An agency within the United States Department of the Interior that administers a portion of America's public lands.

Category – Groupings of species by relative rarity, practicality of pre-disturbance surveys, and information status. Management direction is generally the same for all species within a category and differs between categories.

Direct effect or impact – Direct effects are those that occur at the time and place that a project is implemented. For purposes of the analysis contained in this document, a direct effect is one that takes place within the project area as a direct result of the construction activities associated with establishment of the construction corridor, TEWAs, UCSAs, or other project features.

Effects – Effects, impacts, and consequences are synonymous. Effects may be direct, indirect, or cumulative and may fall in one of these categories: aesthetic, historic, cultural, economic, social, health, or ecological (such as effects on natural resources and on the components, structures, and functioning of affected ecosystems) (USDA and USDI 1994). Effects may be direct or indirect (refer to those definitions) and address how the project would affect Survey and Manage species.

Element Occurrence – An element occurrence is an area of land and/or water in which a species or ecological community is, or was, present. An occurrence should have practical conservation value for the species or ecological community as evidenced by historical or potential continued presence and/or regular recurrence at a given location. For species, the occurrence often corresponds with the local population, but when appropriate may be a portion of a population (e.g., long distance dispersers) or a group of nearby populations (e.g., metapopulation). This definition is based on the NatureServe definition of "Occurrence."

Endemic or endemism – Unique to a specific locality or the condition of being unique to a specific locality.

Equivalent-effort surveys – Pre-disturbance surveys for species whose characteristics, such as small size or irregular fruiting, prevent it from being consistently located during site-specific surveys. These surveys are conducted similarl to practical surveys (to the same intensity and effort), according to written Survey Protocols, and during the times when the likelihood of detecting the species is highest. The difference between equivalent-effort and practical surveys is that equivalent-effort surveys are not expected to meet the description of "likely to determine the presence" of a species because the characteristics of these species make finding sites less certain.

Fifth-field watershed – The standard sized watershed used for research and projects by the BLM and Forest Service. A watershed is the area of land where all surface and groundwater drains into the same body of water, such as a river, wetland, or the ocean. Since the term "watershed" can be used for drainage areas of any size, the U.S. Geological Survey has divided watersheds into distinct units, or "fields," based on size.

Forest Service – An agency within the United States Department of Agriculture that administers a portion of America's public lands.

Fungi – Saprophytic and parasitic spore-producing organisms usually classified as plants that lack chlorophyll and include molds, rusts, mildews, smuts, mushrooms, and yeasts.

GeoBOB (Geographic Biotic Observations) – A relational geodatabase used by the Oregon and Washington offices of the BLM, which stores spatial and attribute data on species of interest to the BLM and Region 6 of the Forest Service. This database currently holds legacy Survey and Manage species locations for both the BLM and the Forest Service. The data on Survey and Manage species on lands administered by the Forest Service are being moved to the Forest Service databases.

Habitat – Place or environment where a plant or animal naturally or normally lives and grows.

High-priority sites – A site or group of sites deemed necessary for species persistence. The high-priority sites may be identified as specific locations, sites meeting specific criteria, or as a distribution of populations or sites over a geographic area that may change over time. High-priority sites are designated through the Management Recommendations for the species. High-priority sites are generally a subset of known sites; however, in some cases, all known sites may be determined to be high-priority sites. Management of high-priority sites is necessary to ensure species persistence.

Historic distribution – The distribution of a species as determined by its habitat associations and by the frequency, magnitude, and patterns of natural and human-caused disturbance and ecological processes characteristic of the Northwest Forest Plan area before European settlement. Historical distribution should be estimated over a long-enough period of time to encompass the limits of variability resulting from disturbance and ecological processes.

Indirect effect or impact – Indirect effects are those caused by a project that are reasonably foreseeable (i.e. not speculative in nature), but that occur later in time or are farther removed in

distance. For purposes of the analysis contained in this document, an indirect effect is one that changes the microclimate or results in other impacts (e.g., noise disturbance) outside of the project area, but within a reasonable distance of the project area (e.g., 100 meters for fungi, lichens, bryophytes, and vascular plants).

Known site – Historic and current location of a species reported by a credible source, available to field offices, and that does not require additional species verification or survey by the Agency to locate the species. Known sites include those known prior to the signing of the Northwest Forest Plan Record of Decision (USDA and USDI 1994), as well as sites located in the future. Known sites can be based on any documented and credible source (such as herbaria/museum records, published documents, Agency records, species expert records, and documented public information). Historic locations where it can be demonstrated that the species and its habitat no longer occur do not have to be considered known sites. A credible source is a professional or amateur person who has academic training and/or demonstrated expertise in identification of the taxon of interest sufficient for the Agency to accept the identification as correct. These can include Agency staff and private individuals. This term is only used in reference to background information compiled for each species and is not specifically used for the persistence evaluation; refer to "site" below.

The known site identification should be precise enough to locate the species by geographic coordinates, maps, or descriptions sufficient to design specific management actions or to be located by other individuals. Also see "site" for description of size or components.

Land allocation – Commitment of a given area of land or a resource to one or more specific uses (such as campgrounds or Wilderness). In the Northwest Forest Plan, one of the seven allocations of Congressionally Withdrawn Areas, Late-Successional Reserves, Adaptive Management Areas, Managed Late-Successional Reserves, Administratively Withdrawn Areas, Riparian Reserves, or Matrix.

Late-successional forest – Forest stand consisting of trees, structural attributes, supporting biological communities, and processes associated with old-growth and/or mature forests (USDA and USDI 1994). Forest seral stages that include mature and old-growth age classes (USDA and USDI 1994). Age is not necessarily a defining characteristic but has been used as a proxy or indicator in some usages. Minimum ages are typically 80 to 130 years, more or less, depending on the site quality, species, rate of stand development, and other factors.

Late-Successional Reserves (LSR) – Land allocation under the Northwest Forest Plan with the objective to protect and enhance conditions of late-successional and old-growth forest ecosystems that serve as habitat for late-successional and old-growth forest related species, including the northern spotted owl. Limited stand management is permitted, subject to review by the Regional Ecosystem Office (USDA and USDI 1994).

Lichens – Complex thallophytic plants comprised of an alga and a fungus growing in symbiotic association on a solid surface (such as a rock or tree).

Local area – The local area was defined as the following 19 5th field watersheds that overlap the PCGP Project area (presented alphabetically in this report): Big Butte Creek, Coos Bay Frontal, East Fork Coquille River, Elk Creek-South Umpqua, Klamath River-John C. Boyle Reservoir,

Lake Ewauna-Upper Klamath River, Little Butte Creek, Lower Coquille River, Lower Lost River, Middle Fork Coquille River, Middle South Umpqua River, Myrtle Creek, North Fork Coquille River, Olalla Creek-Lookingglass Creek, Rogue River-Shady Cove, South Umpqua River, Spencer Creek, Trail Creek, Upper Cow Creek.

Management Recommendation – An interagency document that addresses how to manage known sites and that provide guidance to Agency efforts in conserving Survey and Manage species. They describe the habitat parameters that will provide for maintaining the taxon at that site. They may also identify high-priority sites for uncommon species or provide other information to support management direction. (The proposed LMP amendment associated with this project waives application of management recommendations.)

Management requirement – Minimum standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, wildlife population viability, soil and water protection, and diversity to be met in accomplishing National Forest System goals and objectives (36 CFR 219 National Forest Management Act Regulations).

Matrix – Federal lands outside of reserves, withdrawn areas, Managed Late-Successional Areas, and Adaptive Management Areas (USDA and USDI 1994).

Mature forest – A subset of late-successional forests. Mature forests are characterized by the onset of slowed height growth, crown expansion, heavier limbs, gaps, some mortality in larger trees, and appearance of more shade-tolerant species or additional crown layers. In Douglas-fir west of the Cascades, this stage typically begins between 80 and 130 years, depending on site conditions and stand history (adapted from USDA and USDI 1994, pp. B-2 and B-3).

Mollusks – Invertebrate animals (such as slugs, snails, clams, or squids) that have a soft unsegmented body usually enclosed in a calcareous shell.

Northern spotted owl (NSO) – A bird listed as threatened under the Endangered Species Act in Washington, Oregon, and California. The Northwest Forest Plan created a forest reserve-based system to conserve and manage lands for the northern spotted owl.

Northwest Forest Plan – Coordinated ecosystem management direction incorporated into land management plans for lands administered by the Bureau of Land Management and the Forest Service within the range of the northern spotted owl. In April 1993, President Clinton directed his cabinet to craft a balanced, comprehensive, and long-term policy for management of over 24 million acres of public land within the range of the northern spotted owl. A Forest Ecosystem Management Assessment Team (FEMAT) was chartered to develop a series of options. These options were modified in response to public comment and additional analysis and then analyzed in a Final Supplemental Environmental Impact Statement. A Record of Decision was signed on April 13, 1994, by the Secretaries of the Department of Agriculture and the Department of Interior to adopt *Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA and USDI 1994). The Record of Decision, including the *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* is referred to as the "Northwest Forest Plan." The Northwest Forest Plan is not a "plan" in the agency planning regulations sense; the term instead refers collectively to the 1994

amendment to existing agency unit plans or to the specific standards and guidelines for late successional species incorporated into subsequent administrative unit plans.

Observation or record observation – The points or polygons where individuals or small groups of a given species were located as entered into the NRIS and GeoBOB databases. Unless other information exists to the contrary, this constitutes "best available information" about the actual locations of the species in question.

Old-growth forest – An ecosystem distinguished by old trees and related structural attributes. Old-growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species, composition, and ecosystem function. More specific parameters applicable to various species are available in the USFS, Region 6, 1993 Interim Old Growth Definitions (USDA Forest Service Region 6, 1993). The Northwest Forest Plan SEIS and FEMAT describe old-growth forest as a forest stand usually at least 180 to 220 years old with moderate-to-high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground (USDA and USDI 1994).

Oregon Biodiversity Information Center (ORBIC) – ORBIC is part of the Oregon State University Institute for Natural Resources in the Research Office. Their mission is to identify the plant, animal, and ecological community resources of Oregon. As part of the Natural Heritage Network and NatureServe, the ORBIC contributes to an understanding of global biodiversity and provides tools for managers and the public to better protect vanishing species and communities.

Pacific Connector Gas Pipeline Project (PCGP Project) – The construction, operation, maintenance and termination of a 230-mile-long, 36-inch diameter high pressure natural gas pipeline that would extend from interconnections with other interstate pipelines near Malin, Oregon to the proposed Jordan Cove natural gas liquefaction and terminal at Coos Bay, Oregon.

Persistence (as in persistence objective for a species) – An abbreviated expression of the species management objectives for these standards and guidelines. Generally the persistence objective for vertebrates is based on the Forest Service viability provision in the regulations implementing the National Forest Management Act. For non-vertebrates, it is a similar standard to the extent practicable. See "Species Persistence Objective" in these standards and guidelines for more details. Use in standards and guidelines such as "..sites not needed for persistence" includes an understood "reasonable assurance of" or "to the extent practicable."

"…the Forest Service must use common sense and apply its fish and wildlife expertise in implementing these requirements." (NWFP ROD, Forest Service and BLM 1994)

Persistence (as in persistence at a site) – Continued occupancy by a species at a known site.

Physiographic province – A geographic area having a similar set of biophysical characteristics and processes due to effects of climate and geology that result in patterns of soils and broad-scale plant communities. Habitat patterns, wildlife distributions, and historical land use patterns may

differ significantly from those of adjacent provinces (USDA and USDI 1994) (See Figure 1 in the standards and guidelines).

Practical surveys (relative to surveys prior to habitat-disturbing activities) – Surveys are practical if characteristics of the species (such as size, regular fruiting) and identifying features result in being able to reliably locate the species, if the species is present, within one or two field seasons and with a reasonable level of effort.

Characteristics determining practicality of surveys include: individual species must be of sufficient size to be detectable; the species must be readily distinguishable in the field or with no more than simplelaboratory or office examination for verification of identication; and the surveys must not pose a health and safety risk. See additional detail in the standards and guidelines.

Potentially affected site – A "site" as created by the FME process that is clipped by the spatial buffer used for the Analysis Area is considered as a potentially affected site and is included in the analysis.

Project area (or PCGP Project area) –

- Construction clearing. This is the 95 foot (average) corridor.
- Temporary Extra Work Areas (TEWAs). These are cleared areas used in construction.
- Uncleared Storage Areas (UCSAs). These are areas that are not cleared and are used to store rocks and stumps. The material may or may not be returned to the corridor after construction.
- Roads that may be constructed or reconstructed for the project.

Proportion of sites or habitat in reserves – The proportion of sites and habitat in reserve land allocations was calculated using GIS to obtain a percentage of the sites or habitat on Forest Service and BLM lands that are protected by the regionally mapped reserves (see definition of "Reserves").

Range of the northern spotted owl or NSO range – Area generally comprised of lands in western portions of Washington, Oregon, and northern California (see Province Map, Figure 1) (USDA and USDI 1994). As part of the Northwest Forest Plan, Forest Service and BLM adopted standards and guidelines for the management of habitat for late-successional and old-growth forest associated species within this range.

Rare – A species is considered to be rare when: there are a low number of extant known sites with low numbers of individuals present at each site and populations are not well-distributed within its natural range. "Low" numbers and "not well distributed" are relative terms that must be considered in the context of other criteria such as distribution of habitat, fecundity, and so forth. See complete list of criteria under "Relative Rarity" in the standards and guidelines.

Record of Decision – A document separate from, but associated with, an environmental impact statement that: states the management decision, states the reason for that decision, identifies all alternatives including the environmentally preferable and selected alternatives, and also states whether all practicable measures to avoid environmental harm from the selected alternative have been adopted, and if not, why not (USDA and USDI 1994).

Region or regional area (in the Persistence Evaluation) – The region is bounded by the NSO range, as defined above.

Reserves or reserve lands – Forest Service and BLM lands with a land allocation of Congressionally Reserved, Late Successional Reserve, Managed Late Successional Area (i.e., Marbled Murrelet Area and Known Owl Activity Centers), or Riparian Reserves. Reserves help to protect and enhance conditions of late-successional and old-growth forest ecosystems. Stand management actions are either prohibited or limited within these allocations. The likelihood of maintaining a connected, viable late-successional ecosystem was found to be directly related to the amount of late-successional forest in reserve status.

Riparian Reserves – Areas along live and intermittent streams, wetlands, ponds, lakes, and unstable and potentially unstable areas where riparian-dependent resources receive primary emphasis. Riparian Reserves are important to the terrestrial ecosystem as well, serving, for example, as dispersal habitat for certain terrestrial species. The extent of Riparian Reserves is defined by the National Forest and BLM District land and resource management plans. Because regionally mapped Riparian Reserves were not available for the analysis, the National Hydrography Dataset was used to define Riparian Reserves across the region and was clipped to the land allocation of Other (Matrix).

Site (as in occupied site) – The location where a specimen or population of the target species (taxonomic entry) was located, observed, or presumed to exist (occasionally used as a local option to pre-disturbance surveys for certain vertebrates) based on indicators described in the Survey Protocol or Management Recommendations. Also, the polygon described by connecting nearby or functionally contiguous detections at the same location.

Site (as used in manage known sites) – The occupied site plus any buffer needed to maintain the habitat parameters described in the Management Recommendations.

Site (as in FME site) – Site is a spatial polygon where a species is known to occur and is based on definitions of sites used for the purposes of the Annual Species Reviews and estimates of regional populations. According to the 2001 ROD, for a variety of reasons relative to site management and the species biology, the definition of a "site" or record for entry into the agency geodatabases varies by taxa group. The most striking example was for terrestrial mollusks. For these species, a site was defined as all locations within 30 feet of each other, so individual records in the ISMS database could be as close together as 31 feet. For other species, the distance between locations to define sites was 100 meters. (Page 71, 2001 ROD).

The FME tool (see FME Data Process in Attachment C) applies a spatial buffer to the observation data, as described in the NRIS or GeoBOB databases, using certain criteria for some species. Wherever the original observation occurs on BLM or NFS lands the FME tool dissolves overlaps in spatial buffers to create a discrete polygon that defines a site as described using the definition on page 71 of the ROD. The following buffers were applied to the different taxa groups:

- Buffers for fungi, lichens, bryophytes, vascular plants, and red tree voles are 50 meters.
- No buffer is applied to mollusks or great gray owls because the original data already include a 10-meter buffer around the original point data.

Standards and guidelines – The rules and limits governing actions, as well as the principles specifying the environmental conditions or levels to be achieved and maintained (USDA and USDI 1994).

Survey and Manage – Mitigation measure adopted as a standard and guideline within the Northwest Forest Plan Record of Decision and replaced with the 2001 standards and guidelines that are intended to mitigate impacts of land management efforts on those species that are closely associated with late-successional or old-growth forests whose long-term persistence is a concern. These measures apply to all land allocations and require land managers to take certain actions relative to species of plants and animals, particularly some amphibians, bryophytes, lichens, mollusks, vascular plants, fungi, and arthropods, which are rare or about which little is known. These actions include: (1) manage known sites; (2) survey prior to ground-disturbing activities; (3) conduct extensive and general regional (strategic) surveys.

Uncommon (species) – Species that does not meet the definition for rare, but where concerns for its persistence remain. See criteria under "Relative Rarity" in the standards and guidelines.

Vascular plants – Plants that contain conducting or vascular tissue. They include seed-bearing plants (flowering plants and trees) and spore-bearing plants (ferns, horsetails, and clubmosses).

Vertebrates – A species that has a backbone or spinal column (includes fishes, amphibians, reptiles, birds, and mammals, all of which have a segmented bony or cartilaginous spinal column)

Viability – Ability of a wildlife or plant population to maintain sufficient size to persist over time in spite of normal fluctuations in numbers, usually expressed as a probability of maintaining a specific population for a specified period (USDA and USDI 1994).

Viability Provision – A provision contained in the National Forest System Land and Resource Management Planning Regulation of 1982, pursuant to the National Forest Management Act. This provision is found in 36 CFR 219.19 and reads as follows: "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area."

Viable population – A wildlife or plant population that contains an adequate number of reproductive individuals appropriately distributed in the planning area to ensure the long-term existence of the species (USDA and USDI 1994).

Well distributed – Distribution sufficient to permit normal biological function and species interactions, considering life history characteristics of the species and the habitats for which it is specifically adapted. For purposes of this report, a species is considered to be well distributed in at least part of its range in the NSO range if sites are relatively abundant, mostly clustered, and widespread across potentially suitable habitat.

ATTACHMENT C

Spatial Analysis Process for Persistence Evaluation

Spatial Analysis Process for Persistence Evaluation

This attachment presents additional details on the spatial analysis process used to evaluate the persistence of the Survey and Manage (S&M) species that could be affected by the Pacific Connector Gas Pipeline Project (PCGP Project). The overall process entailed identification of appropriate spatial data sources to use; collection of the data; processing of the data to fit the needs of the analysis; and analysis of the data to describe distribution patterns, abundance of the S&M species, and effects of the PCGP Project on the S&M species.

Spatial Data Sources

The key spatial data sources used for the persistence evaluation are listed in Table C-1 below. These data were collected from a variety of sources, including the U.S. Forest Service (Forest Service), U.S. Bureau of Land Management (BLM), U.S. Geological Survey, State of Oregon, and Oregon State University. The primary site data used for the analysis were provided by the Forest Service and BLM and were a product of the Feature Manipulation Extraction (FME) tool; additional details on the use of this tool can be obtained from the agencies upon request. Sample images of the site polygons, observation data associated with those polygons, analysis area boundaries, and red tree vole Habitat Areas are depicted in Figures C-1 through C-3 following the table.

Table C-1

List of Key Spatial Data

File Name	Type of Information	Source	Use in Analysis
General Data			
NSR_NWFP_Bndry.shp	Boundary of the NSO range	Forest Service	Regional area boundary
Provinces.shp	Physiographic provinces as defined in the 2001 ROD	Regional Ecosystem Office	Province boundaries used for discussion of species' distribution
NSR_HUC5_Crossed.shp	5th field watershed boundaries for those watersheds that encompass the project area	Edge/NSR	Local area boundary
NSR_Lands_NWFP.shp	Land ownership	BLM/NSR	Distribution of sites across different ownerships
nwfp_lua_2009_2013.shp	Land use allocations per 2001 ROD; includes regional dataset combined with local Forests and BLM Districts data in Oregon	Regional Ecosystem Office; local BLM/Forest Service offices	Distribution of sites across different land allocations
NHD_Other_2013.shp	National Hydrography Dataset intersected with the Other (Matrix) land allocation from the 2013 land use data	NSR/USGS	Distribution of sites in Riparian Reserves, regionally mapped
Reserves_NWFP_2013_FS_BLM.shp	Reserves combined from land allocation data and Riparian Reserve data	NSR	Distribution of sites in Reserves
FSForests_ROW.shp	National Forest boundaries that encompass the project area	Forest Service	Distribution of sites in the National Forests

Table C-1

List of Key Spatial Data

File Name	Type of Information	Source	Use in Analysis
BLMDistricts_ROW.shp	BLM Districts that encompass the project area	BLM	Distribution of sites in the BLM Districts
mr200_sppsz_2006.grd	Vegetation data (forest cover, structure, age) for 15-year monitoring report	Forest Service and Oregon State University	Habitat (coniferous, mixed hardwood-coniferous, or hardwood forests)
LSOG.shp	Late-successional and old-growth forests, as mapped for the 15-year monitoring report	Forest Service and Oregon State University	LSOG habitat and distribution of sites in LSOG forests
contour_100X.shp (ce, w, sw, nw, n, s)	100-foot contours for Oregon	State of Oregon	Contours used for habitat data processing and elevation of sites
n39w123.grd – n49w125.grd	Digital Elevation Models for parts of CA, OR, and WA	U.S. Geological Survey	DEMs converted to contour data and used for habitat data processing and elevation of sites
Project-Related Data			
Analysis_Area_50m_0913.shp	50-meter buffer of project area	NSR	Analysis area used for fungi, lichens, bryophytes, plants, and mollusks
Analysis_Area_RTV_100m_0913.shp	100-meter buffer of project area	NSR	Analysis area used for red tree vole
Analysis_Area_STNE_0913.shp	0.25-mile and 1-mile buffer (combined) of project area	NSR	Analysis area used for great gray owl
Combined_ROW_Roads_0913.shp	Combined project area data (roads and corridor with associated features)	NSR	Project area boundary
Construction_Right_of_Way (geodatabase feature)	PCGP Project features	Edge	Project features that could affect sites
Roads_disturbance_poly_v032113.shp	PCGP Project Transportation Management Plan	Edge/NSR	Roads that could affect sites
Milepost_100th_Proposed_Route_2013_4_29_2013 (geodatabase feature)	Mileposts along construction corridor for PCGP Project	Edge	Milepost numbers for locations of sites in or near project area
contour_10.shp	20-foot contours around the project area	Edge	Elevation and topography around sites in and near the project area
Species Data			
SMKnownSites_2013 in SurveyManageKnownSites-Nov2013.mdb	FME site output for all species	Forest Service and BLM	“Sites” for each species (note species removed from 2001 list were not included)
SelectSpp_Sites_dissolve.shp; SelectSpp_Sites_dissolve_0414.shp; CAGL_Sites_0414.shp	Sites created using same criteria as for FME	NSR	“Sites” for species that had been removed from 2001 list
ARLO_Habitat_Areas_1113.shp	Habitat Areas for red tree vole	NSR	Habitat Areas for analysis of impacts to red tree vole

Figure C-1: Sample Site and Observation Data

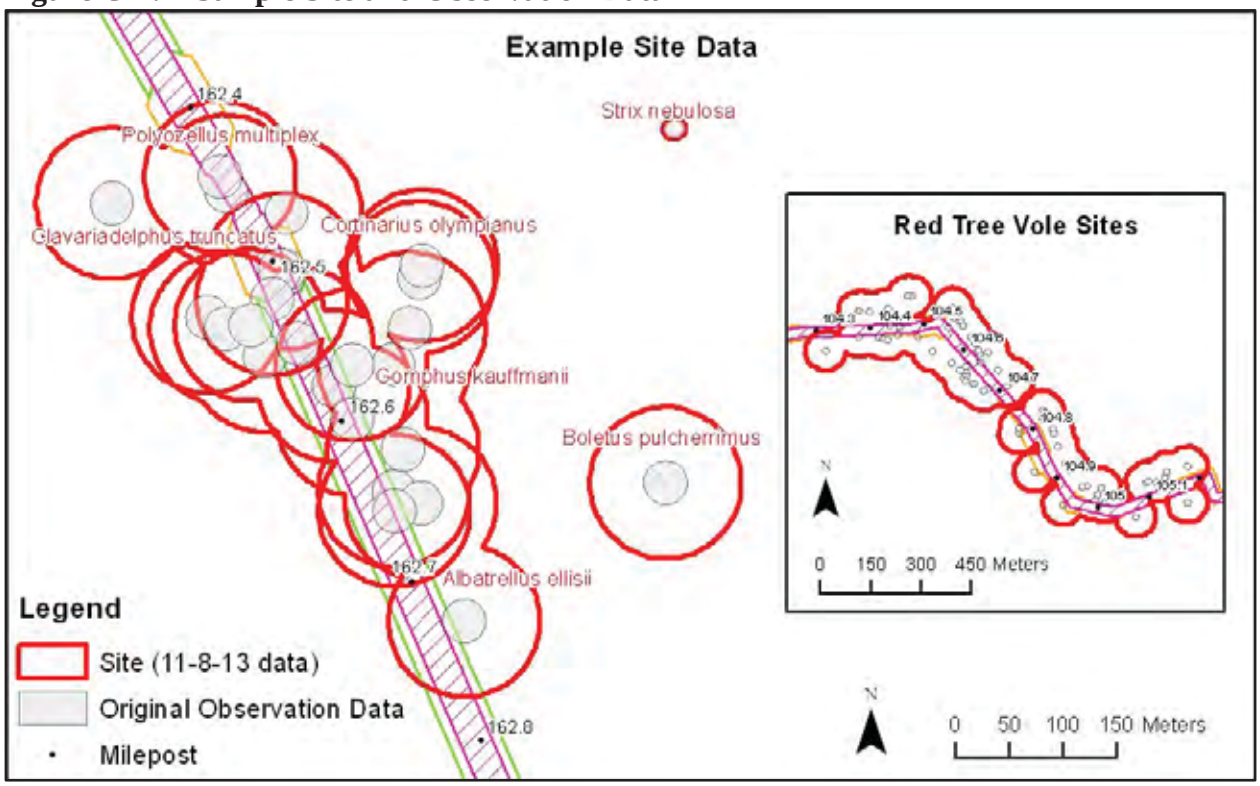


Figure C-2: Analysis Area Boundaries

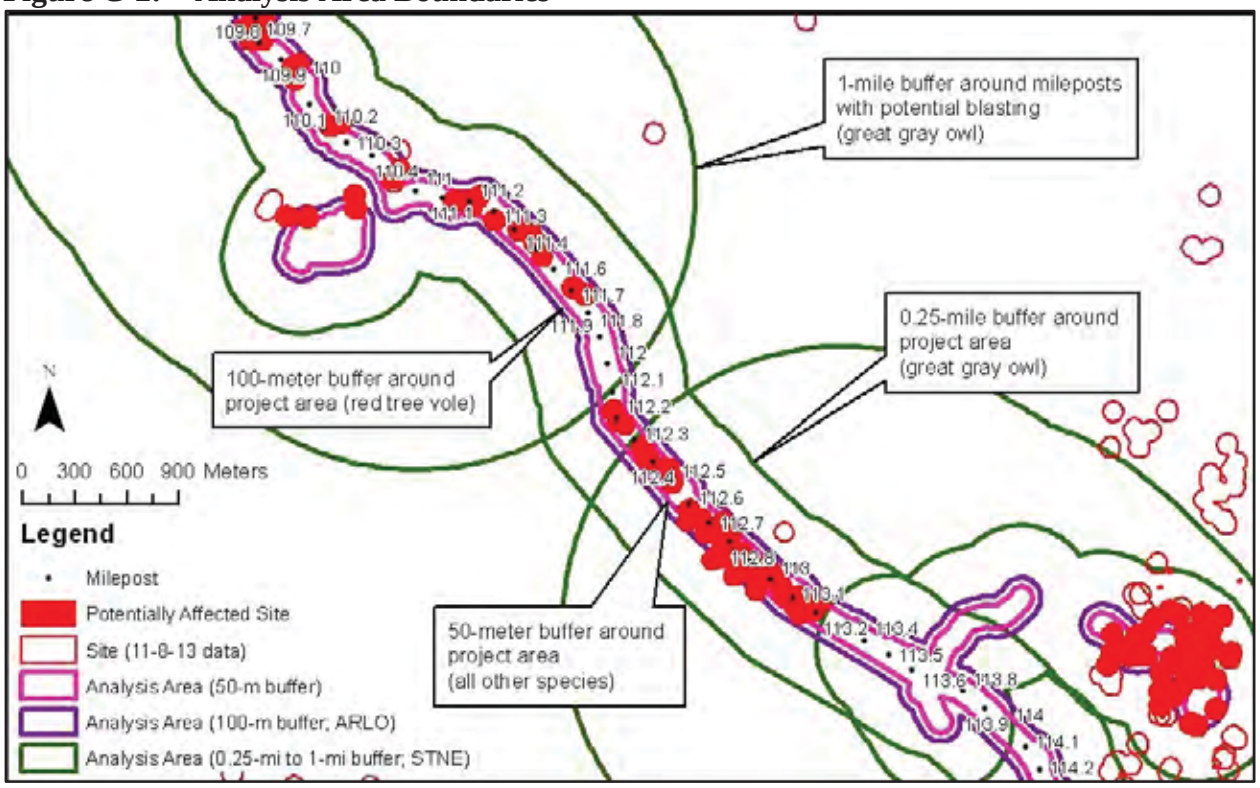
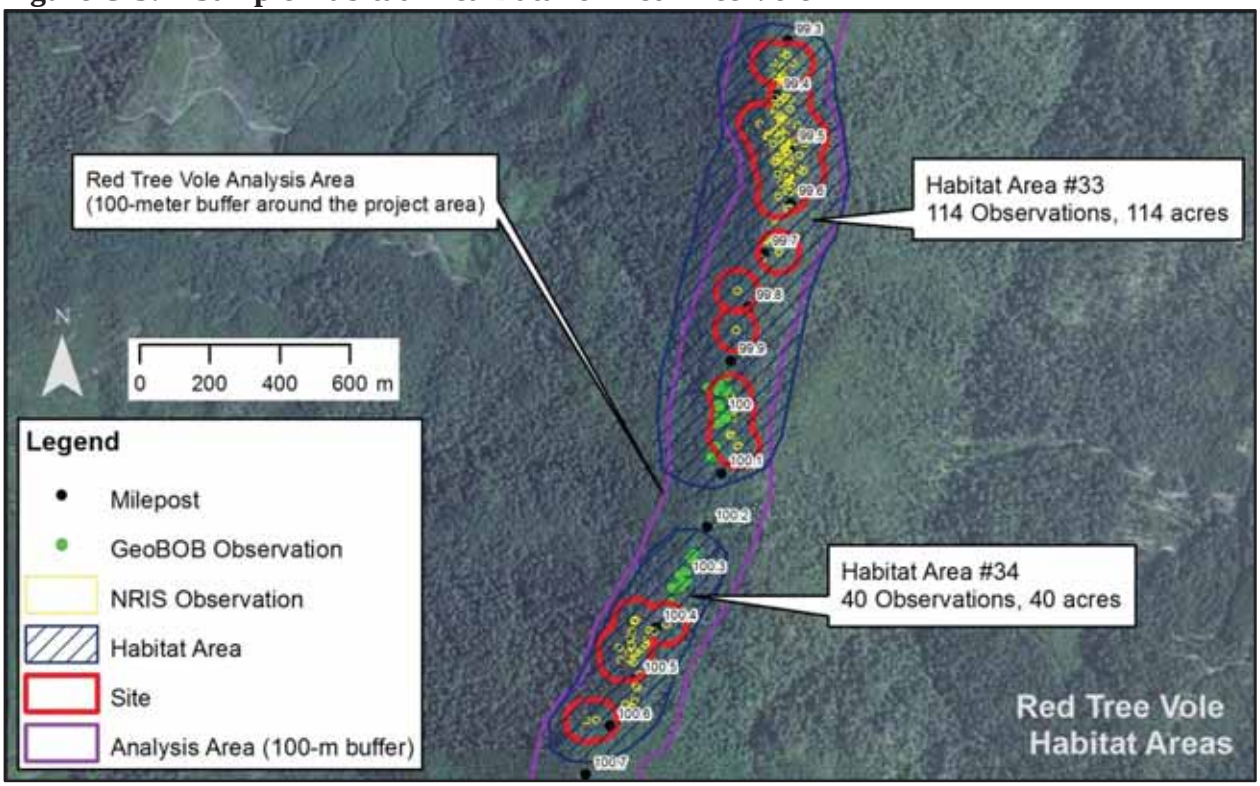


Figure C-3: Sample Habitat Area Data for Red Tree Vole



Data Processing

The data obtained in Table C-1, as well as other necessary data (e.g., state and county boundaries), were processed to support the persistence evaluation. All datasets that covered an extent greater than the range of the northern spotted owl (NSO) were clipped to the "NSR_NWFP_Bndry" shapefile. For the species data (sites), a Select by Location process was run to extract out only those sites within the NSO range; this resulted in a smaller subset of the data. Other specific processes that were run are detailed below.

Lands Data Processing

The land ownership and allocation data were processed to produce subsets of the data for analysis purposes, as follows:

- A Select by Attributes process was used for the "NSR_Lands_NWFP" shapefile to select those lands with an "NSR_Own" attribute of "USFS" or "BLM" or "US Forest Service" or "Bureau of Land Management" and produce a layer with only National Forest System and BLM lands (NSR_Lands_NWFP_FS_BLM.shp).
- A reserve lands layer was produced from a subset of the "nwfp_lua_2009_2013" shapefile combined with the subset of the National Hydrography Dataset. A Select by Attributes process was used for the "nwfp_lua_2009_2013" shapefile to extract only those features with reserve land allocations (LUA = CR, LSR, LSR3, or LSR4). The National Hydrography Dataset was clipped to the features with the "Other" attribute in the land allocation dataset (LUA = Other) to produce the regionally mapped Riparian Reserves (NHD_Other_2013.shp). These datasets were merged to produce the regional

reserve lands (Reserves_NWFP_2013.shp). Because the land allocation data included Congressionally Reserved features on National Park Service and U.S. Fish and Wildlife Service lands, the data were further clipped using the "NSR_Lands_NWFP_FS_BLM" shapefile to produce reserve lands only on National Forest System and BLM lands (Reserves_NWFP_2013_FS_BLM.shp).

- The regional National Forest System and BLM lands and reserve lands layers were clipped to the local area boundary (NSR_HUC5_Crossed.shp) to estimate the extent of these lands in the local area.
- National Forest and BLM District boundaries obtained from the respective agencies were processed to create layers depicting only the National Forest System and BLM lands in each management unit. The "FSForests_ROW" shapefile was intersected with the "NSR_Lands_NWFP_FS_BLM" shapefile to produce the "FSForests_ROW_FSland" shapefile; the "BLMDistricts_ROW" shapefile was also intersected with the "NSR_Lands_NWFP_FS_BLM" shapefile to produce the "BLMDistricts_ROW_BLMland" shapefile.

Project Data Processing

The project data obtained from Edge and the project applicant were combined and buffered for use in the analysis. The following steps were used to process the data:

- The project features (Construction_Right_of_Way) and roads (Road_disturbance_poly_v032113.shp) layers were merged and dissolved to produce a project area boundary (Combined_ROW_Roads_0913.shp). This boundary was also used to clip the National Forest System and BLM lands layer and produce the extent of these lands in the project area (Combined_ROW_Roads_0913_BLM_FS.shp).
- The project area was buffered to create analysis area boundaries for the S&M species. The analysis area for all species except great gray owl and red tree vole was established by creating a 50-meter buffer around the project area. For red tree vole, the project area was buffered by 100 meters. For great gray owl, a 1-mile buffer was established around potential blasting areas based on mileposts (Milepost_100th_Proposed_Route_2013_4_29_2013) where blasting may be necessary; this layer was merged with a 0.25-mile buffer around the project area to produce the analysis area for great gray owl. Figure C-2 displays the three analysis areas.

Site Data Processing

The site data produced by the FME tool was processed for the analysis to identify those sites that could be affected by the PCGP Project (potentially affected sites) and to estimate the extent of impacts to the sites. The following steps were used to process the site data:

- A Select by Location process was used to extract out the sites that intersect, or fall within, the analysis area appropriate for the species (50-meter buffer of the project area for fungi, lichens, bryophytes, plants, and mollusks; 100-meter buffer of the project area for red tree vole; and 0.25–1-mile buffer of the project area for great gray owl). The extracted sites using the 50-meter analysis area were imported into the FME geodatabase of the original site data and labeled as "SMKnownSites_2013_AnalysisArea50m." For the species that had been removed from the 2001 list, the sites were selected from the

"SelectSpp_Sites_dissolve" layer, then exported as a shapefile (SelectSpp_Sites_AnalysisArea). The extracted red tree vole and great gray owl sites were also imported into the FME geodatabase (SMKnownSites_2013_STNE_AnalysisArea and SMKnownSites_2013_RTV_AnalysisArea100m).

- For the non-vertebrate species, the analysis area sites layers were queried for the species, then the selected sites were clipped to the project area and intersected with the project features and road layers. The acreage of each clipped or intersected site was calculated to estimate the extent of the site subject to impacts. The resulting layers were labeled with the species' alpha code and part of the clipped or intersected file's name (e.g., alel_project_clip, alel_project_inter, alel_road_inter). Figure C-4 displays the processes used to analyze site impacts. The STNE analysis area data were not subject to these processes because none of the sites overlapped the project area.
- For red tree vole (ARLO), the analysis area sites were further modified to create Habitat Areas using guidance from the species' Management Recommendations. Each site was reviewed in ArcGIS with the locations of original observations (active and inactive nest sites) from GeoBOB and NRIS and aerial photography, and the sites were manually modified to create polygons that encompass all nest sites (active and inactive, per the guidance) and an appropriate habitat area (i.e., potentially suitable habitat of older forests, as visible on the aerial imagery) around those sites using the guidance (i.e., 1 acre per nest site if more than 10 nests; 10 acres for less than 10 nests; consider site potential tree distance of about 200 feet a nest site and the perimeter of the polygon; and combine overlapping Habitat Areas or include nest sites within 330 feet of one another, whether active or inactive). The "ARLO_Habitat_Areas_1113" shapefile was then processed as with the other analysis area site data to estimate the extent and types of impacts to each Habitat Area. Figure C-3 displays examples of the Habitat Areas.

Habitat Mapping

Raster data (mr200_sppsz_2006.grd) with forest cover, structure, and age were obtained from the Forest Service and Oregon State University, LEMMA group, and were the same data used for the Northwest Forest Plan 15-year monitoring report. In support of that report, the raster was processed to produce a shapefile depicting the extent of LSOG forests across the NSO range. The shapefile was also used for this report to produce the LSOG subset of forests for each species and determine the number of sites found in LSOG forests. The forest cover raster was processed using the following steps to produce a regional forest coverage layer and map and estimate the extent of forests that could provide habitat for each species:

- The raster was first reclassified using the "FORTYPBA" attribute, which describes the forest type based on the dominant tree species using alpha codes from the 2000 PLANTS database.
- The resulting raster (mr200_fortest) was further classified by coniferous (code of "1" based on dominant plants that are only conifer species), mixed hardwood-coniferous (code of "2" based on dominant plants that are conifer and hardwood species), and hardwood (code of "3" based on dominant plants that are only hardwood species) forests by adding a new attribute column, then the raster was clipped to the CA, OR, and WA extents of the NSO range to produce three smaller rasters to work with.

- The resulting rasters were converted to shapefiles using the new attribute column for forest type (1, 2, or 3) and clipped to the extent of Forest Service and BLM lands (NSR_Lands_NWFP_FS-BLM.shp) to only display and use the extent of forests on those lands subject to the Northwest Forest Plan Standards and Guidelines. The acreage of each forest type was also calculated. These layers provided the extent of coniferous, mixed hardwood-coniferous, and hardwood forests across the region (NSO range).
- The OR forest layer (mr200_fortyp_or_FS_BLM.shp) was further clipped to the local (NSR_HUC5_Crossed.shp) and project (Combined_ROW_Roads_0913.shp) areas to calculate the extent of all forests at those scales. It was also intersected with the project features layer to estimate the extent of impacts to the forests from each activity type in the project area.
- For species that had elevation limits, the forest layers were further processed according to the elevation criteria. Figure C-5 displays the process used to select out the appropriate elevation limit using the DEMs (converted into feet) and intersect the elevation layer with the forest layer to generate a new shapefile of any forest type above or below a specified elevation limit (e.g., coniferous and mixed hardwood-coniferous forests below 6,000 feet above mean sea level) for each state. Acreages were calculated for these layers to produce an estimate of the regional extent of the forests. The OR forest layer was further processed, as with the general forest layer, to produce estimates at the local and project area scales and estimate the extent of impacts to the forests (refer to Figure C-6).
- For species with narrower ranges than the regional area (e.g., only found in a few provinces in the NWFP area), the regional forest layer was clipped to the range boundary. Range boundaries were created using the province or county data or a combination of the two datasets, depending on where the species' known range extends based on available information and site locations.
- These datasets were used to map forests that could provide habitat for each species according to the background information collected on the species. The background information was supplemented with the locations of sites at various elevations and in the different forests using a Select by Location process to select the forest type and elevation contours that intersected the sites. The spatial information was used as a general reference to supplement the published information on each species.

Spatial Analysis Steps

Once the spatial data were processed, the data were used to describe information on each species in terms of their spatial distributions and anticipated effects associated with the PCGP Project, as detailed below.

Species Distributions

The distribution patterns of each species was described at three scales (regional, local, and analysis areas) using the GIS data. The following steps detail the processes used to obtain information on the species' distributions:

- The data listed in Table C-1, as modified by the data processes discussed above, were uploaded into ArcGIS.

- A definition query was set for the site data (SMKnownSites_2013_NWFP, SelectSpp_Sites_dissolve, SMKnownSites_2013_AnalysisArea50m, SelectSpp_Sites_AnalysisArea, SMKnownSites_2013_STNE_AnalysisArea, and SMKnownSites_2013_RTV_AnalysisArea100m) for the species in question.
- The site data were queried for number of sites in the regional, local, analysis, and project areas (i.e., total feature count for regional and analysis areas data; Select by Location for sites that intersect the NSR_HUC5_Crossed.shp and Combined_ROW_Roads_0913.shp).
- The site data were queried for number of sites in each land ownership (Forest Service, BLM, National Park Service, U.S. Fish and Wildlife Service, or Other) and across each scale (regional, local, and analysis areas). A Select by Attributes process was first used on the "NSR_Lands_NWFP" shapefile for the "NSR_Own" attribute to select the land owner, then the Select by Location process was used to select sites that intersect the selected land ownership features.
- Using the same processes as for the land ownership data, the site data were queried for number of sites in each land use allocation (LUA = AMA, AMR, AW, CR, LSR, LSR3, LSR4, MLSA, ND, Other in nwfp_lua_2009_2013.shp) and in Riparian Reserves (NHD_Other_2013.shp) across each scale.
- The distribution of the sites across the physiographic provinces was assessed by using the Select by Location process for the "Provinces" shapefile to select provinces that intersect the sites.
- The number of sites on BLM and National Forest System lands and in reserve land allocations across the three scales (regional, local, and analysis areas) was counted by using a Select by Location on the site layer to select sites that intersect the "NSR_Lands_NWFP_FS_BLM" shapefile and "Reserves_NWFP_2013_FS_BLM" shapefile. The selection started with the regional sites, and those sites within the local and analysis areas were reselected.
- The site data were queried for number of sites on BLM and National Forest System lands within the BLM Districts and National Forests that encompass the project area. A Select by Attributes process was first used on the "BLMDistricts_ROW_BLMland" and "FSForests_ROW_FSland" shapefiles for the "SUBJ_DOB" or "FORESTNAME" attribute, respectively, to select the District or Forest name, then the Select by Location process was used to select sites that intersect the selected features.
- The locations of sites in or near the project area were identified using the mileposts associated with the construction corridor.
- The extent of potential habitat for each species was calculated using the processed habitat data and presented in a map with the sites to portray the distribution of sites across the habitat. When appropriate, range boundaries were also displayed on the habitat maps.
- Maps were produced to display the distribution of sites across the regional and local areas on BLM and National Forest System lands and reserve lands within those lands.

Analysis of PCGP Project Impacts on Sites

Two levels of analysis were conducted using the GIS data, depending on the potential for concern for the species' persistence in the NSO range. For all species, an initial analysis was conducted using the steps below:

- Sites, as produced by the FME tool, that could be affected by the PCGP Project, either directly or indirectly, were identified by selecting those sites that fall within, either partially or entirely, the analysis area for the species. These sites are contained in the analysis area site layers (SMKnownSites_2013_AnalysisArea50m, SMKnownSites_2013_STNE_AnalysisArea, and SMKnownSites_2013_RTV_AnalysisArea100m geodatabase feature classes and SelectSpp_Sites_AnalysisArea.shp).
- The direct impacts to the sites were calculated in acres using the processed site data (SPECIES_project_clip.shp, SPECIES_project_inter.shp, and SPECIES_road_inter.shp). The intersected layers provided details by feature of the PCGP Project that would cause the impact (e.g., FEATURE = Construction Right-of-Way).
- The estimated acreage of impacts to potential habitat was calculated using the processed habitat data (habitat data clipped to and intersected with the project area). The estimated amount of forests to be restored within the project area was also calculated using the intersected data (44 percent of the Construction Right-of-Way impacts and 100 percent of the Temporary Extra Work Areas impacts).

If the level of project-related impacts appeared to create a concern for species persistence, the following steps were used to conduct a closer analysis of the anticipated impacts and assess the potential for site persistence at each affected site:

- The original observation data from GeoBOB and NRIS were uploaded into ArcGIS and viewed with the analysis area site data, the PCGP Project data, contour data, and aerial imagery (BING basemaps provided through ArcGIS) to determine proximity of the observation to the project area and potential for impacts (direct or indirect).
- A map was produced of the analysis area sites to display the observation and other useful data that were used to assess impacts.
- If the impacts would still create a concern for species persistence in the NSO range, a potential route modification was determined using the GIS data and mileposts.

This page intentionally left blank.

Figure C-4: Example Model for Survey and Manage Site Data Processing

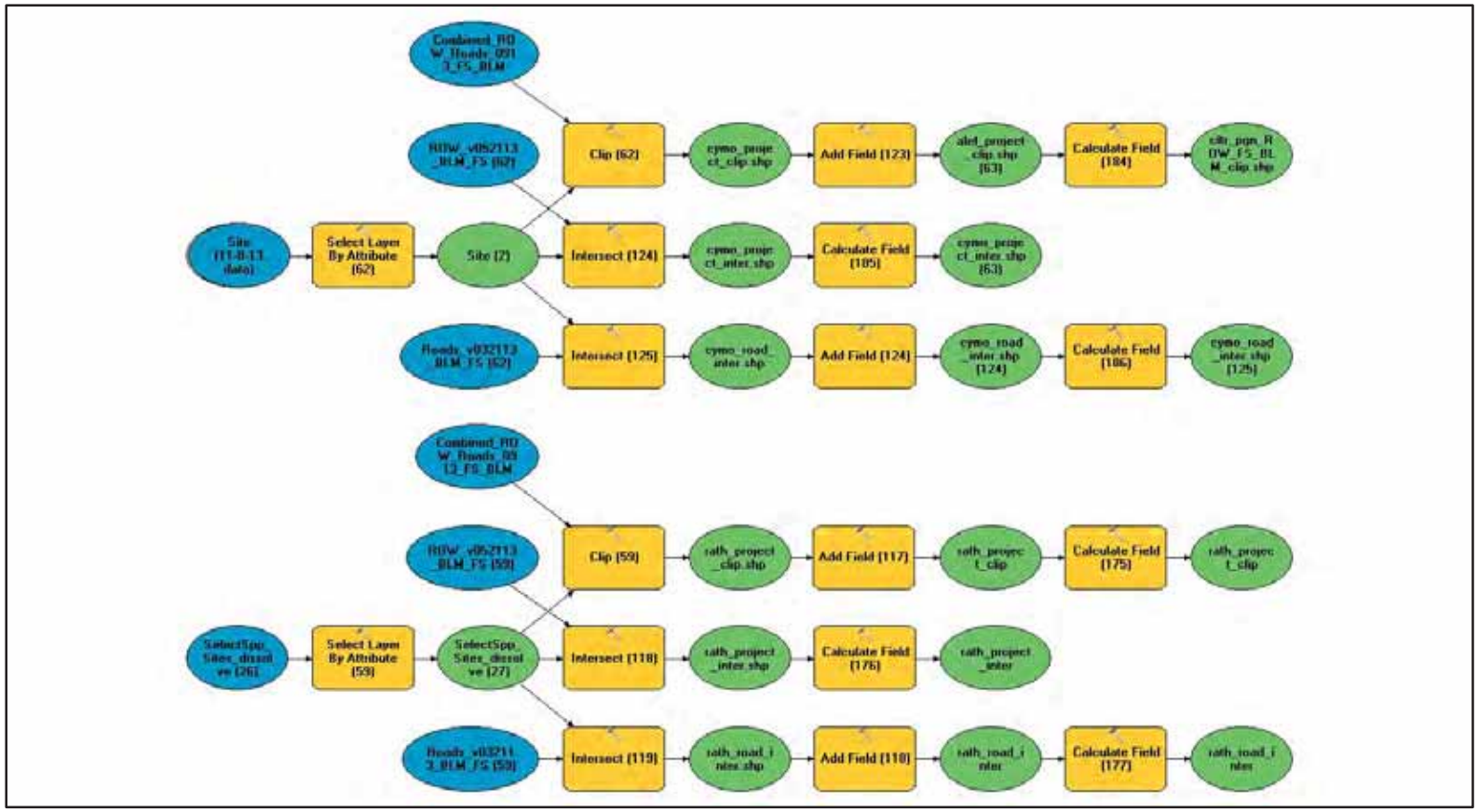


Figure C-5: Example Model for Forest Data Processing by Elevation

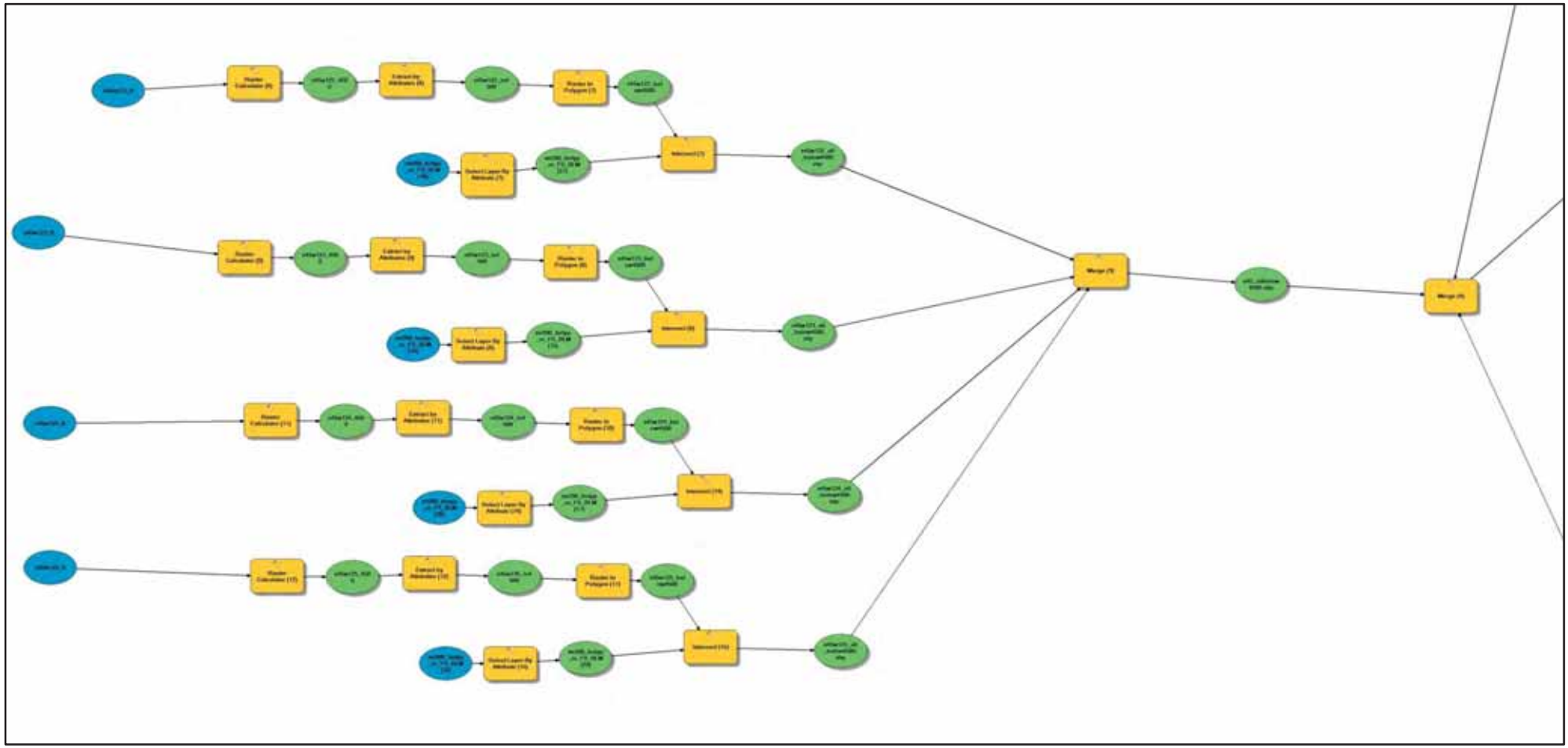


Figure C-6: Example Model for Forest Data Processing by Elevation in Oregon

