APPENDIX L

Biological Evaluation

Appendix L

Pacific Connector Gas Pipeline Project

Draft Biological Evaluation

October 2014

Prepared by:



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Acronyms and Abbreviations

BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
CMP	Compensatory Mitigation Plan
CR	Clearcut-Regenerating
dBA	A-weighted decibels
dbh	diameter at breast height
DEIS	Draft Environmental Impact Statement
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Department of Agriculture, Forest Service
GIS	Geographical Information System
HDD	Horizontal Directional Drilling
ISSSSP	Interagency Special Status/Sensitive Species Program
LNG	Liquefied Natural Gas
LO	Late Successional-Old Growth
LSR	Late-Successional Reserve
LWD	large woody debris
MP	milepost
MS	Mid-Seral
NSO	northern spotted owl
NWFP	Northwest Forest Plan
NWR	National Wildlife Refuge
NEPA	National Environmental Policy Act
ODFW	Oregon Department of Fish and Wildlife
ORBIC	Oregon Biodiversity Information Center
Pacific Connector	Pacific Connector Gas Pipeline, LP
PCT	Pacific Crest Trail

Project	Pacific Connector Gas Pipeline
ROW	Right-of-Way
TEWA	Temporary Extra Work Area
UCSA	Uncleared Storage Area

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1.0 INTRODUCTION

This Draft Biological Evaluation (BE) evaluates potential impacts to U.S. Department of Agriculture, Forest Service (Forest Service) sensitive species on National Forest System (NFS) land from construction and operation of the Pacific Connector Gas Pipeline Project (Project), proposed by Pacific Connector Gas Pipeline, LP (Pacific Connector). The proposed Project consists of an approximately 232-mile natural gas pipeline that crosses the Umpqua, Rogue River, and Winema national forests in Oregon. Species considered in this BE are those listed by the Forests as sensitive species from the December 1, 2011 Regional Forester Special Status Species List, that can be found on the Interagency Special Status/Sensitive Species Program (ISSSSP) website (ISSSSP 2011). Impacts to species that are listed or proposed for listing under the federal Endangered Species Act [ESA]; 16 U.S.C.A. §§ 1531 et seq.) are discussed in the Biological Assessment (BA) and not are discussed in this BE, even where these species are Forest Service sensitive species. Survey and Manage Species that have the potential to be affected by the Project on federal land, including species that are also Forest Service sensitive species are not discussed in this BE, but instead are discussed in the Survey and Manage Species Persistence Evaluation, Appendix K to the Draft Environmental Impact Statement (DEIS; FERC 2014).

2.0 PROPOSED ACTION AND ACTION ALTERNATIVES

CP13-492-000 As filed with the Federal Energy Regulatory Commission (FERC) on June 5, 2013 under FERC Docket No:CP13-492-000, the Project consists of a new 232-mile, 36-inch diameter, natural gas pipeline and associated aboveground facilities that extends from a new liquefied natural gas (LNG) export terminal (Jordan Cove LNG Terminal) on the North Spit of Coos Bay, Oregon through Coos, Douglas Jackson, and Klamath counties before terminating near Malin, Oregon (Figure 1). The pipeline would cross 10.9 miles within the Umpqua National Forest, 13.8 miles within the Rogue River National Forest, and 6.4 miles within the Winema National Forest. The pipeline right-of-way (ROW) would generally consist of a 95-foot wide construction corridor, of which 65 feet would be allowed to revegetate after construction is completed. A more detailed description of the Project, including its Purpose and Need, can be found in Section 2.0 of the DEIS (FERC 2014).

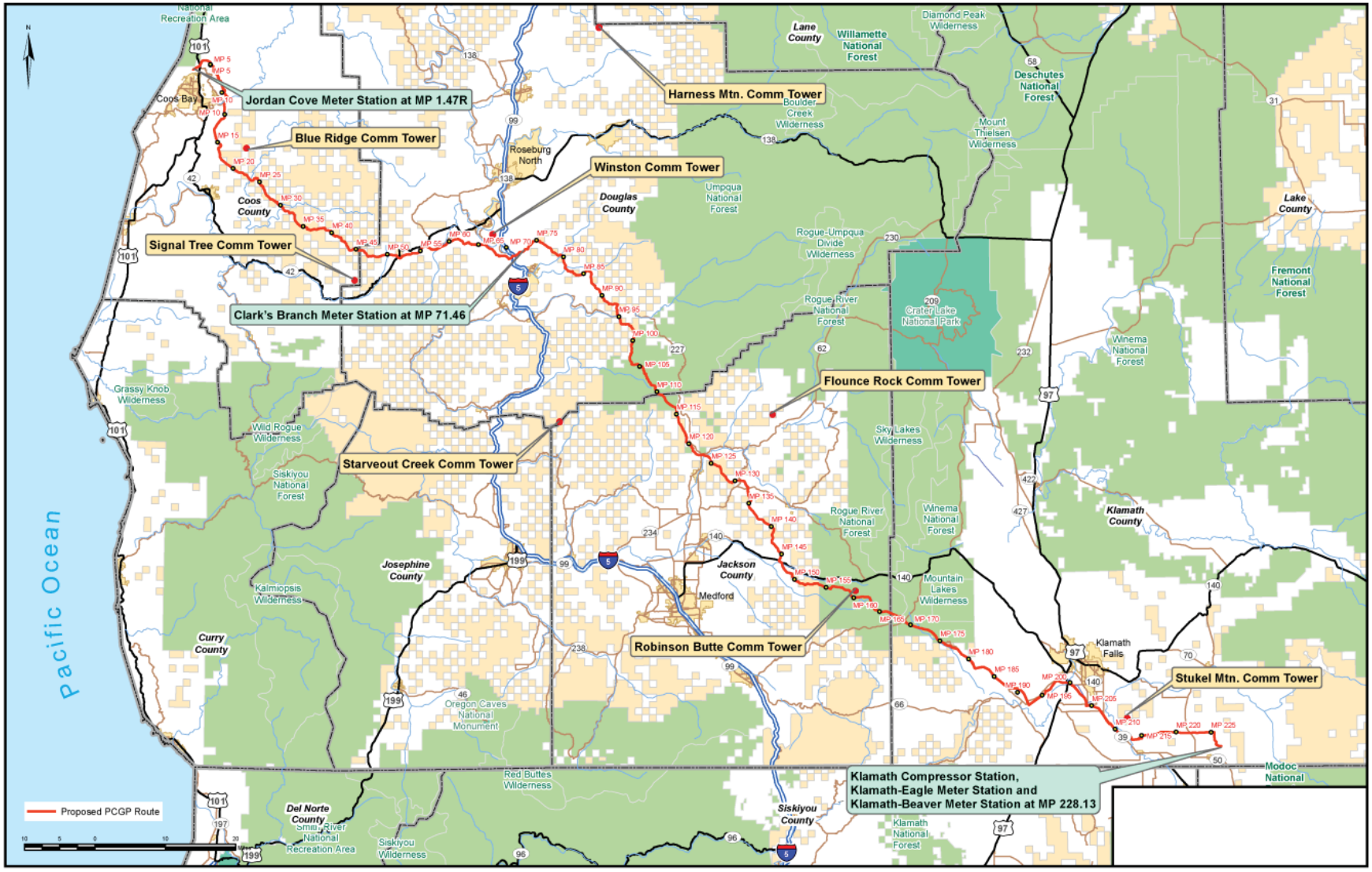


Figure 1: General Location of the Proposed Project

Alternatives to the proposed action considered on Forest Service land include the no action alternative, major route alternatives (alternative route segments), and minor route alternatives (minor route variations) (FERC 2014, Pacific Connector 2013). The no action alternative is assumed to have no impact on the species discussed in this BE, and thus this alternative is not discussed further. Major route alternatives are generally those that follow different routes through a majority of the area between the beginning and ending points of the proposed action; no alternatives that avoided NFS land entirely were considered do to ownership patterns in Southwest Oregon (FERC 2014, Pacific Connector 2013). Nonetheless, during preliminary route selection and the feasibility analysis, numerous alternative route segments were analyzed, and this selection process is summarized here.

During the course of refining the route alignment for the currently proposed route, Pacific Connector incorporated five minor route variations on National Forest lands to avoid impacts to rare Survey and Manage fungi. Although these minor route variations were included in the June 2013 application (Pacific Connector 2013), and thus have been incorporated into the proposed action, the rationale behind these route adjustments is described below in order to demonstrate avoidance measures and provide context for the proposed route. In some instances, the Forest Service determined that Pacific Connector's minor realignments were inadequate based on species persistence evaluations and proposed additional realignments in our draft EIS. Pacific Connector will continue to work with the Forest Service to adjust these realignments so that these fungi locations are sufficiently avoided.

As the major and minor route alternatives discussed here have all either been discounted or incorporated into the proposed action, impacts to each species discussed in this BE are not evaluated for each of these alternatives. A general description of these action alternatives and the rationale behind their selection or incorporation into the proposed action are presented in this section; however, Sections 3.0 through 6.0 address the proposed action only. A detailed alternatives analysis can be found in Resource Report 10 of the Application for Certification filed with FERC on June 5, 2013 (Pacific Connector 2013), and in Chapter 3 of the draft EIS.

Seven major route alternatives and six minor route alternatives were considered in the three national forests crossed by the Project. As described below, the proposed routes in the national forests are the result of various constraints analyses, meetings and site visits between Pacific Connector and Forest Service biologists.

2.1 Umpqua National Forest

Pacific Connector evaluated three route alternatives and various construction measures (such as narrowing the construction ROW) in the vicinity of Long Prairie (mileposts [MPs] 104.8 – 111.5) to avoid or minimize potential impacts to cultural resources and to address the concerns of the Forest Service and the Cow Creek Band of Umpqua Indians. Based on these evaluations and consultations with the Forest Service and Cow Creek Band of Umpqua Indians, Pacific Connector determined that the only feasible/constructible alternative to ensure safety, stability, and integrity is the Compromise Route, which is approximately 2,000 feet longer than the original 2006 route and requires crossing steep slopes and the East Fork of Cow Creek.

After further consultation with the Forest Service, Pacific Connector further modified the Compromise Route to avoid impacts to a rock quarry, Riparian Reserves, northern spotted owl (NSO; *Strix occidentalis caurina*) nest sites, waterbody crossings, and dispersed recreation areas. These modifications are now incorporated into the 10.9-mile proposed route on the Umpqua National Forest.

2.2 Rogue River National Forest

Pacific Connector evaluated three alternatives to the proposed route and various construction measures (such as co-locating the pipeline along existing roads) to minimize potential impacts on NSOs, late-successional reserves (LSR), wetlands, and Riparian Reserves. Between MPs 155.1 and 168.9, the Forest Service identified an alternative that would be within or parallel to existing forest roads almost entirely through the National Forest. By using existing cleared corridors (forest roads), this alternative serves to minimize fragmentation and impacts to LSRs. This alternative would also cross the Pacific Crest Trail (PCT) along an existing road, which would minimize potential impacts to trail users by avoiding the creation of a separate linear crossing of the trail.

Pacific Connector studied the Forest Service alternative and determined that the alignment was feasible for the most part, except where the alignment followed tight radius road curves. During initial routing efforts for the Original May 2006 Route, Pacific Connector avoided aligning the Project along forest roads because of the perceived impact that the widened corridor (i.e., 95 feet) would cause, as forest roads are only about 20 to 30 feet in width and traverse mature forest stands.

After further consultation with the Forest Service, Pacific Connector developed the current proposed route, which follows the original May 2006 Route more closely but uses existing forest clear-cuts or thinned areas to minimize impacts to mature forests and the Big Elk NSO nest patch. The proposed route in this area follows existing roads where possible and is aligned to avoid impacts to wetlands. This route is also designed to minimize side slope construction and extra work area requirements between MPs 155.1 to 159.6, and to avoid a wetland Riparian Reserve area between MPs 168 and 168.9. The Forest Service also identified a alternative for crossing the PCT which is discussed separately below.

Between 2010 and 2012, Pacific Connector completed surveys for Survey and Manage species along route alternatives that passed through federally-managed lands. During these field surveys, the Survey and Manage fungi *Gymnomyces abietis, Sedecula pulvinata* and *Hygrophorus caeruleus* were detected between MPs 154.7 and 155.1,158.0 and 158.4, and 164.2 and 164.3, respectively (SBS 2010, FERC 2014). Minor route variations were developed to avoid these Survey and Manage fungi locations and are now incorporated into the 13.8-mile proposed route; however, Forest Service determined that these realignments are inadequate based on their species persistence evaluations and proposed additional realignments in our draft EIS. Pacific Connector will continue to work with the Forest Service to adjust these realignments so that these fungi locations are sufficiently avoided.

2.3 Winema National Forest

Pacific Connector identified two short alternative route segments within the Rogue River and Winema national forests in Klamath County between MPs 167.5 and 169.1. The western segment crosses the PCT while the eastern segment crosses the Dead Indian Memorial Highway. These two alternative crossings are referred to collectively as the PCT and Dead Indian Memorial Highway Alternative Route. Note that these alternatives are also discussed above in Section 2.2 as part of the larger 13.8-mile route under Rogue River National Forest; however, the PCT and Dead Indian Memorial Highway Alternative Route spans both the Rogue River and Winema national forests and is discussed in more detail here.

When Pacific Connector first mapped out its pipeline route in 2006, it considered a straight line perpendicular crossing of the PCT at MP 167.8. This would have created an unnatural tunnel-like visual effect through the forest that would not have met Forest Service standards for the Retention or Partial Retention Visual Quality Objective for the PCT. The Forest Service recommended a realignment to minimize visual impacts to the PCT. Pacific Connector reviewed the proposed alignment modification using existing maps, aerial photography, and contour data. Based on desktop analysis, Pacific Connector determined that the Forest Service's modification was feasible.

During field surveys, Survey and Manage fungi species were identified on the Winema National Forest: *Hygrophorus caeruleus* was identified between MPs 168.6 and 169.1, both *Hygrophorus caeruleus* and *Choiromyces alveolatus* were identified between MPs 171.2 and 173.0, and *Arcangeliella crassa* was identified between MPs 173.18 and 173.32. Pacific Connector incorporated minor route deviations into the proposed route to avoid these Survey and Manage fungi species; although the Forest Service determined that the realignment between MPs 171.2 and 173.0 was inadequate. Pacific Connector will continue to work with the Forest Service to adjust these realignments so that these fungi locations are sufficiently avoided (Pacific Connector 2013, SBS 2010, FERC 2014).

The proposed route is expected to have similar or slightly fewer impacts than the 2007 Route because it would require less clearing of old growth forest within a known NSO home range, avoid Survey and Manage fungi (although full avoidance has not yet been achieved as discussed above), and implement measures to reduce the width of the construction ROW at the PCT crossing, as well as other measures to minimize impacts to users of this trail. These modifications are now incorporated into the 10.9-mile proposed route.

3.0 PRE-FIELD REVIEW

Species considered in this BE are those Forest Service sensitive species with documented or suspected occurrence(s) in National Forest(s) crossed by the Project, per the ISSSSP (ISSSSP 2011). A documented occurrence means that a species is known to be located on land administered by the Forest Service based on historic or current known sites of a species, reported by a credible source and for which the Forest Service has knowledge of written, mapped, or specimen documentation of the occurrence (ISSSSP 2011). A suspected occurrence means that the species is not documented on land administered by the Forest Service, but may occur on the unit because: 1) the National Forest is considered to be within the species' range and 2) appropriate habitat is present; or 3) there is a known occurrence of the species (historic or current) in close enough vicinity that the species could occur on Forest Service land (ISSSSP 2011).

Additional desktop information on sensitive species occurrence is based on several data sources including data from the Oregon Biodiversity Information Center (ORBIC; 2012) and the Forest Service (2006), as well as from aerial photographs and other publically-available Geographical Information System (GIS) databases. Sources of habitat, range, status, threats, and natural history information for each species included: ISSSSP species fact sheets (ISSSSP 2014), NatureServe (2013), the Atlas of Oregon Wildlife (Csuti et al. 2001), Wildlife Habitat Relationships in Oregon and Washington (Johnson and O'Neil 2001), as well as additional sources specific to the species (see Sections 6.2.1 to 6.2.8). Results of this review, including expected habitats and documented or suspected occurrences on Forest Service lands, are presented in Section 6.0 for species potentially impacted by the Project, and in Appendix A for species not expected to be impacted by the Project.

4.0 RESULTS OF FIELD SURVEYS

Biological surveys were conducted in the Project area by SBS and its subcontractors. Initial surveys were conducted in the spring of 2007. Additional surveys were conducted in 2008 and 2010 to account for minor route alternatives and to survey access roads and laydown areas, as well as to conduct persistence surveys for Survey and Manage species (Forest Service and BLM 2001, SBS 2011b).

Only Forest Service sensitive species are evaluated in this document; however, target species during surveys also included federal and state-listed threatened and endangered species and other special-status species. Special-status species groups included Bureau of Land Management (BLM) Oregon/Washington State Director Special Status Species, and Region 6 Survey and Manage species that included vascular plants, non-vascular plants, fungi, and mollusks. Forest Service sensitive species detected during the 2007, 2008, or 2010 surveys that are discussed in this BE include two terrestrial invertebrates (mollusks) and one vascular plant:

- Terrestrial Invertebrates:
    - Traveling sideband (*Monadenia fidelis celeuthia*); and
    - Siskiyou hesperian (*Vespericola sierranas*).
- Vascular plants:
    - Bellinger's meadowfoam (*Limnanthes floccosa* ssp. *bellingeriana*).

Additional federally-listed and proposed and Survey and Manage species that are also Forest Service sensitive species were documented during surveys. However, these species are discussed in the BA and Survey and Manage Species Persistence Evaluation, respectively, and are not discussed in this BE. However the occurrence and impact determinations for these species are summarized in Table 1.

5.0 SPECIES IMPACT DETERMINATION SUMMARY

Table 1 lists the 260 Forest Service sensitive species that have been documented or are suspected to occur within the Umpqua, Rogue River, and Winema national forests based on the December 1, 2011 Regional Forester Special Status Species List (ISSSSP 2011). Where suitable habitat was documented for a species, but species-specific surveys were not conducted for that species, presence of the species was assumed and potential effects of the Project were analyzed based on the critera presented below in Section 6.0.

One of four possible impact determinations are listed for each species: 1) No Impact (NI); 2) May Impact Individuals or Habitat but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species (MIIH); 3) Will Impact Individuals or Habitat with a consequence that the action will contribute to a trend toward Federal listing or cause a loss of viability to the population or species (WOFV); and 4) or Beneficial Impact (BI).

Of the 260 Forest Service sensitive species, 40 had impact determinations of MIIH. Of those, 33 are discussed in detail in Section 6.2, and the remaining 7 are discussed in more detail in the Survey and Manage Persistence Evaluation (Appendix K to the DEIS). Appendix A includes the species that were dropped from further analysis due to a lack of suitable habitat or because they were not detected during targeted field surveys. Appendix A additionally includes a description of suitable habitat, documented or suspected occurrence by National Forest, and a rationale for the impact determination for each species.

Federally-listed or proposed species that are also considered Forest Service sensitive species are included in Table 1 (3 mammals, 1 bird, 1 amphibian, 3 fish, and 4 plants). These species are addressed in detail in the Biological Assessment. Impact determinations in Table 1 are those from the Biological Assessment and thus do not use Forest Service terminology. Three possible impact determinations are shown for federally-listed or proposed species: 1) No effect (NE); 2) Not likely to adversely affect (NLAA); and 3) Likely to adversely affect (LAA).

Table 1. Forest Service Sensitive Species with Potential to Occur near the Project

Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Mammals					
Pallid bat *Antrozous pallidus pacificus*	D – UMP [d/] D – RRS D – FWI	Y	N	U	MIIH
Red tree vole *Arborimus longicaudus* [b/]	D – UMP	Y	Y	Y	MIIH
Townsend's big-eared bat *Corynorhinus townsendii*	D – UMP D – RRS D – FWI	Y	N	U	MIIH
Fringed myotis *Myotis thysanodes*	D – UMP D – RRS D – FWI	Y	N	U	MIIH
Pygmy rabbit *Brachylagus idahoensis*	S – FWI	N	N	U	NI
North American wolverine *Gulo gulo luscus*	S – UMP S – RRS S – FWI	N	N	N	NI
Gray wolf *Canis lupus* [a/]	D – UMP [d/]	Y	N	U	NLAA
Pacific fisher *Martes pennanti* [a/]	D – UMP D – RRS D – FWI	Y	N	U	NLAA
Birds					
Red-necked grebe *Podiceps grisegena*	D – UMP D – FWI	Y	N	U	MIIH
Horned grebe *Podiceps auritus*	D – UMP D – FWI	Y	N	U	MIIH
American white pelican *Pelecanus erythrorhynchos*	D – RRS [d/] D – FWI	Y	N	U	MIIH
Harlequin duck *Histrionicus histrionicus*	D – UMP D – RRS	Y	N	U	MIIH
Bufflehead *Bucephala albeola*	D – UMP D – FWI	Y	N	U	MIIH
Yellow rail *Coturnicops noveboracensis*	S – UMP D – FWI	N	N	U	NI
Upland sandpiper *Bartramia longicauda*	D – FWI	Y	N	U	MIIH
Bald eagle *Haliaeetus leucocephalus*	D – UMP D – RRS D – FWI	Y	N	U	MIIH
American peregrine falcon *Falco peregrinus anatum*	D – UMP D – RRS D – FWI	Y	N	U	MIIH
Greater sage-grouse *Centrocercus urophasianus*	D – FWI	N	N	N	NI
Northern spotted owl *Strix occidentalis caurina* [a/]	D – UMP D – RRS D – FWI	Y	Y	Y	LAA

Table 1. Forest Service Sensitive Species with Potential to Occur near the Project

Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Great gray owl *Strix nebulosa* [b/]	D – RRS	Y	Y	Y	MIIH
Black swift *Cypseloides niger*	D – UMP	N	N	U	NI
White-headed woodpecker *Picoides albolarvatus*	D – UMP D – RRS D – FWI	Y	N	U	MIIH
Lewis' woodpecker *Melanerpes lewis*	D – UMP D – RRS D – FWI	Y	N	U	MIIH
Purple martin *Progne subis*	S – UMP S – RRS S – FWI	Y	N	U	MIIH
Northern waterthrush *Seiurus noveboracensis*	D – RRS	N	N	N	NI
Tricolored blackbird *Agelaius tricolor*	D – RRS D – FWI	Y	N	U	MIIH
Amphibians					
Siskiyou Mountains salamander *Plethodon stormi* [b/]	D – RRS	N	N	N	NI
Black salamander *Aneides flavipunctatus*	D – RRS	N	N	N	NI
California slender salamander *Batrachoseps attenuates*	D – RRS	N	N	N	NI
Foothill yellow-legged frog *Rana boylii*	D – UMP D – RRS	Y	N	U	MIIH
Northern leopard frog *Lithobates pipiens*	S – FWI	N	N	N	NI
Oregon spotted frog *Rana pretiosa* a/	S – UMP S – RRS D – FWI	Y	N	U	NLAA
Columbia spotted frog *Rana luteiventris*	S – FWI	N	N	U	NI
Reptiles					
Western pond turtle *Actinemys marmorata* (formerly Pacific pond turtle)	D – UMP D – RRS D – FWI	Y	N	U	MIIH
Non-anadromous Fish					
Umpqua chub *Oregonichthys kalawatseti*	D – UMP	Y	N	U	MIIH
Upper Klamath redband trout *Oncorhynchus mykiss newberrii*	D – FWI	Y	N	U	MIIH

Table 1. Forest Service Sensitive Species with Potential to Occur near the Project

Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Anadromous Fish					
Chinook salmon *Oncorhynchus tshawytscha* Southern Oregon t/Northern California Coastal ESU, Fall-run, Spring-run	D – RRS	N	N	N	NI
Chum salmon *Onocorhynchus keta* Pacific Coast ESU	I – UMP I – RRS	N	N	N	NI
Steelhead *Oncorynchus mykiss* Oregon Coast ESU	D – UMP D – RRS	N	N	N	NI
Coho salmon *Oncorhynchus kisutch* Southern Oregon/Northern California Coast ESU Rogue (and Klamath) SMU [a/]	D – RRS	Y	N	U	LAA
Coho salmon *Oncorhynchus kisutch* Oregon Coast ESU Coastal SMU [a/]	D – UMP D – RRS	Y	N	U	LAA
Green sturgeon *Acipenser medirostris* Southern DPS [a/]	I – RRS	Y	N	U	LAA
Terrestrial Invertebrates					
Evening fieldslug *Deroceras hesperium* [b/]	S – RRS D – FWI	Y	Y	Y	MIIH
Chace sideband *Monadenia chaceana* [b/]	D – UMP D – RSS S – FWI	Y	Y	Y	MIIH
Green sideband *Monadenia fidelis beryllica*	D – RRS	Y	Y	N	NI
Traveling sideband *Monadenia fidelis celeuthia*	D – RRS D – FWI [d/]	Y	Y	Y	MIIH
Modoc sideband *Monadenia fidelis* ssp. *Nov.*	D – FWI	Y	Y	N	NI
Crater Lake tightcoil *Pristiloma arcticum crateris* [b/]	D – UMP D – RRS D – FWI	Y	Y	N	NI
Siskiyou hesperian *Vespericola sierranas*	D – UMP [d/] D – RRS D – FWI	Y	Y	Y	MIIH
Franklin's bumblebee *Bombus franklini*	D – UMP [d/] D – RRS	Y	N	U	MIIH
Western bumblebee *Bombus occidentalis*	D – UMP D – RRS D – FWI	Y	N	U	MIIH

Table 1. Forest Service Sensitive Species with Potential to Occur near the Project

Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Siskiyou short-horned grasshopper *Chloealtis aspasma*	S – UMP D – RRS	Y	N	U	MIIH
Gray-blue butterfly *Plebejus podarce*	D – UMP D – RRS D – FWI	Y	N	U	MIIH
Seaside hoary elfin butterfly *Callophrys polios maritima* (formerly hoary elfin)	S – RRS	Y	N	U	NI
Johnson's hairstreak *Callophrys johnsoni*	D – UMP D – RRS D – FWI	Y	N	U	MIIH
Insular blue butterfly *Plebejus saepiolus littoralis*	S – RRS	N	N	U	NI
Mardon skipper *Polites mardon*	S – UMP D – RRS D – FWI	Y	N	U	MIIH
Leona's little blue butterfly *Philotiella leona*	D – FWI	N	N	N	NI
Coronis fritillary *Speyeria coronis coronis*	D – UMP D – RRS	Y	N	U	MIIH
California shield-backed bug *Vanduzeeina borealis californica*	S – UMP S – RRS	N	N	N	NI
Aquatic Invertebrates					
Turban pebblesnail *Fluminicola turbinformis*	D – FWI	Y	Y	N	NI
Western ridged mussel *Gonidea angulata*	S – UMP S – RRS D – FWI	Y	N	U	MIIH
Great Basin ramshorn *Helisoma newberryi newberryi*	D – FWI	Y	Y	N	NI
Highcap lanx *Lanx alta*	D – RRS D – FWI	N	N	N	NI
Scale lanx *Lanx klamathensis*	S – RRS D – FWI	Y	Y	N	NI
Rotund lanx *Lanx subrotunda*	D – UMP D – FWI	Y	Y	N	NI
A caddisfly (no common name) *Namamyia plutonis*	S – UMP D – RRS S – FWI	Y	N	U	MIIH
Montane peaclam *Pisidium ulttramontanum*	D – FWI	N	N	N	NI
Robust walker *Pomatiopsis binneyi*	D – RRS	Y	Y	N	NI

Table 1. Forest Service Sensitive Species with Potential to Occur near the Project

Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Pacific walker *Pomatiopsis californica*	S – RRS	N	N	N	NI
Archimedes springsnail *Pyrgulopsis archimedis*	D – FWI	Y	N	U	MIIH
Haddock's Rhyacophilan caddisfly *Rhyacophila haddocki*	D – RRS	Y	N	U	NI
Lined ramshorn *Vorticifex effusa diagonalis*	D – FWI	N	N	U	NI
Vascular Plants					
California maiden-hair *Adiantum jordanii*	S – UMP D – RRS S – FWI	Y	Y	N	NI
Peninsular onion *Allium peninsulare*	S – RRS	Y	Y	N	NI
Crater Lake rock-cress *Arabis suffrutescens* var. *horizontalis*	S – UMP D – RRS D – FWI	Y	Y	N	NI
Gasquet (hairy) manzanita *Arctostaphylos hispidula*	D – RRS	N	N	N	NI
Shasta arnica *Arnica viscosa*	D – UMP S – RRS D – FWI	Y	Y	N	NI
Grass-fern *Asplenium septentrionale*	D – UMP D – RRS D – FWI	Y	Y	N	NI
Lemmon's milkvetch *Astragalus lemmonii*	D – FWI	Y	Y	N	NI
Bensonia *Bensoniella oregana*	D – RRS	Y	Y	N e/	NI
Crenulate moonwort (Crenulate grape-fern) *Botrychium crenulatum*	S – FWI	Y	Y	N	NI
Brewer's reedgrass *Calamagrostis breweri*	S – UMP	Y	Y	N	NI
Greene's mariposa-lily *Calochortus greenei*	S – FWI	Y	Y	N	NI
Howell's camassia *Camassia howellii*	D- RRS	N	N	N	NI
Slender-flowered evening primrose *Camissonia graciliflora*	D- RRS	Y	Y	N	NI

Table 1. Forest Service Sensitive Species with Potential to Occur near the Project

Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Capitate sedge *Carex capitata*	D – RRS D – FWI	Y	Y	N	NI
Bristly sedge *Carex comosa*	S – RRS	Y	Y	N	NI
Cordilleran sedge *Carex cordillerana*	D – FWI	Y	Y	N	NI
Crawford's sedge *Carex crawfordii*	S – UMP S – RRS	Y	Y	N	NI
Lesser panicled sedge *Carex diandra*	S – UMP D – FWI	Y	Y	N	NI
A sedge *Carex klamathensis*	D – RRS	Y	Y	N	NI
Slender sedge *Carex lasiocarpa* var. *americana*	S – UMP D – FWI	Y	Y	N	NI
Spikenard sedge *Carex nardina*	D – UMP	Y	Y	N	NI
Sierra nerved sedge *Carex nervina*	D – RRS	Y	Y	N	NI
Russet sedge *Carex saxatilis*	S – FWI	Y	Y	N	NI
Native sedge *Carex vernacula*	S – UMP D – FWI	Y	Y	N	NI
Green-tinged paintbrush *Castilleja chlorotica*	D – FWI	N	N	N	NI
Split-hair paintbrush *Castilleja schizotricha*	D – RRS	N	N	N	NI
Coville's lip-fern *Cheilanthes covillei*	D – RRS	Y	Y	N	NI
Fee's lip-fern *Cheilanthes feei*	S – FWI	Y	Y	N	NI
Coastal lip-fern *Cheilanthes intertexta*	S – RRS S – FWI	Y	Y	N	NI
Narrow-leaved amole *Chlorogalum angustifolium*	S – RRS	Y	Y	N	NI
Oregon timwort *Cicendia quadrangularis*	D – RRS	Y	Y	N	NI
Mt. Mazama collomia *Collomia mazama*	D – UMP D – RRS D – FWI	Y	Y	N	NI
Milo baker's cryptantha *Cryptantha milobakeri*	D – RRS	Y	Y	N	NI

Table 1. Forest Service Sensitive Species with Potential to Occur near the Project

Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Baker's cypress *Cupressus bakeri*	D – RRS	Y	Y	N	NI
Short-pointed cyperus *Cyperus acuminatus*	S – RRS	Y	Y	N	NI
Clustered lady's slipper *Cypripedium fasciculatum* [b/]	D – UMP D – RSS	Y	Y	Y	MIIH
Red larkspur *Delphinium nudicaule*	D – RRS	Y	Y	N	NI
Few-flowered bleedingheart *Dicentra pauciflora*	D – RRS	Y	Y	N	NI
Howell's whitlow-grass *Draba howellii*	D – RRS	Y	Y	N	NI
Short seeded waterwort *Elatine brachysperma*	S – UMP S – FWI	Y	Y	N	NI
Bolander's spikerush *Eleocharis bolanderi*	D – FWI	Y	Y	N	NI
Oregon willow herb *Epilobium oreganum*	D – RRS	N	N	N	NI
Siskiyou willow herb *Epilobium siskiyouense*	D – RRS	N	N	N	NI
Golden fleece *Ericameria arborescens*	D – RRS	Y	Y	N	NI
Siskiyou daisy *Erigeron cervinus*	D – RRS	Y	Y	N	NI
Cliff (rock) daisy *Erigeron petrophilus*	D – RRS	Y	Y	N	NI
Lobb's buckwheat *Eriogonum lobbii*	D – RRS	Y	Y	N	NI
Prostrate buckwheat *Eriogonum prociduum*	D – FWI	Y	Y	N	NI
Green buckwheat *Eriogonum umbellatum* var. *glaberrimum*	D – FWI	Y	Y	N	NI
Howell's adder's tongue *Erythronium howellii*	D – RRS	Y	Y	N	NI
Gold poppy *Eschscholzia caespitosa*	S – RRS	N	N	N	NI

Table 1. Forest Service Sensitive Species with Potential to Occur near the Project

Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Wayside aster [b/] *Eucephalus vialis*	S – UMP D – RRS	Y	Y	Y	MIIH
Umpqua swertia *Frasera umpquaensis*	D – UMP D – RRS	Y	Y	N	NI
Gentner's fritillary *Fritillaria gentner* [a/]	D – RSS	Y	Y	Y	LAA
Warner Mt. bedstraw *Galium serpenticum* ssp. *warnerense*	D – FWI	Y	Y	N	NI
Newberry's gentian *Gentiana newberryi* var. *newberryi*	S – UMP S – RRS D – FWI	Y	Y	N	NI
Elegant gentian *Gentiana plurisetosa*	D – RRS	Y	Y	N	NI
Waldo gentian *Gentiana setigera*	D – RRS	Y	Y	N	NI
Beautiful stickseed *Hackelia bella*	S – RRS	Y	Y	N	NI
Salt heliotrope *Heliotropium curassavicum*	D – FWI	N	N	N	NI
Shaggy hawkweed *Hieracium horridum*	S – RRS	Y	Y	N	NI
Henderson's horkelia *Horkelia hendersonii*	D – RRS	N	N	N	NI
Three-toothed horkelia *Horkelia tridentata* ssp. *tridentata*	D – RRS	N	N	N	NI
California globe-mallow *Iliamna latibracteata*	D – UMP D – RRS	Y	Y	N	NI
Shockley's ivesia *Ivesia shockleyi*	D – FWI	Y	Y	N	NI
Fragrant kalmiopsis *Kalmiopsis fragrans*	D – UMP	Y	Y	N	NI
Bush beardtongue *Keckiella lemmonii*	D – RRS	Y	Y	N	NI
Columbia lewisia *Lewisia columbiana* var. *columbiana*	D – UMP	Y	Y	N	NI
Lee's lewisia *Lewisia leana*	S – UMP D – RRS	Y	Y	N	NI

Table 1. Forest Service Sensitive Species with Potential to Occur near the Project

Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Bellinger's meadowfoam *Limnanthes floccosa* ssp. *bellingeriana*	D – RRS	Y	Y	Y	MIIH
Slender meadow-foam *Limnanthes gracilis* ssp. *gracilis*	D – UMP [d/] S – RRS	Y	Y	N	NI
Aristulate lipocarpha *Lipocarpha aristulata*	S – FWI	Y	Y	N	NI
Cook's lomatium *Lomatium cookii* [a/]	S – RSS	Y	N	N	NLAA
Englemann's desert-parsley *Lomatium engelmannii*	D – RRS	N	N	N	NI
Stipuled trefoil *Lotus stipularis*	D – RRS	Y	Y	N	NI
Mt. Ashland lupine *Lupinus lepidus* var. *ashlandensis*	D – RRS	N	N	N	NI
Kincaid's lupine *Lupinus sulphureus* var. *kincaidii* a/	D – UMP	Y	Y	Y	NE
Tracy's lupine *Lupinus tracyi*	D – RRS	Y	Y	N	NI
Bog club-moss *Lycopodiella inundata*	D – FWI	Y	Y	N	NI
White meconella (fairy poppy) *Meconella oregana*	S – RRS	Y	Y	N	NI
Bolander's monkeyflower *Mimulus bolanderi*	D – RRS	Y	Y	N	NI
Congdon's monkeyflower *Mimulus congdonii*	S – RRS	Y	Y	N	NI
Disappearing monkeyflower *Mimulus evanescens*	D – FWI	N	N	N	NI
Tri-colored monkeyflower *Mimulus tricolor*	D – FWI	Y	Y	N	NI
Annual dropseed *Muhlenbergia minutissima*	S – FWI	Y	Y	N	NI
Slender nemacladus *Nemacladus capillaris*	S – RRS	Y	Y	N	NI
Adder's-tongue *Ophioglossum pusilum*	D – UMP D – RRS	Y	Y	N	NI
Coffee fern *Pellaea andromedifolia*	D – UMP S – RRS	Y	Y	N	NI

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Bird's-foot fern *Pellaea mucronata* ssp. *mucronata*	S – RRS	Y	Y	N	NI
Blue-leaved penstemon *Penstemon glaucinus*	D – FWI	Y	Y	N	NI
Red-rooted yampah *Perideridia erythrorhiza*	S – UMP D – RRS D – FWI	Y	Y	N	NI
Siskiyou phacelia *Phacelia leonis*	D – RRS	Y	Y	N	NI
American pillwort *Pilularia americana*	S – RRS S – FWI	Y	Y	N	NI
Whitebark pine *Pinus albicaulis*	D – UMP D – RRS D – FWI	Y	Y	N	NI
Coral seeded allocarya *Plagiobothrys figuratus* var. *corallicarpus*	S – RRS	Y	Y	N	NI
Greene's popcorn flower *Plagiobothrys greenei*	S – RRS	Y	Y	N	NI
Rough popcorn flower *Plagiobothrys hirtus* a/	S – UMP	Y	Y	N	NLAA
Desert allocarya *Plagiobothrys salsus*	S – FWI	Y	Y	N	NI
Timber bluegrass *Poa rhizomata*	S – UMP S – RRS	Y	Y	N	NI
Profuse-flowered mesa mint *Pogogyne floribunda*	S – FWI	Y	Y	N	NI
California sword-fern *Polystichum californicum*	D – UMP S – RRS	Y	Y	N	NI
Rafinesque's pondweed *Potamogeton diversifolius*	S – FWI	Y	Y	N	NI
California chicory *Rafinesquia californica*	S – RRS	Y	Y	N	NI
Redberry *Rhamnus ilicifolia*	D – RRS	Y	Y	N	NI
Straggly gooseberry *Ribes divaricatum* var. *pubiflorum*	S – RRS	Y	Y	N	NI
Thompson's mistmaiden *Romanzoffia thompsonii*	D – UMP D – RRS	Y	Y	N	NI

Table 1. Forest Service Sensitive Species with Potential to Occur near the Project

Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Columbia cress *Rorippa columbiae*	S – RRS D – FWI	Y	Y	N	NI
Lowland toothcup *Rotala ramosior*	S – UMP S – FWI	Y	Y	N	NI
Joint-leaved saxifrage *Saxifragopsis fragarioides*	D – RRS	Y	Y	N	NI
Scheuchzeria *Scheuchzeria palustris* ssp. *americana*	D – UMP D – RRS D – FWI	Y	Y	N	NI
Water clubrush *Schoenoplectus subterminalis* (formerly *Scirpus subterminalis*)	D – UMP D – RRS D – FWI	Y	Y	N	NI
Drooping bulrush *Scirpus pendulus*	D – RRS	Y	Y	N	NI
California fetid adderstongue *Scoliopus bigelovii*	D – RRS	Y	Y	N	NI
Rogue river stonecrop *Sedum moranii*	D – RRS	Y	Y	N	NI
Verrucose sea-purslane *Sesuvium verrucosum*	S – FWI	Y	Y	N	NI
Coast checkermallow *Sidalcea malviflora patula*	D – RRS	Y	Y	N	NI
Bolander's catchfly *Silene hookeri bolanderi*	D – RRS	Y	Y	N	NI
Parish's horse-nettle *Solanum parishii*	D – RRS	Y	Y	N	NI
Western sophora *Sophora leachiana*	D – RRS	Y	Y	N	NI
Common jewel flower *Streptanthus glandulosus*	S – RRS	Y	Y	N	NI
Howell's streptanthus *Streptanthus howellii*	D – RRS	Y	Y	N	NI
Howell's tauschia *Tauschia howellii*	D – RRS	N	N	N	NI
Short-podded thelypody *Thelypodium brachycarpum*	D – FWI	N	N	N	NI
Siskiyou trillium *Trillium kurabayashii*	D – RRS	Y	Y	N	NI

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Common Name and/or Scientific Name[1/]	Documented or Suspected Occurrence Within Forest[2/]	Potential Habitat[3/]	Surveys Performed[4/]	Species Present[5/]	Impact Determination[6/]
Lesser bladderwort *Utricularia minor*	D – UMP D – RRS D – FWI	Y	Y	N	NI
Northern bladderwort *Utricularia ochroleuca*	S – UMP S – FWI	Y	Y	N	NI
Western bog violet *Viola primulifolia* ssp. *occidentalis*	D – RRS	N	N	N	NI
Dotted water-meal *Wolffia borealis*	S – UMP	Y	Y	N	NI
Columbia water-meal *Wolffia columbiana*	S – UMP S – RRS	Y	Y	N	NI
Small-flowered death camas *Zigadenus fontanus*	S-RRS	Y	Y	N	NI
Fungi					
Albatrellus avellaneus [b/ c/]	D – RSS	Y	Y	N	NI
Arcangeliella camphorata [b/ c/]	D – RSS	Y	Y	N	NI
Boletus pulcherrimus [b/ c/]	D – UMP D – RSS D – FWI	Y	Y	Y	MIIH
Chamonixia caespitosa [b/ c/]	D – RSS	Y	Y	N	NI
*Cortinarius barlowensis (*syn. *Cortinarius azureus)* [b/ c/]	D – UMP	Y	Y	N	NI
Dermocybe humboldtensis [b/ c/]	S – UMP S – RSS	Y	Y	N	NI
Gastroboletus vividus [b/ c/]	S – UMP D – RSS S – FWI	Y	Y	N	NI
Gymnomyces fragrans	S – UMP D – RRS	Y	Y	N	NI
Hygrophorus caeruleus [b/ c/]	D – UMP D – RSS D – FWI	Y	Y	Y	MIIH
*Pseudorhizina californica (*formerly *Gyromitra californica)* [b/ c/]	D – UMP D – RSS D – FWI	Y	Y	N	NI
Ramaria amyloidea [b/ c/]	D – UMP S – RSS	Y	Y	N	NI
Ramaria spinulosa var. *diminutiva* [b/ c/]	S – UMP S – RSS	Y	Y	N	NI

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Rhizopogon chamaleontinus b/ c/	D – RSS	Y	Y	N	NI
Rhizopogon ellipsosporus b/ c/	D – RSS	Y	Y	N	NI
Rhizopogon exiguus b/ c/	S – UMP D – RSS	Y	Y	N	NI
Rhizopogon inquinatus b/ c/	S – UMP	Y	Y	N	NI
Stagnicola perplexa b/ c/	S – UMP D – RSS	Y	Y	N	NI
Lichen					
Bryoria subcana b/ c/	S – RSS	Y	Y	N	NI
Shield lichen *Heterodermia leucomelos*	S – RRS	Y	Y	N	NI
Leptogium cyanescens b/ c/	S – UMP S – RSS S – FWI	Y	Y	N	NI
Lobaria linita b/ c/	D – UMP S – RSS	Y	Y	N	NI
Pseudocyphellaria mallota c/	D – UMP	Y	Y	N	NI
Ramalina pollinaria b/ c/	S – UMP S – RSS	Y	Y	N	NI
Woven spore lichen *Texosporium sancti-jacobi*	S – FWI	Y	Y	N	NI
Bryophytes					
Tiny Notchwort *Anastrophyllum minutum*	S – UMP S – RRS S – FWI	Y	Y	N	NI
Broad-leaved lantern moss *Andreaea schofieldiana*	S – UMP D – RRS	N	N	N	NI
Spidery threadwort *Blepharostoma arachnoideum*	D – UMP	Y	Y	N	NI
Giant fourpoint *Barbilophozia lycopodioides*	S – FWI	Y	Y	N	NI
Beautiful bryum *Bryum calobryoides*	S – UMP D – RRS	Y	Y	N	NI

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Bog pouchwort *Calypogeia sphagnicola*	D – UMP D – RRS	N	N	N	NI
Spiny threadwort *Cephaloziella spinigera*	S – UMP D – RRS D – FWI	Y	Y	N	NI
Racomitrium moss *Codriophorus depressus (*formerly *Racomitrium depressum)*	S – UMP S – RRS S – FWI	Y	Y	N	NI
Cryptomitrium tenerum	D – RRS	Y	Y	N	NI
White-mouthed Extinguisher-moss *Encalypta brevicollis*	S – UMP D – RRS	Y	Y	N	NI
Candle snuffer moss *Encalypta brevipes*	S – UMP D – RRS	N	N	N	NI
Banded cord-moss *Entosthodon fascicularis*	S – UMP S – RRS	Y	Y	N	NI
Braided frostwort *Gymnomitrion concinnatum*	S – UMP	Y	Y	N	NI
Great mountain flapwort *Harpanthus flotovianus*	S – UMP D – RRS D – FWI	Y	Y	N	NI
Blandow's feather moss *Helodium blandowii*	D – UMP D – RRS D – FWI	Y	Y	N	NI
Gillman's pawwort *Lophozia gillmanii*	S – UMP S – FWI	Y	Y	N	NI
Marsupella emarginata var. *aquatica* b/,c/	S – UMP	Y	Y	N	NI
Meesia moss *Meesia uliginosa*	S – UMP D – RRS D – FWI	Y	Y	N	NI
Orthodontium gracile [b/ c/]	D – RSS	Y	Y	N	NI
Translucent orthodontium *Orthodontium pellucens*	D – RRS	N	N	N	NI
Tuberous hornwort *Phymatoceros phymatodes*	S – RRS	Y	Y	N	NI
Dwarf rock haircap *Polytrichum sphaerothecium*	S – UMP S – FWI	Y	Y	N	NI
Bolander's scalemoss *Porella bolanderi*	S – UMP D – RRS	Y	Y	N	NI

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Blunt water moss *Pseudocalliergon trifarium* (formerly *Calliergon trifarium*)	S – RRS D – FWI	N	N	N	NI
Schistidium moss *Schistidium cinclidodonteum*	S – RRS S – FWI	Y	Y	N	NI
Schistostega pennata [b/ c/]	D – UMP S – RSS S – FWI	Y	Y	N	NI
Alpine masterwort *Schofieldia monticola*	S – UMP	Y	Y	N	NI
Purple-vased stink moss *Splachnum ampullaceum*	S – UMP S – RRS D – FWI	Y	Y	N	NI
Tetraphis geniculata [b/ c/]	S – UMP	Y	Y	N	NI
Tomentypnum moss *Tomentypnum nitens*	D – UMP D – RRS D – FWI	Y	Y	N	NI
Mucronleaf tortula moss *Tortula mucronifolia*	D – RRS	Y	Y	N	NI
Asano's trematodon moss *Trematodon asanoi*	S – UMP S – FWI	Y	Y	N	NI
Tritomaria exsectiformis [b/ c/]	D – UMP S – RSS D – FWI	Y	Y	N	NI

General Notes

1/ Sensitive species located in the Project area were documented by SBS (2008, 2010, 2011a, 2011b, 2011c). Forest Service sensitive species that are also Survey and Manage species were documented; however, these species are not discussed here but are included in the Survey and Manage Report submitted as a stand-alone document.

2/ Occurrence Key:

National Forest: FWI = Winema National Forest, RRS = Rogue River National Forest, UMP = Umpqua National Forest

D = Documented occurrence = A species located on land administered by the Forest Service based on historic or current known sites of a species reported by a credible source for which the Forest Service has knowledge of written, mapped or specimen documentation of the occurrence.

S = Suspected occurrence = Species is not documented on land administered by the Forest Service, but may occur on the unit because: 1) National Forest is considered to be within the species' range and 2) appropriate habitat is present or 3) known occurrence of the species (historic or current) in vicinity such that the species could occur on FS land.

I = Downstream Influence by Forest Service Actions

Note: ISSSSP 2011 lists documented and suspected occurance status by grouping Fremont-Winema national forests together, and Rogue River-Siskiyou national forests together. We are assuming that this status information pertains to the forests crossed by the Project.

3/ Potential Habitat: Y = Yes, suitable habitat present; N = no suitable habitat present

4/ Surveys Performed: Y = Yes, surveys were conducted; N = No surveys were conducted for the species.

5/ Species Present: Y = Yes; N = No; U = Unknown because no targetted surveys were conducted for the species.

6/ Impact Determination: NI = No Impact, MIIH = May Impact Individuals or Habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species. For federally-listed or proposed species: NE=No effect, NLAA= Not likely to adversely affect, LAA= Likely to adversely affect.

Species-Specific Notes

a/ Denotes listing under ESA as endangered or threatened, or a species proposed for ESA listing. Full analysis can be found in the BA for this project.

b/ Denotes a species on the Survey and Manage list under the Northwest Forest Plan. These species are analyzed in Appendix K, Survey and Manage Species Persistence Evaluation.

c/ No common name found for this species.

d/ Documented based on recent observations.

e/ Detected on BLM-managed lands but not on Forest Service-managed lands crossed by the Project.

6.0 DETAILED EFFECTS OF PROPOSED ACTION ON SPECIES CONSIDERED

6.1 Global Discussion

6.1.1 Analysis Areas and Current Environment

In order to characterize the current environment for each species, buffers of 700 feet and 3,200 feet were applied to the proposed action, and acreages of each habitat type were calculated. To characterize past actions in forested environments, seral stage (0-40 years, 40-80 years, and greater than 80 years) was assigned to all forested types within the buffer area. In non-forested habitat types, acreages were given for existing habitats within the buffered area. These buffers were analyzed using a combination of Johnson and O'Neil (2001) habitat types, Gap Analysis Project (GAP) data, aerial photographs, and other available data, including late-successional old growth coverage (BLM 2008, ORNHIC and The Wetland Conservancy 2009, USGS 2011).

The 700-foot buffer was used as the analysis area for species that could potentially be impacted by edge effect, but would not likely be impacted by noise or other long-ranging effects (Table 2). The species evaluated using the 700-foot buffer include two terrestrial invertebrates (traveling sideband and Siskiyou hesperian; Section 6.2.6), and vascular plants (Section 6.2.8). Fundamental changes in the microclimate of a stand, humidity and strong winds in particular, have been recorded at distances greater than 700 feet from the forest edge in late-successional Douglas fir forests (Chen et al. 1995). Approximately 62 percent of forested National Forest lands within the 700-foot buffer have been harvested within the last 80 years (41 percent 0-40 years, 21 percent 40-80 years), leaving approximately 38 percent late-successional forest (Table 2).

Table 2: Available Habitat within 700 feet of the Proposed Action							
Habitat Category (Johnson and O'Neil, 2001)	**Forest-Woodland Age Category[1/]**	**National Forest Service**			**Other Federal [2/]**	**Non-Federal**	**Overall Total**
		Umpqua	**Rogue River**	**Winema**			
Forest – Woodland							
Westside Lowland Conifer-Hardwood-Forest	L-O				721.24	108.35	829.59
	M-S				947.28	1,287.97	2,235.25
	C-R				530.39	4,002.58	4,532.98
	Total				2198.91	5,398.90	7,597.82
Montane Mixed Conifer Forest	L-O	0.25	33.23	56.06	107.83	0	197.37
	M-S		22.87	7.35	0	52.86	83.09
	C-R		47.92	115.1	0	23.87	186.89
	Total	0.25	104.02	178.52	107.83	76.73	467.35
Southwest Oregon Mixed Conifer-Hardwood Forest	L-O	920.57	442.74	104.13	2041.81	685.37	4,194.63
	M-S	789.53	185.88	28.34	387.84	3,446.84	4,838.44
	C-R	384.39	316.69	27.39	1050.56	3,330.59	5,109.61
	Total	2,094.49	945.31	159.86	2380.21	7,462.81	14,142.68
Ponderosa Pine Forest and Woodlands	L-O			65.52	707.26	83.83	856.6
	M-S			24.43	101.25	610.43	736.11
	C-R			67.4	244.97	984.41	1,296.78
	Total			157.35	1053.47	1,678.67	2,889.49
Westside Oak and Dry Douglas-fir Forest and Woodlands	L-O				240.51	102.88	343.39
	M-S				39.21	281.38	320.59
	C-R				77.61	802.97	880.59
	Total				357.33	1,187.24	1,544.56
Western Juniper and Mountain Mahogany Woodlands	L-O				45.81	0	45.81
	M-S				7.23	655.95	663.17
	C-R				0	316	316
	No Age				12.12	230.55	242.68
	Total				65.15	1,202.50	1,267.65
Other Forested-Woodland Habitat[3/]	L-O		488.37	61.29	36.45	47.61	633.72
	M-S		80.08	101.02	7.97	473.72	662.79
	C-R	11.95	731.95	655.66	116.66	2,743.59	4,259.82
	Total	11.95	1,300.40	817.97	161.08	3,244.92	5,536.32
Forest-Woodland Subtotal	L-O	920.82	964.34	287	3,900.91	1,028.04	7,101.11
	M-S	789.53	288.83	161.14	1,490.78	6,809.15	9,539.44
	C-R	396.34	1,096.56	865.55	2,020.19	12,204.01	16,582.67
	No Age	0	0	0	12.12	230.55	242.68
	Total	**2,106.69**	**2,349.73**	**1,313.70**	**7,423.98**	**20,271.77**	**33,465.87**

Table 2: Available Habitat within 700 feet of the Proposed Action							
Habitat Category (Johnson and O'Neil, 2001)	**Forest-Woodland Age Category[1/]**	**National Forest Service**			**Other Federal [2/]**	**Non-Federal**	**Overall Total**
		Umpqua	**Rogue River**	**Winema**			
Non-Forested Habitat							
Shrub-Steppe	N/A		9.26		124.15	1,039.70	1,173.10
Westside Grasslands[4/]	N/A		10.67		46.12	905.24	962.03
Eastside Grasslands[4/]	N/A		0.61	1.96	2.38	173.17	178.12
Herbaceous Wetlands		0.86	0.06	18.73	4.62	558.59	582.86
Westside Riparian Wetlands		1.12	8.34	0	1.42	135.64	146.51
Eastside Riparian Wetlands				17.29	0	0.17	17.46
Agriculture, Pastures and Mixed Environs	N/A				416.95	10,707.42	11,124.38
Developed-Urban and Mixed Environs	N/A	10.07	10.78		4.58	1,675.86	1,701.30
Roads	N/A	30.16	24.9	30.56	83.33	550.68	719.63
Open Water-Lakes, Rivers, and Streams	N/A	3.84	4.8	38.95	58.62	1,115.86	1,222.06
Bays and Estuaries	N/A				0	381.74	381.74
Other Non-Forest Habitat[5/]	N/A	17.72	8.63	10.68	56.23	144.02	237.28
Non-Forest Subtotal		**63.77**	**78.05**	**118.17**	**798.4**	**17,388.09**	**18,446.47**
Total Overall Habitat[6/]	L-O	921.33	965.82	287.11	3,901.91	1,036.99	7,113.16
	M-S	790	289.19	161.66	1,490.85	6,833.59	9,565.29
	C-R	396.34	1,103.06	872.03	2,020.54	12,233.25	16,625.25
	No Age	0	0	0	12.12	230.55	242.68
	Non-Forest	62.79	69.71	111.06	796.98	17,325.46	18,365.99
	Total	**2,170.46**	**2,427.78**	**1,431.86**	**8,222.4**	**37,659.84**	**51,912.37**

1/ Forest-Woodland Age Categories are L-O, Late Succession/Old Growth assumed to be ≥80 years old; M-S, Mid-Seral assumed to be ≥40 but ≤80 years old; C-R, Clearcut-Regenerating Forest assumed to be ≤40 years old; Age classes were determined by using BLM modeling developed for the Western Oregon Plan Revision (http://www.blm.gov/or/plans/wopr/data/final/data-details.php?id=199).

Table 2: Available Habitat within 700 feet of the Proposed Action

Habitat Category (Johnson and O'Neil, 2001)	Forest-Woodland Age Category[1/]	National Forest Service			Other Federal [2/]	Non-Federal	Overall Total
		Umpqua	Rogue River	Winema			

2/ Other Federal Lands include Bureau of Reclamation, U.S. Fish and Wildlife Service Lands, GSA Lands, BLM Lands, and other National Forest Service Lands not crossed by the proposed Project.

3/ Other Forest-Woodland Habitat: delineation and available GIS data sources indicate that the area is forested but Johnson & O'Neil, 2001 GIS database identified the area as non-forested. Forested habitats that were not included in the Habitat Categories above were also included in this category.

4/ Grasslands were only delineated within a variable approximately 2000 foot Project corridor; outside this corridor, grasslands are included in the Agriculture and Pastures category.

5/ Other Non-Forest Habitat: delineation and available GIS data sources indicate that the area is not forested but Johnson & O'Neil, 2001 GIS database identified the area as forested.

6/ Forested wetlands are included in this overall total by seral stage, and not in the overall non-forest total presented here.

The 3,200-foot buffer was used as the analysis area for species that could potentially be impacted by noise from construction of the proposed pipeline in addition to edge effects (Table 3). The species evaluated using the 3,200-foot buffer included all bat species (Section 6.2.1), birds, (Section 6.2.2), amphibians (Section 6.2.3), reptiles (Section 6.2.4), and the terestrial invertebrates except the traveling sideband and Siskiyou hesperian (Section 6.2.6). The 3,200-foot buffer was applied as the distance at which noise produced from construction of the proposed pipeline would likely attenuate to background levels. The distance estimate is based on the following assumptions:

- Maximum noise anticipated during construction is likely to be 99 dB at 50 feet during ditching through rock and includes mitigated blasting (see Section 6.1.2.4).
- Ambient noise within the analysis area is 40 dB, as assumed in the Olympic National Forest (FWS 2003).
- Detectability threshold for sensitive species (NSO or marbled murrelet) is 4 dB above baseline noise level (FWS 2003).
- Noise attenuates by 7.5 dB per doubling of distance from sources based on soft site reduction assumptions (WSDOT 2008)
- More than likely there are 200 feet of dense vegetation (timber) between the noise source and noise-sensitive target (distance at which noise attenuates to 44 dB). Maximum influence of vegetation is a 10-dB reduction between source and receptor (WSDOT 2008).

With these assumptions, a noise of 99 A-weighted decibles (dBA) at 50 feet would attenuate to 44 dBA at 3,200 feet from the edge of the construction ROW. A-weighted decibles are used to account for the relative loudness perceived by the human ear, presumed to also apply to most animals, as the ear is less sensitive to low audio frequencies. Therefore, 3,200 feet on each side of the Project has been used to define a zone of Project effects for the effects analysis.

Approximately 58 percent of forested National Forest lands within the 3,200-foot buffer have been harvested within the last 80 years (47 percent 0-40 years, 11 percent 40-80 years), leaving approximately 42 percent late-successional forest (Table 3).

Table 3: Available Habitat within 3,200 feet of the Proposed Action

Habitat Category (Johnson and O'Neil, 2001)	Forest-Woodland Age Category[1/]	National Forest Service			Other Federal[2/]	Non-Federal	Overall Total
		Umpqua	Rogue River	Winema			
Forest – Woodland							
Westside Lowland Conifer-Hardwood-Forest	L-O				3,841.22	606.99	4,448.22
	M-S				4,941.79	6,632.70	11,574.49
	C-R				2,911.12	14,465.04	17,376.16
	Total				11,694.13	21704.74	33398.87
Montane Mixed Conifer Forest	L-O	550.86	33.23	56.06	396.86	0	1,037.02
	M-S		22.87	7.35	0	186.9	217.12
	C-R		47.92	115.1	0	23.87	186.89
	Total	550.86	104.02	178.52	396.86	210.77	1,441.03
Southwest Oregon Mixed Conifer-Hardwood Forest	L-O	4,310.33	1,744.07	205.11	9,325.43	4,414.83	19,999.76
	M-S	1,956.04	343.77	28.34	1,890.44	7,532.59	11,751.19
	C-R	2,072.13	1,291.80	28.57	3,684.54	18,947.87	26,024.92
	Total	8,338.50	3,379.65	262.02	14,900.42	30,895.29	57,775.87
Ponderosa Pine Forest and Woodlands	L-O			274.97	3,686.80	345.05	4,306.82
	M-S			56.58	560.95	37,78.86	4,396.39
	C-R			626.15	794.61	6,488.15	7,908.91
	Total			957.7	5,042.36	10,612.05	16,612.11
Westside Oak and Dry Douglas-fir Forest and Woodlands	L-O				887.25	632.5	1,519.75
	M-S				132.15	572.29	704.44
	C-R				208.95	3,052.31	3,261.26
	Total				1,228.35	4,257.10	5,85.45
Western Juniper and Mountain Mahogany Woodlands	L-O				199.04	7.99	207.03
	M-S				50.90	844.27	895.17
	C-R				0.00	1,314.40	1,314.40
	No Age				78.48	2,596.40	2,674.88
	Total				328.43	4,763.06	5,091.49

Table 3: Available Habitat within 3,200 feet of the Proposed Action							
Habitat Category (Johnson and O'Neil, 2001)	**Forest-Woodland Age Category[1/]**	**National Forest Service**			**Other Federal[2/]**	**Non-Federal**	**Overall Total**
		Umpqua	**Rogue River**	**Winema**			
Other Forested-Woodland Habitat[3/]	L-O		2,622.90	555.84	303.70	432.88	3915.32
	M-S	13.5	217.12	149.44	63.43	1,382.99	1,826.49
	C-R	189.52	4,447.71	2,945.81	755.52	15,841.21	24,179.77
	Total	203.02	7,287.73	3651.09	1,122.66	17,657.08	29,921.58
Forest-Woodland Subtotal	L-O	4,861.19	4,400.20	1,091.98	18,640.30	6,440.24	35,433.92
	M-S	1,969.54	583.76	241.71	7,639.66	20,930.60	31,365.29
	C-R	2,261.65	5,787.43	3,715.63	8,354.74	60,132.85	80,252.31
	No Age	0	0	0	78.48	2,596.40	2,674.88
	Total	**9,092.38**	**10,771.40**	**5,049.33**	**34,713.21**	**90,100.09**	**149,726.40**
Non-Forested Habitat							
Shrub-Steppe	N/A		9.26		159.11	3,908.68	4,077.04
Westside Grasslands[4/]	N/A		10.67		60.01	1,616.05	1,687.34
Eastside Grasslands[4/]	N/A		0.61	1.96	2.38	161.91	166.25
Herbaceous Wetlands	N/A	0.89	0.06	27.23	9.92	1,680.13	1,718.21
Westside Riparian Wetlands	N/A	5.64	33.92		8.07	642.59	690.18
Eastside Riparian Wetlands	N/A			223.81	13.20	96.42	333.43
Agriculture, Pastures and Mixed Environs	N/A				2,190.80	50,198.27	52,389.07
Developed-Urban and Mixed Environs	N/A	10.07	10.78		48.16	5,575.58	5,644.59
Coastal Dunes and Beaches[5/]	N/A				191.84	199.3	391.13
Roads	N/A	39.58	43.68	33.01	120.73	792.22	1,029.21
Open Water-Lakes, Rivers, and Streams	N/A	21.06	54.74	131.13	470.31	4,101.46	4,778.70
Bays and Estuaries	N/A				0.00	1,869.67	1,869.67

Table 3: Available Habitat within 3,200 feet of the Proposed Action

Habitat Category (Johnson and O'Neil, 2001)	Forest-Woodland Age Category[1/]	National Forest Service			Other Federal[2/]	Non-Federal	Overall Total
		Umpqua	Rogue River	Winema			
Other Non-Forest Habitat[6/]	N/A	40.9	233.6	24.94	190.90	458.6	948.93
Non-Forest Subtotal		**118.14**	**397.32**	**442.08**	**3,465.43**	**71,300.87**	**75,723.76**
Total Overall Habitat[7/]	L-O	4,863.98	4,414.22	1,093.98	18,643.28	6,466.57	35,482.03
	M-S	1,970.36	585.08	242.23	7,643.18	20,977.77	31,418.63
	C-R	2,262.74	5,806.01	3,722.95	8,356.14	60,293.45	80,441.30
	No Age	0	0	0	78.48	2,596.40	2,674.88
	Non-Forest	113.44	363.4	432.24	3,457.53	71,066.77	75,433.32
	Total	**9,210.52**	**11,168.71**	**5,491.40**	**38,178.61**	**161,400.96**	**225,450.16**

1/ Forest-Woodland Age Categories are L-O, Late Succession/Old Growth assumed to be ≥80 years old; M-S, Mid-Seral assumed to be ≥40 but ≤80 years old; C-R, Clearcut-Regenerating Forest assumed to be ≤40 years old; Age classes were determined by using BLM modeling developed for the WOPR (http://www.blm.gov/or/plans/wopr/data/final/data-details.php?id=199).

2/ Other Federal Lands include Bureau of Reclamation, U.S. Fish and Wildlife Service Lands, GSA Lands, BLM Lands, and other National Forest Service Lands not crossed by the proposed Project

3/ Other Forest-Woodland Habitat: delineation and available GIS data sources indicate that the area is forested but Johnson & O'Neil, 2001 GIS database identified the area as non-forested. Forested habitats that were not included in the Habitat Categories above were also included in this category.

4/ Grasslands were only delineated within a variable approximately 2000 foot Project corridor; outside this corridor, grasslands are included in the Agriculture and Pastures category.

5/ Coastal Dunes and Beaches are Categorized within the Siuslaw NF (Oregon Dunes National Recreation Area).

6/ Other Non-Forest Habitat: delineation and available GIS data sources indicate that the area is not forested but Johnson & O'Neil, 2001 GIS database identified the area as forested.

7/ Forested wetlands are included in this overall total by seral stage, and not in the overall non-forest total presented here.

The analysis area for fish (Section 6.2.5) consists of waterbody crossings as described in Appendix C. Most of these waterbodies would be crossed using a dry open cut method, meaning they would be dewatered prior to surface disturbance.

In order to assess the cumulative effects of the Project on a broad scale, impacts from the Project combined with impacts from reasonably foreseeable Projects were assessed by fifth field watershed. Thus, the cumulative effects analysis area for each species consists of the fifth field watershed(s) where the Project crosses national forests where the species has been documented or is suspected to occur. For example, the pallid bat has been documented on all three national forests crossed by the Project, so the pallid bat cumulative effects analysis area consists of all seven fifth field watersheds crossed by the Project.

6.1.2 Impacts

6.1.2.1 Duration of Impact

Construction activities for the proposed pipeline would be initiated by Pacific Connector approximately 1 year after work begins on the LNG terminal in five construction spreads along the proposed 232-mile pipeline. General timing of activities for each of the five construction spreads is discussed in more detail in Section 2.0 of the draft EIS and is shown schematically in Figure 2, below. Pacific Connector anticipates that timber clearing would generally occur from May through November and the pipeline construction would occur from early May concurrent with timber clearing and continue through November of the next year. Exceptions to this timeline would occur where adherence to seasonal restrictions for federally endangered or threatened species is expected and in Spread 5 (MP 188 – 231) where winter construction is scheduled in part to comply with Oregon Department of Fish and Wildlife (ODFW) instream construction windows (Figure 2). Construction activities would be conducted during daylight hours only. The average time a given point along the pipeline is estimated to be disturbed by construction would be approximately 8 weeks. This would vary, as the speed at which crews would be able to work would be affected by terrain, construction methods and activities, weather, and environmental construction windows.

The five construction spreads would include all timber clearing, construction, and restoration activities within a specific MP range along the pipeline. The location of each construction spread is provided in Table 4.

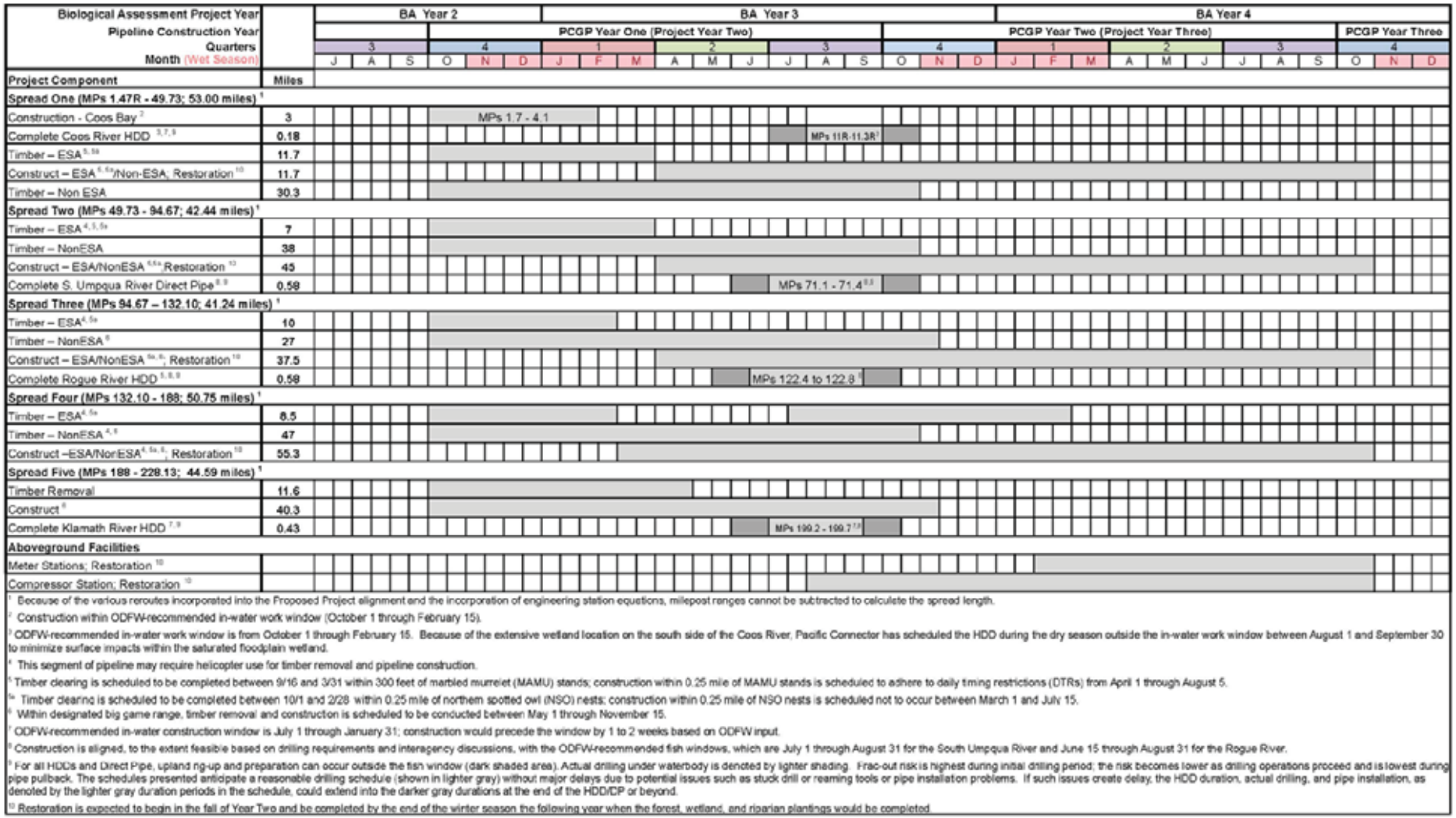
Table 4: Pacific Connector Pipeline Construction Spread Locations

Spread	MP Range 1	Length (miles) [1/]
1	1.47R to 49.73	53.00
2	49.73 to 94.67	42.44
3	94.67 to 132.10	41.24
4	132.10 to 188.00	50.75
5	188.00 to 228.13	44.59

1/ MPs remain the same (through the use of equations), although reroutes have been incorporated into the alignment and the actual spread lengths have been adjusted.

During operation of the proposed pipeline, Pacific Connector would maintain a 30-foot wide ROW corridor, centered over the pipe, for the length of the pipeline. ROW maintenance activities (i.e., mowing, cutting) would occur every 3 to 5 years and would have the potential to impact species associated with habitats within that corridor. To avoid disturbance and destruction of bird eggs and nests, all vegetation maintenance would be conducted in late summer or early autumn, after nesting has generally been completed.

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[1] Because of the various reroutes incorporated into the Proposed Project alignment and the incorporation of engineering station equations, milepost ranges cannot be subtracted to calculate the spread length.

[2] Construction within ODFW-recommended in-water work window (October 1 through February 15).

[3] ODFW-recommended in-water work window is from October 1 through February 15. Because of the extensive wetland location on the south side of the Coos River, Pacific Connector has scheduled the HDD during the dry season outside the in-water work window between August 1 and September 30 to minimize surface impacts within the saturated floodplain wetland.

[4] This segment of pipeline may require helicopter use for timber removal and pipeline construction.

[5] Timber clearing is scheduled to be completed between 9/16 and 3/31 within 300 feet of marbled murrelet (MAMU) stands; construction within 0.25 mile of MAMU stands is scheduled to adhere to daily timing restrictions (DTRs) from April 1 through August 5.

[5a] Timber clearing is scheduled to be completed between 10/1 and 2/28 within 0.25 mile of northern spotted owl (NSO) nests; construction within 0.25 mile of NSO nests is scheduled not to occur between March 1 and July 15.

[6] Within designated big game range, timber removal and construction is scheduled to be conducted between May 1 through November 15.

[7] ODFW-recommended in-water construction window is July 1 through January 31; construction would precede the window by 1 to 2 weeks based on ODFW input.

[8] Construction is aligned, to the extent feasible based on drilling requirements and interagency discussions, with the ODFW-recommended fish windows, which are July 1 through August 31 for the South Umpqua River and June 15 through August 31 for the Rogue River.

[9] For all HDDs and Direct Pipe, upland rig-up and preparation can occur outside the fish window (dark shaded area). Actual drilling under waterbody is denoted by lighter shading. Frac-out risk is highest during initial drilling period; the risk becomes lower as drilling operations proceed and is lowest during pipe pullback. The schedules presented anticipate a reasonable drilling schedule (shown in lighter gray) without major delays due to potential issues such as stuck drill or reaming tools or pipe installation problems. If such issues create delay, the HDD duration, actual drilling, and pipe installation, as denoted by the lighter gray duration periods in the schedule, could extend into the darker gray durations at the end of the HDD/DP or beyond.

[10] Restoration is expected to begin in the fall of Year Two and be completed by the end of the winter season the following year when the forest, wetland, and riparian plantings would be completed.

Figure 2. General Construction Schedule for the Pacific Connector Pipeline

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6.1.2.2 Habitat Effects

Impact to habitats can result in direct effects to organisms (e.g., mortality, displacement, increased energy expense, decreased reproduction) if they inhabit the affected areas while construction or other human-related disturbances occur.

Indirect impacts are related to but removed from the action by an intermediate step or process. For wildlife, indirect impacts are often associated with alteration, elimination, or degradation of habitats. As habitat becomes less suitable and less available, wildlife populations that may have been in equilibrium with the amount of formerly suitable habitat must adjust, through density-dependent mechanisms, to reach new equilibria with habitats (often called carrying capacity). Impacts to wildlife, whether direct or indirect, affect demographic parameters by decreasing survival and/or decreasing reproduction. Such impacts can lead to decreasing population growth rates and smaller populations.

Indirect effects may result from induced changes to wildlife habitats, potentially by conversion of one vegetation cover type to another, by fragmenting existing wildlife habitats and inducing various “edge effects” to interior habitats, and in general by affecting a variety of inter- and intra-specific interactions including competition and predation. Such indirect impact to habitats decreases their functional capacity to support wildlife populations at non-impacted levels. Indirect effects and/or secondary effects of the Project on wildlife may also occur with increased human population base and increased access, whether as a result of the requirements of the action itself (the workforce needed to construct or operate the Project) or as a consequence of the action such as increasing a need for ancillary goods, services, or opportunities resulting from the Project (Comer 1982).

Seventeen broad wildlife habitat classifications coincide with the Project area (Johnson and O’Neil 2001). Affected wildlife habitats classified by Johnson and O’Neil (2001) include: 1) Westside Lowland Conifer-Hardwood-Forest, 2) Montane Mixed Conifer Forest, 3) Southwest Oregon Mixed Conifer-Hardwood Forest, 4) Ponderosa Pine Forest and Woodlands, 5) Westside Oak and Dry Douglas-fir Forest and Woodlands, 6) Western Juniper/Mountain Mahogany Woodlands 7) Sagebrush Steppe, 8) Westside Grasslands, 9) Eastside Grasslands, 10) Herbaceous Wetlands, 11) Westside Riparian-Wetlands, 12) Eastside Riparian-Wetlands, 13) Agriculture, Pastures, and Mixed Environs, 14) Developed-Urban and Mixed Environs, 15) Coastal Dunes and Beaches16) Open Water-Lakes, River, and Streams, and 17) Oceans, Bays and Estuaries (see Table 5).

Roads have been added to the habitats in Table 5. In addition, relative seral development, described as Late Successional-Old Growth (LO), Mid-Seral (MS), and Clearcut-Regenerating (CR) forested types, have been identified for the several forest and woodland types in the Table. Specialized habitat features also occur within the vicinity of the Project area. Such features include cliffs that provide nesting for peregrine falcons and possibly other raptors. Snags provide roosting locations for several bat species and nesting locations for several raptor species and cavity-nesting birds. Large downed woody debris is present with which

herpetofauna are often associated, and caves that are used as hibernacula by some bat species.

For other species, use of a specific habitat type included in Table 5 depends on its proximity to water (Johnson and O'Neil 2001). Presence of those habitats and dependent species' potential occurrence has been assumed if habitats occur within Riparian Reserves associated with waterbodies that would be crossed by or are adjacent to the proposed action (Table 6, Table 7).

The acres of each habitat type that would be either removed by construction or modified by use as Uncleared Storage Areas (UCSAs) provide the basis for evaluating effects to the sensitive species included in this BE. Detailed effects to habitats by various Project construction and operational components are provided in Appendix B for each National Forest.

Table 5. Effects to acres of Johnson and O'Neil Habitat Type by National Forest										
General Habitat Type	Johnson and O'Neil (2001) Habitat Types	Seral Stage[1/]	National Forest						National Forest Total (acres)	
			Umpqua		Rogue River		Winema			
			Acres Removed[2/]	Acres Modified[3/]	Acres Removed[2/]	Acres Modified[3/]	Acres Removed[2/]	Acres Modified[3/]	Acres Removed[2/]	Acres Modified[3/]
Forest-Woodland	Westside-Lowland Conifer-Hardwood-Forest	LO								
		MS								
		CR								
		Total								
	Montane Mixed Conifer Forest	LO			12.64	4.07	6.33	2.96	18.97	7.03
		MS			6.88	3.57	2.73	0.92	9.61	4.49
		CR			34.45	11.67	18.01	3.14	52.46	14.81
		Total			53.97	19.31	27.07	7.02	81.04	26.33
	Southwest Oregon Mixed Conifer-Hardwood Forest	LO	87.22	36.44	64.72	32.26	34.13	2.28	186.07	70.98
		MS	37.61	7.14	5.43	1.30	6.70	0.70	49.74	9.14
		CR	29.87	1.35	49.90	13.98	9.44	1.09	89.21	16.42
		Total	164.70	44.93	120.05	47.54	50.27	4.07	335.02	96.54
	Ponderosa Pine Forest and Woodlands	LO								
		MS								
		CR					0.01		0.01	
		Total					0.01		0.01	
	Westside Oak and Dry Douglas-fir Forest and Woodlands	LO								
		MS								
		CR								
		Total								
	Western Juniper and Mountain Mahogany Woodlands	LO								
		MS								
		CR								
		Total								

Table 5. Effects to acres of Johnson and O'Neil Habitat Type by National Forest										
General Habitat Type	Johnson and O'Neil (2001) Habitat Types	Seral Stage[1/]	National Forest						National Forest Total (acres)	
			Umpqua		Rogue River		Winema			
			Acres Removed[2/]	Acres Modified[3/]	Acres Removed[2/]	Acres Modified[3/]	Acres Removed[2/]	Acres Modified[3/]	Acres Removed[2/]	Acres Modified[3/]
Forest-Woodland (cont.)	Forest-Woodland Sub-Total	LO	87.22	36.44	77.36	36.33	40.46	5.24	205.04	78.01
		MS	37.61	7.14	12.31	4.87	9.43	1.62	59.35	13.63
		CR	29.87	1.35	84.35	25.65	27.46	4.23	141.68	31.23
		Total	164.70	44.93	174.02	66.85	77.35	11.09	416.07	122.87
Grasslands-Shrublands	Shrub-Steppe	N/A			6.49	0.51			6.49	0.51
	Westside Grasslands	N/A			3.37	0.46			3.37	0.46
	Eastside Grasslands	N/A			0.39		0.91		1.30	
Wetland/Riparian	Herbaceous Wetlands	N/A					0.15		0.15	
	Westside Riparian Wetlands	N/A	0.09						0.09	
	Eastside Riparian Wetlands						0.26		0.26	
Developed	Agriculture, Pastures and Mixed Environs	N/A								
	Developed-Urban and Mixed Environs	N/A	10.06		10.76				20.82	
Barren	Roads	N/A	13.84	0.60	12.67	2.51	2.67	0.05	29.18	3.16
Open Water	Open Water-Lakes, Rivers, and Streams	N/A	0.32		0.14	0.09	0.05		0.51	0.09
	Bays and Estuaries	N/A								
Other Non-Forest Habitat[4/]					1.54				1.54	

Table 5. Effects to acres of Johnson and O'Neil Habitat Type by National Forest

General Habitat Type	Johnson and O'Neil (2001) Habitat Types	Seral Stage[1/]	National Forest						National Forest Total (acres)	
			Umpqua		Rogue River		Winema			
			Acres Removed[2/]	Acres Modified[3/]	Acres Removed[2/]	Acres Modified[3/]	Acres Removed[2/]	Acres Modified[3/]	Acres Removed[2/]	Acres Modified[3/]
Total			**189.01**	**45.53**	**209.38**	**70.42**	**81.39**	**11.14**	**479.78**	**127.09**

1/ Forest-Woodland Age Categories Acres are LO, Late Successional/Old Growth assumed to be ≥80 years old; MS, Mid-Seral assumed to be ≥40 but ≤80 years old; CR, Clearcut-Regenerating Forest assumed to be ≤40 years old.

2/ Project components considered in calculation of habitat "Removed": Project construction ROW, temporary extra work areas, aboveground facilities, permanent and temporary access roads (PAR, TAR), pipe storage yards, rock source/disposal sites, and hydrostatic discharge sites.

3/ Project components considered in calculation of habitat "Modified": Project UCSAs that would not be cleared of trees during construction. These areas would be used to store forest slash, stumps and dead and downed log materials that would be removed and scattered across the ROW after construction during restoration and are considered as temporary insignificant habitat modifications.

4/ Other Non-Forest Habitat: delineation and available GIS data sources indicate that the area is not forested and includes, for example, roads, quarries, lake shorelines, and other non-forested habitats.

Table 6. Total Terrestrial Habitat Affected/Removed[1/] by Construction within Riparian Reserves in Fifth Field Watersheds

Fifth Field Watershed (Hydrologic Unit Code) and Landowner	Forested Habitat (acres) [2/]					Other Habitat (acres) [2/]						Total Riparian Reserves Impact (acres)
	Late Successional – Old Growth	Mid-Seral Forest	Regenerating Forest	Clearcut Forest	Total	Forested Wetland	Non-Forested Wetland	Unaltered Non-Forested Habitat	Agriculture	Altered Habitat	Total	
Upper Cow Creek (HUC 1710030206)												
Umpqua National Forest	2.82	3.47	3.43		**9.72**		0.09			0.71	**0.80**	**10.52**
Trail Creek (HUC 1710030706)												
Umpqua National Forest		2.94	0.00		**2.94**					4.90	**4.90**	**7.84**
Little Butte Creek (HUC 1710030708)												
Rogue River National Forest	1.46	0.40	2.30		**4.16**			0.32			**0.32**	**4.48**
Spencer Creek (HUC 1801020601)												
Winema National Forest	2.69	0.57	2.67		**5.93**	0.26	0.15	0.18		0.35	**0.94**	**6.87**
All Fifth Field Watersheds												
Umpqua National Forest	2.82	6.41	3.43		**12.66**		0.09			5.61	**5.70**	**18.36**
Rogue River National Forest	1.46	0.40	2.30		**4.16**			0.32			**0.32**	**4.48**
Winema National Forest	2.69	0.57	2.67		**5.93**	0.26	0.15	0.18		0.35	**0.94**	**6.87**
Fifth Field Watershed Total	**6.97**	**7.38**	**8.40**		**22.80**	**0.26**	**0.24**	**0.50**		**5.96**	**6.96**	**29.71**

1 / Project components considered in calculation of habitat "Removed": Project construction ROW, temporary extra work areas, aboveground facilities, and permanent and temporary access roads (PAR, TAR). Habitat "Modified," i.e., UCSAs, are not considered here because there are no UCSAs in Riparian Reserves so habitat removed is the extent of habitat affected.

2/ Habitat Types within Late Successional Reserves generally categorized as: Late Successional (Mature) or Old Growth Forest (coniferous, deciduous, mixed ≥80 years old); Mid-Seral Forests (coniferous, deciduous, mixed ≥40 but ≤80 years old); Regenerating Forest (coniferous, deciduous, mixed ≥5 but ≤40 years old); Clearcut Forests; Wetland Forested, Unaltered Nonforested Habitat (grasslands, sagebrush, shrublands), and Altered Habitats (urban, industrial, residential, roads, utility corridors, quarries).

Table 7. Total Terrestrial Habitat Affected in the 30-foot-wide Maintained Corridor within Riparian Reserves in Fifth Field Watersheds

Fifth Field Watershed (Hydrologic Unit Code) and Landowner	Forested Habitat (acres)[1/]					Other Habitat (acres)[1/]						Total Riparian Reserves Impact (acres)
	Late Successional-Old Growth	Mid-Seral Forest	Regenerating Forest	Clearcut Forest	Total	Forested Wetland	Non-Forested Wetland	Unaltered Non-Forested Habitat	Agriculture	Altered Habitat	Total	
Upper Cow Creek (HUC 1710030206)												
Umpqua National Forest	0.79	0.88	0.90		**2.57**		0.01			0.19	**0.20**	**2.77**
Trail Creek (HUC 1710030706)												
Umpqua National Forest					**0.00**							
Little Butte Creek (HUC 1710030708)												
Rogue River National Forest	0.31	0.04	0.47		**0.82**			0.06			**0.06**	**0.88**
Spencer Creek (HUC 1801020601)												
Winema National Forest	0.91	0.11	0.47		**1.49**	0.10	0.05		0.03	0.02	**0.20**	**1.69**
All Fifth Field Watersheds												
Umpqua National Forest	0.79	0.88	0.90		2.57		0.01			0.19	0.20	**2.77**
Rogue River National Forest	0.31	0.04	0.47		0.82			0.06			0.06	**0.88**
Winema National Forest	0.91	0.11	0.47		1.49	0.10	0.05		0.03	0.02	0.20	**1.69**
Fifth Field Watershed Total	**2.01**	**1.03**	**1.84**		**4.88**	**0.10**	**0.06**	**0.06**	**0.03**	**0.21**	**0.46**	**5.34**

1/ Habitat Types within Late Successional Reserves generally categorized as: Late Successional (Mature) or Old Growth Forest (coniferous, deciduous, mixed ≥80 years old); Mid-Seral Forests (coniferous, deciduous, mixed ≥40 but ≤80 years old); Regenerating Forest (coniferous, deciduous, mixed ≥5 but ≤40 years old); Clearcut Forests; Wetland Forested, Unaltered Nonforested Habitat (grasslands, sagebrush, shrublands), and Altered Habitats (urban, industrial, residential, roads, utility corridors, quarries)

Pacific Connector prepared estimates of snag density (numbers of snags per acre) that would be affected within the construction ROW and Temporary Extra Work Areas (TEWAs) on each of the three national forests based upon timber reconnaissance conducted in 2007 (Chapman 2007). Snag density by size catagory (inches, diameter at breast height [dbh]) and decay class (hard or soft) are provided in Table 8. Most of the smaller snags (<13 inches, dbh) were observed as hard wood, rather than softened due to decay. The number of snags removed by the Project within each National Forest was calculated by multiplying the sum of hard and soft decay-class densities for all size catagories by the acreage of forest-woodland removed during construction (Table 5). Loss of snags regardless of decay class is expected to be a long-term impact because recruitment of new snags within the affected areas would take much longer than 3 years. Estimates of snags within removed acres, as well as within the 700-foot and 3,200-foot analysis areas can be found in Appendix D; these estimates were generated by extrapolating estimates of snag density per acre (Table 8) by acres of forested habitat.

Table 8. Snag Density Estimates on Forest Service Lands

National Forest	Tree Type	Decay Class	Estimates of Snag Density (Number per Acre) by Size Category (inches, dbh)			
			<13	13-24	25-36	>36
Umpqua	conifer	Hard	5.0	0.6	0.8	0.0
		Soft	0.1	0.4	0.2	0.4
Rogue River	conifer	Hard	1.0	0.2	0.1	0.01
		Soft	0.0	0.5	0.2	0.0
	hardwood	Hard	1.5	0.0	0.0	0.0
		Soft	0.0	0.1	0.0	0.0
Winema	conifer	Hard	3.0	0.1	0.1	0.0
		Soft	0.0	0.4	0.1	0.0

6.1.2.3 Invasive Species

Invasive species are of concern for all terrestrial and aquatic species. Short- or long-term impacts to fish and wildlife habitat could result if the proposed pipeline causes the establishment and spread of noxious weeds, as well as other invasive species (animals and microbes) not native to a region. Noxious weeds often out-compete native vegetation. They displace native species by spreading rapidly and utilizing resources (nutrients, water, sunlight) that can eventually lead to a weed-dominated monoculture.

Clearing of vegetation from the ROW and soil disturbance from ROW grading could increase the chance of spreading noxious weeds through the removal of native, established species and soil disturbance, which could encourage the establishment of invasive plants. Equipment moving along the ROW could also bring seeds from one place to the next, aiding the spread of these species. Pacific Connector developed an Integrated Pest Management Plan, in consultation with the Oregon Department of Agriculture (Butler 2006), BLM, and the Forest Service, to minimize the potential spread and infestation of weeds along the construction ROW.

This plan can be found in Attachment 14 to the Plan of Development, which was included in Pacific Connector's application to the FERC. This plan includes surveys prior to construction to determine the presence of noxious weeds; cleaning of construction equipment in areas where weeds have been identified or when leaving these areas to prevent the import and spread of weeds; and vegetation clearing and grading requirements in areas of noxious weeds. Additionally, disturbed areas would be replanted with appropriate seed mixes to prevent noxious weed germination. After construction, the ROW would be monitored and any noxious weed infestations would be controlled. Pacific Connector would also investigate noxious weed issues raised by landowners during operation of the pipeline.

6.1.2.4 Noise Disturbance

Noise could potentially impact wildlife during clearing and grading of the construction ROW, during pipeline construction, and during ROW clean up, restoration, maintenance, and travel to and from the site. In some remote and steep areas crossed by the proposed pipeline, helicopters may be used during ROW timber-clearing and during pipe delivery and pipeline surveys. Minimal increase in ambient noise levels would also occur during periodic ROW vegetation maintenance activities (i.e., mowing, chainsaws) during operation. Noise would most likely temporarily displace wildlife some distance away from noise sources if wildlife species are nearby. However, any short-term effects to wildlife by noise would occur simultaneously with human presence and the presence of heavy machinery normally required for pipeline construction. Most likely, any impacts to wildlife due to noise could not be separated from those due to all other construction-related activities occurring concurrently. Noise and human presence would move along the construction ROW, albeit at a rather slow pace. Therefore, impacts to wildlife because of noise would be of relatively short duration (approximately 8 weeks in a given area) and spatially localized (by construction spread as described in Section 6.1.2.1).

Research has demonstrated varying short-term reactions of wildlife to noise. Most research has focused on wildlife reaction to more constant noise generated by roads and high-volume traffic (e.g., Forman and Alexander 1998). However, some research has documented wildlife reaction to airplanes, sonic booms, helicopters, artillery, and blasting that could produce similar reactions from noises associated with construction activities for the proposed Project. Golden et al. (1980) provided the following behavioral and physiological reactions of animals to known noise levels ranging between 75 and 105 dB from various disturbances, including aircraft:

- Fish demonstrate reduced viability, survival, and/or growth (20 dB for 11 to 12 days);
- Ungulates become nervous and/or run (82 to 95 dB) or panic (95 to 105 dB);
- Waterfowl flock (80 to 85 dB), move and/or become nervous (85 to 95 dB), or startle (95 to 105 dB); and
- Other birds scare (85 dB).

Raptors and other forest-dwelling bird species have demonstrated more adverse impacts to project-generated sound during nesting and breeding when levels substantially exceed ambient conditions existing prior to a project (i.e., by 20 to 25 dB experienced by the animal) and when the total sound level is very high and exceeds 90 dB. Such impact could potentially result in egg

failure or reduced juvenile survival, malnutrition or starvation of the young, or reducing the growth or likelihood of survival of young. In contrast, these effects may be minimal; Awbrey and Bowles (1990) found that raptors that flushed from their nests while incubating did not leave the eggs exposed for more than 10 minutes, and concluded that multiple, closely spaced disturbances would be required to cause lethal egg exposure. Some raptors, for example osprey, refuse to be flushed from their nest despite closely approaching helicopters (Poole 1989).

Pacific Connector anticipates ambient sound levels in much of the proposed pipeline area would be similar to the Arcata Fish and Wildlife Office's projections (FWS 2006). Ambient sound is defined as the sound qualities as they might exist currently and might include human-generated sources over the long term. The typical ambient sound level for forest habitats ranges from 25 dBA to 44 dBA (FWS 2006).

Noise levels at stream crossings are expected to be within the range of normal construction activity. Pacific Connector anticipates crossing 14 stream crossings that occur along 4 creeks would be needed on Forest Service land (Appendix C). Pacific Connector proposes to use dry open-cut methods to cross the creeks and not horizontal directional drilling (HDD) which typically results in higher noise levels. Dry open-cut methods use a pump and flume procedure to route the water around the pipeline trench area.

Double rotor helicopters may be used during timber clearing and pipeline construction along portions of the proposed Pacific Connector pipeline in areas that would be less accessible to pipeline construction contractors and logging trucks. Noise associated with this size of helicopter (generally >92 dBA) could have negative impacts to species, especially bird species during the breeding season. However, this level of noise attenuates to 92 dBA at distances of 650-700 feet from the aircraft. Conservation measures to reduce noise from helicopters consist of maintaining flight speed of 80 to 90 knots (92 to 104 miles per hour), gradual and controlled movement, and avoidance of noise sensitive areas (Appendix O of the BA).

Pacific Connector indicated that it may use helicopters for timber clearing and pipe stringing within locations where there are steep slopes and limited access to the ROW. All of the locations identified in Table 9 occur on the Umpqua National Forest.

Table 9. Helicopter Staging Locations

Begin MP	End MP	Helicopter Staging
101.3	102.30	TEWA 101.63-N, 101.77-N, & 102.19-N
108.5	110.40	TEWA 109.10-W, & 110.34-W TEWA 110.73 Helicopter landing Peavine Quarry
116.30	117.85	TEWA-116.59-W, & 117.68-N
123.30	125.15	TEWAs 123.53-W, 123.71-N, 124.30-N, 124.54-W, 124.99-W, & 124.95-N

Blasting may be required for pipeline trench construction in areas where hard, non-rippable bedrock occurs within the trench profile; however, alternate mechanical methods would first be employed in order to attain the desired trench depth, such as ripping, hydraulic hammers or rock saws (Appendix N of the BA). The bedrock units that may require blasting are expected to consist primarily of volcanic and metavolcanic rocks in the Klamath Mountains and volcanic rocks in the Cascade Range and along the ridges in the Basin and Range physiographic province. Pacific Connector identified areas where blasting may be neccesary by reviewing the NRCS soils maps and descriptions to identify soil units that typically contain bedrock within 5 feet of the ground surface. Low, moderate, and high potential blasting areas were identified on and adjacent to Forest Service-managed lands. Specifically, there is low potential for blasting between MPs 110.9 and 112.1 within the Umpqua National Forest, moderate to high potential for blasting between MPs 112.1 and 135.4 within the Umpqua National Forest and adjacent private, BLM, and state land, and high potential for blasting between MPs 159.9 and 172.0 within the Rogue River and Winema national forests and adjacent private land. Blasting activities may involve a single blast or a repetitive blasting sequence. As reported by the Arcata Fish and Wildlife Office (FWS 2006), noise associated with blasting activities may be in the range of 112dB within 50 feet of the trench and may cause alarm in wildlife. Blasting during pipeline construction is expected to generate lower dBA levels (~75 -100dB) since all blast charges would be underground and muffled with blasting mats, but could be as high as 112dB (Appendix P of the BA).

Table 10 estimates cumulative noise (dBA) at 50 feet associated with each activity in the proposed Project (Figure 3). Table 10 also estimates noise levels at 200 feet and 1,320 feet with or without a buffer of trees between the noise and the target point. Additionally, the distance at which the noise would attenuate to background (assuming an ambient noise level of 40 dBA) is estimated. Average noise levels over the entire construction sequence would be 84.68 dBA if trenching in rock-free areas, or 85.37 dBA if trenching in rocky areas that may include blasting. If blasting were needed, the maximum attenuation distance to background (40 dBA) would be approximately 2.2 miles if terrain was flat and no trees were present. However, if 100 feet of trees were present, the distance would decrease to approximately 1.4 miles.

Distances at which noise would attenuate to ambient levels would depend on local conditions such as tree cover and density, topography, weather (humidity), and wind, all of which can alter background noise conditions (see Appendix P of the BA). Consequently, short-term impact to wildlife by noise would vary along the length of the proposed pipeline.

Table 10. Estimated Equipment Noise and Noise Attenuation at Specified Distances During a Typical Pipeline Construction Sequence									
Drawing Number [1/]	Pipeline Construction Sequence [1/]	Equipment Expected [2/]	Estimated Cumulative Noise (dBA) At 50 feet [3/]	Estimated Noise (dBA) at 200 feet[4/]		Estimated Noise (dBA) at 0.25 miles[4/]		Attenuation Distance (feet) to Background[6/]	
				No Trees	With Trees (100 ft)[5/]	No Trees	With Trees (100 ft)[5/]	No Trees	With Trees (100 ft)[5/]
1	ROW Acquisition and Survey	Pickup Truck Chain Saw	88	73	68	53	48	4,222	2,660
2	Clearing and Grading	Pickup Truck Chain Saw Excavator Dozer Flatbed Truck Loader Shovel Logger-Cutter Skidder Crawler-Chipper	93	78	73	58	53	6,745	4,249
3	Fencing	Pickup Truck Auger Drill Rig	86	71	66	51	46	3,510	2,211
4	Centerline Survey of Ditch	Pickup Truck	80	63	58	45	40	2,016	1,270

Table 10. Estimated Equipment Noise and Noise Attenuation at Specified Distances During a Typical Pipeline Construction Sequence

Drawing Number [1/]	Pipeline Construction Sequence [1/]	Equipment Expected [2/]	Estimated Cumulative Noise (dBA) At 50 feet [3/]	Estimated Noise (dBA) at 200 feet [4/]		Estimated Noise (dBA) at 0.25 miles [4/]		Attenuation Distance (feet) to Background [6/]	
				No Trees	With Trees (100 ft) [5/]	No Trees	With Trees (100 ft) [5/]	No Trees	With Trees (100 ft) [5/]
5	Ditching (Rock-Free)	Pickup Truck Backhoe Excavator Dozer Flatbed Truck Dump Truck Tracked Ditcher	86	71	66	51	46	3,510	2,211
OR									
6	Ditching (Rock)	Pickup Truck Backhoe Excavator Dozer Flatbed Truck Auger Drill Rig Mounted Impact Hammer Rock Drill Blasting (Mitigated rock fracturing) Dump Truck	99	84	79	64	58	11,670	7,352
7	Padding Ditch Bottom	Pickup Truck Backhoe Excavator Dump Truck	86	71	66	51	46	3,510	2,211
8	Stringing	Pickup Truck Excavator Flatbed Truck Crane	86	71	66	51	46	3,510	2,211

Table 10. Estimated Equipment Noise and Noise Attenuation at Specified Distances During a Typical Pipeline Construction Sequence

Drawing Number [1/]	Pipeline Construction Sequence [1/]	Equipment Expected [2/]	Estimated Cumulative Noise (dBA) At 50 feet [3/]	Estimated Noise (dBA) at 200 feet [4/]		Estimated Noise (dBA) at 0.25 miles [4/]		Attenuation Distance (feet) to Background [6/]	
				No Trees	With Trees (100 ft) [5/]	No Trees	With Trees (100 ft) [5/]	No Trees	With Trees (100 ft) [5/]
9	Bending	Pickup Truck Excavator Dozer	87	72	67	52	47	3,850	2,425
10	Line Up, Stringer Bead and Hot Pass	Pickup Truck Excavator Dozer Side-Boom Welder/Torch	86	71	66	51	46	3,510	2,211
11	Fill and Cap Weld	Pickup Truck Welder/Torch	81	66	61	46	41	2,211	1,393
12	As-Built Footage	Pickup Truck Welder/Torch	82	67	62	47	42	2,425	1,528
13	X-Ray and Weld Repair	Pickup Truck Welder/Torch	82	67	62	47	42	2,425	1,528
14	Coating Field and Factory Welds	Pickup Truck Welder/Torch	82	67	62	47	42	2,425	1,528
15	Inspection (Jeeping) and Repair of Coating	Pickup Truck	80	65	60	45	40	2,016	1,270
16	Lowering In and Tie-Ins	Pickup Truck Backhoe Excavator Dozer	87	72	67	52	47	3,850	2,425
17	As-Built Survey	Pickup Truck	80	65	60	45	40	2,016	1,270
18	Pad and Backfill	Pickup Truck Backhoe Excavator Dozer Dump Truck	87	72	67	52	47	3,850	2,425

Table 10. Estimated Equipment Noise and Noise Attenuation at Specified Distances During a Typical Pipeline Construction Sequence

Drawing Number [1/]	Pipeline Construction Sequence [1/]	Equipment Expected [2/]	Estimated Cumulative Noise (dBA) At 50 feet [3/]	Estimated Noise (dBA) at 200 feet[4/]		Estimated Noise (dBA) at 0.25 miles[4/]		Attenuation Distance (feet) to Background[6/]	
				No Trees	With Trees (100 ft)[5/]	No Trees	With Trees (100 ft)[5/]	No Trees	With Trees (100 ft)[5/]
19	Test and Final Tie-In	Pickup Truck Backhoe Pumps	86	71	66	51	46	3,510	2,221
20	Replace Topsoil and Cleanup	Pickup Truck Backhoe Excavator Dozer Tractor	88	73	68	53	48	4,222	2,660

1/ Drawing Number and Pipeline Construction Sequence are shown in Figure 3.
2/ Equipment expected, based on "typical" pipeline construction requirements at a given location.
3/ Estimated Cumulative Noise at 50 feet is based on equipment-specific noise values (WSDOT 2008; de Hoop and Lalonde 2003) and rules for decibel addition specified by Washington State Department of Transportation (WSDOT 2008).
4/ Noise attenuation assumes "soft site" (absorptive ground) conditions and point-source noise reduction of 7.5 dB for every doubling of distance (WSDOT 2008).
5/ In these estimates, a buffer of 100 feet of dense vegetation is present in line of sight between noise source and receptor. If 200 feet of dense vegetation is present, noise would be reduced by an additional 5 dB.
6/ Background noise assumed to be 40 dB during daylight hours, when construction would occur.
Source: de Hoop and Lalonde 2003; WSDOT 2011.

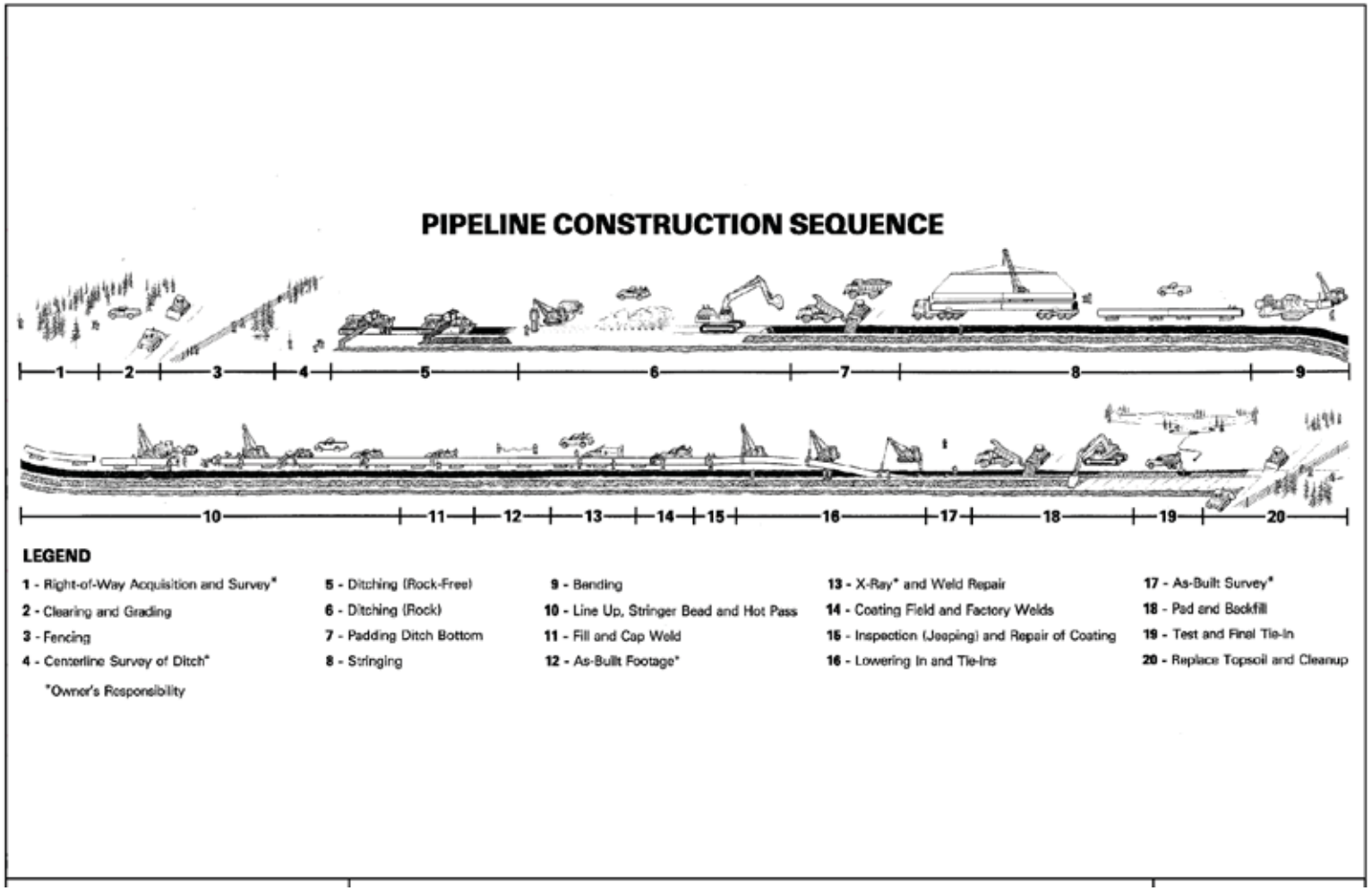


Figure 3: Generalized Pipeline Construction Sequence

6.1.2.5 Cumulative Impacts

In order to understand the contribution of past actions to the cumulative effects of the proposed action, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

Current and reasonably foreseeable projects that may cumulatively impact resources that would be affected by construction and operation of the proposed Project on Forest Service-managed lands are listed in Table 11. Note that these activities may include projects that are outside Forest Service-managed lands, but within the fifth-field watersheds crossed by the Project on Forest Service-managed lands.

A Forest Service action must meet three criteria to be a candidate for inclusion in the cumulative effects analysis for this BE. The action must:

- Affect a resource (e.g., forests) or resources potentially affected by the proposed Project on Forest Service-managed lands; and
- Overlap with the Project in time and space.

Planned projects within watersheds where the proposed action crosses Forest Service lands include a variety of timber, fuel, grazing and biological projects (Table 11). Planned projects on the Umpqua National Forest include 13 projects within the Elk Creek, Upper Cow Creek and Trail Creek Watersheds (Table 11). Forest Service projects include a weed treatment project, several timber treatments, livestock grazing, a fuelbreak project, and various aquatic restoration projects; other projects include clearcutting on private lands, and a BLM timber sale and highway realignment (Table 11). On the Rogue River National Forest, there are 9 planned projects within the Little Butte Watershed that consist of 8 livestock grazing allotments and one quarry (Table 11). On the Winema National Forest, there are 7 planned projects within the Spencer Creek Watershed that consist of several livestock grazing allotments, road maintenance, noxious weed treatments and reclamation activities associated with this Project (Table 11).

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Table 11. Current or Proposed Activities Potentially Cumulatively Affecting Resources of Concern on Forest Service-managed Lands			
Fifth Field Watershed	**Activity**	**Project Description**	**Construction Dates**
Umpqua National Forest			
Elk Creek	Weed Treatment	50 acres per year. Hand pulling and cutting	Ongoing
	Proposed Elk Creek Collaborative Watershed Restoration Project 1	900 acres commercial thin, 500 acres fuels reduction, 250 acres prescribed burn, 100 acres, pre-commercial thin, 50 acres weed treatment, 50 acres planting, 4 culvert replacements, 5 miles road decommission	2015
	Livestock Grazing	9,963 acres livestock grazing	Ongoing
	Proposed Tiller Aquatic Restoration Project	2 culvert replacements, 7 miles instream habitat improvement, 5 sump maintenance sites, 142 acres Riparian Reserve thinning, 1 pond habitat improvement	Expect implementation to begin in 2014
	Anticipated Clear Cutting on Private Land	150 acres	Unknown
	Proposed Elk Creek Collaborative Watershed Restoration Project 2	200 acres commercial thin, 500 acres fuels reduction, 250 acres prescribed burn, 100 acres pre-commercial thin, 50 acres weed treatment, 50 acres planting, 2 culvert replacements, 5 miles road decommission	Expect implementation to begin in 2015
Upper Cow Creek	Livestock Grazing	8,250 acres	Ongoing
	Anticipated Clear Cutting on Private Land	270 acres	Unknown
	Proposed Tiller Aquatic Restoration Project	1 culvert replacement	Expect implementation to begin in 2014
	Red Mountain Stewardship	1,366 acres shaded fuel break 240 acres commercial thinning	Expect implementation to begin in 2015
Trail Creek	Livestock Grazing	4,230 acres	Ongoing
	Mouse Trail Timber Sale (BLM lands)	1,000 acres of restoration thinning, 500 acres of pre-commercial thinning.	Expected implementation in 2015
	Tiller-Trail Highway Realignment Project (BLM lands)	1 mile (7 acres)	Expected implementation in 2014.
Rogue River National Forest			
Little Butte Creek	2004 Deadwood Complex EA (Allotment Management Plan Update for Five Allotments)	400 acres of livestock grazing on the South Butte Allotment	Unknown
	2009 Fish Lake and Rancheria Allotment Management Plan Update	1,000 acres of livestock grazing on the Fish Lake Allotment	Unknown
	2004 Deadwood Complex EA (Allotment Management Plan Update for Five Allotments)	2,000 acres of livestock grazing (900 acres on the South Butte Allotment, and 1,100 acres on the Conde Allotment)	Unknown
	2004 Deadwood Complex EA (Allotment Management Plan Update for Five Allotments)	5,300 acres of livestock grazing on the South Butte Allotment	Unknown
	2009 Fish Lake and Rancheria Allotment Management Plan Update	6,500 acres of livestock grazing on the Fish Lake Allotment	Unknown
	2013 Big Elk Cinder Pit CE (DM will be published within next 6 months)	Excavation of cinders from 5 acres of land in an existing cinder quarry	Unknown
	2004 Deadwood Complex EA (Allotment Management Plan Update for Five Allotments)	14,100 acres of livestock grazing (7,000 acres on the South Butte Allotment, 4,900 acres on the Deadwood Allotment, and 2,200 acres on the Conde Allotment)	Unknown
	2004 Deadwood Complex EA (Allotment Management Plan Update for Five Allotments)	8,700 acres of livestock grazing on the South Butte Allotment	Unknown
	2004 Deadwood Complex EA (Allotment Management Plan Update for Five Allotments)	16,800 acres of livestock grazing (3,400 acres on the South Butte Allotment, 13,400 acres on the Deadwood Allotment	Unknown

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Table 11. Current or Proposed Activities Potentially Cumulatively Affecting Resources of Concern on Forest Service-managed Lands			
Fifth Field Watershed	**Activity**	**Project Description**	**Construction Dates**
Winema National Forest			
Spencer Creek	Lakewoods WUI Harvest Project	Variety of fuels treatments surrounding the Lakewoods private land subdivision. Commercial harvest approximately 70 acres.	Unknown
	Indian Livestock Grazing Allotment	livestock grazing	Unknown
	Buck Cattle and Horse Allotment	Livestock grazing	Unknown
Spencer Creek	Road Maintenance	Variety of routine road maintenance activities	Unknown
	Road Decommissioning as part of Pacific Connector Project mitigation	Decommission approximately 29 miles as off-site Pacific Connector mitigation	Unknown
	Winema Invasive Plant Treatment EIS 2011	Ongoing invasive plant treatment project currently prescribes treatment of known infestations of invasive plants and will reduce the potential for invasive plant introduction and spread by allowing for timely treatment of sites in or near the Project area	Ongoing
	Pacific Connector Project reclamation activities	All activities associated with reclamation of construction ROW; access roads; etc.	Unknown

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The cumuative effects analysis for each species takes into consideration the effects of the proposed Project, including proposed mitigation, in conjunction with the reasonably forseeable projects described above. Table 12 below lists the acreage impacted by the Project, proposed mitigation, and other identified projects by watershed.

Table 12: Cumulative Acres Impacted by Watershed by the Project, Related Mitigation Projects, and Other Projects [1/]

Activity, Fifth Field Watershed	Acres	Percent of Watershed
UMPQUA NATIONAL FOREST		
Watershed: Days Creek South Umpqua	76,250	
Other Identified Projects	0	0
Pacific Connector Pipeline and Associated Facilities	842	1.1
Project-related Mitigation on Federal Lands	1,000	1.3
Cumulative Area Impacted	***1,842***	***2.4***
Watershed: Elk Creek South Umpqua	54,895	
Other Identified Projects	2,052	3.7
Pacific Connector Pipeline and Associated Facilities	42	<0.1
Project-related Mitigation on Federal Lands	2,370	4.3
Cumulative Area Impacted	***4,422***	***8.1***
Watershed: Upper Cow Creek	47,416	
Other Identified Projects	1,867	3.9
Pacific Connector Pipeline and Associated Facilities	95	0.2
Project-related Mitigation on Federal Lands	2,004	4.2
Cumulative Area Impacted	***3,871***	***8.2***
Watershed: Trail Creek	28,867	
Other Identified Projects	6,055	21
Pacific Connector Pipeline and Associated Facilities	240	0.8
Project-related Mitigation on Federal Lands	1,260	4.4
Cumulative Area Impacted	***7,555***	***26.2***
Total Umpqua National Forest	207,428	
Other Identified Projects	9,974	4.8
Pacific Connector Pipeline and Associated Facilities	1,219	0.6
Project-related Mitigation on Federal Lands	6,634	3.2
Umpqua Total Cumulative Area Impacted	***17,690***	***8.5***
ROGUE RIVER NATIONAL FOREST		
Watershed: Big Butte Creek	43,813	
Other Identified Projects	0	0
Pacific Connector Pipeline and Associated Facilities	82	0.2
Project-related Mitigation on Federal Lands	0	0
Cumulative Area Impacted	***82***	***0.2***
Watershed: Little Butte Creek	238,598	
Other Identified Projects	2,805	1.2
Pacific Connector Pipeline and Associated Facilities	649	0.3
Project-related Mitigation on Federal Lands	703	0.3
Cumulative Area Impacted	***3,851***	***1.6***
Total Rogue River National Forest	282,411	
Other Identified Projects	2,805	1.0
Pacific Connector Pipeline and Associated Facilities	731	0.3

Table 12: Cumulative Acres Impacted by Watershed by the Project, Related Mitigation Projects, and Other Projects [1/]

Activity, Fifth Field Watershed	Acres	Percent of Watershed
Project-related Mitigation on Federal Lands	703	0.2
Roge River Total Cumulative Area Impacted	***3,933***	***1.4***
WINEMA NATIONAL FOREST		
Watershed: Spencer Creek	54,420	
Other Identified Projects	70	0.1
Pacific Connector Pipeline and Associated Facilities	231	0.4
Project-related Mitigation on Federal Lands	397	0.7
Cumulative Area Impacted	***698***	***1.3***
Total Winema National Forest	54,420	
Other Identified Projects	70	0.1
Pacific Connector Pipeline and Associated Facilities	231	0.4
Project-related Mitigation on Federal Lands	397	0.7
Winema Total Cumulative Area Impacted	***698***	***1.3***
Grand Total: Umpqua, Rogue River, Winema National Forests	544,259	
Other Identified Projects	12,849	2.4
Pacific Connector Pipeline and Associated Facilities	2,181	0.4
Project-related Mitigation on Federal Lands	7,734	1.4
Cumulative Area Impacted	**22,321**	***4.1***

1/ Other Identified Projects include only those resulting in new disturbance (e.g., continued grazing on existing allotments is not included).
Numbers are not exact, columns do not sum correctly due to rounding.
Table adapted from Table 4.14.3-1 of the DEIS (FERC 2014).

Wetlands

Wetlands covered as much as 2.3 million acres (3.6 percent) of what is now Oregon as of the late 1700s (Dahl 1990). Since that time, wetland acreage has decreased by more than one-third, mostly owing to conversion of wetlands to agricultural uses by diking, draining, or both. Other causes of wetland loss or degradation have been urbanization, industrial development, flood-control projects, surface-water diversion and ground-water pumping for irrigation, stream snagging, land clearing, livestock grazing, and beaver trapping (ODSL and WCSW 1995). The greatest losses were of estuarine marshes, eastern Oregon riparian wetlands, Willamette River Valley wet prairies and riparian wetlands, and Klamath Basin marshes (ODSL and OPRD 1989).

In addition to general area wetland losses, the quality of remaining wetlands has also decreased, primarily due to human activities, with complex wetlands such as riverine wetlands losing connectivity with their water sources due to roads and similar construction. A third feature, wetland plants, also indicates that wetlands are declining. ORBIC reports that 29 percent of Oregon's wetland plants are imperiled (OPB 2000). Current regulatory programs to slow wetland loss, as well as creating incentives to increase wetland health and acreage, have the potential to stop and possibly reverse current trends.

Based on Johnson and O'Neil habitat classifications, there are 583 acres of wetlands within the 700-foot analysis area, and 1,718 acres within the 3,200-foot analysis area. Of those, 0.15 acres would be impacted by the Project (Table 5).

Riparian Areas

There are about 114,500 miles of rivers and streams in Oregon, and their surrounding riparian areas make up almost 15 percent of the state (Oregon Water Resources Department as cited in OPB 2000). Like wetlands, the hydrologic function of streams and rivers has been altered, reducing the connection between the river and the riparian zones. Agricultural and livestock grazing practices on private lands have reduced vegetation along streams to a large extent, and increased flow rates while reducing water quality and habitat for threatened fish species (Matthews and Barnhard 1996). Human settlement and land development have drastically reduced the ecological functions of these habitats (OPB 2000). Additionally, non-native vegetation has been invading these corridors, with up to 50 percent non-native species in the Willamette riparian forests (Tabacchi et al. 1996).

Intensive human activity along the most impacted riparian corridors makes the restoration of these areas particularly difficult. Slightly more success is possible in more rural areas where conservation easements and evolving agricultural and livestock grazing practices can be more easily altered.

Based on Johnson and O'Neil habitat classifications, there are 164 acres of riparian habitat within the 700-foot analysis area, and 1,024 acres within the 3,200-foot analysis area. Of those, 0.35 acres would be impacted by the Project (Table 5).

6.1.3 Conservation Measures and Mitigation

Project conservation measures can be categorized into one of five "mitigation" applications, described by the CEQ (43 FR 55990 §1508.20, 1978):

1. Avoiding the impact altogether by not taking a certain action or parts of an action;
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
5. Compensating for the impact by replacing or providing substitute resources or environments.

Categories 1 through 4 have occurred or would occur within the Project area, and include design features and best management practices (BMPs), while the fifth category would occur outside the Project area, and consist of off-site compensatory mitigation designed to compensate for impacts of the Project that cannot be avoided, further minimized, or otherwise mitigated.

Pacific Connector's proposed avoidance and minimization measures include re-routing the Project to avoid sensitive resources, restricting the pipeline corridor width in environmentally sensitive areas (e.g., riparian areas), utilizing UCSAs within forested habitats, and maintaining large snags and trees with cavities on the edge of the construction ROW or TEWAs where feasible. Pacific Connector would also restore affected habitats to the maximum extent practicable including restoring habitat diversity features such as cavities and snags, large woody debris (LWD), and rock and brush piles. Pacific Connector would reduce impact over time by minimizing disturbances during Project operation, including waiting until late summer or early autumn to conduct routine (every 3 to 5 years) vegetation maintenance. By avoiding, minimizing, rectifying, and reducing Project impacts to sensitive habitats, Pacific Connector would minimize impacts to the species that utilize those habitats, including many of the Forest Service sensitive species discussed in this BE.

Specific Project conservation measures, including measures proposed for construction, post-construction restoration, and operation are listed in Appendix N of the BA, and are detailed in the following plans: Pacific Connector's Spill Prevention, Containment, and Countermeasures Plan (SPCC; Appendix L of the BA), Waterbody Crossing Plans (Appendix W to the BA), Fish Salvage Plan (Appendix T of the BA), Blasting and Helicopter Noise Analysis and Mitigation Plan (Appendix P of the BA), Erosion Control and Revegetation Plan (ECRP; Appendix F of the BA), and FERC's Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA).

To compensate for unavoidable impacts of the Project, Pacific Connector developed a Compensatory Mitigation Plan (CMP; Appendix O of the BA). The goal of the CMP is to compensate for unavoidable impacts to the sensitive resources through achieving No Net Loss or an overall Net Benefit for the resource. Additionally, the CMP is designed to satisfy the requirements of the National Forest Management Act (NFMA) and associated Land and Resource Management Plans (LRMPs), including the Northwest Forest Plan (NWFP), as well as comply with the ESA and other applicable requirements. Specific compensatory mitigation has only been proposed for three Forest Service sensitive species discussed in this BE (Mardon skipper [*Polites mardon*], Siskiyou short-horned grasshopper [*Chloealtis aspasma*], and Upper Klamath redband trout [*Oncorhynchus mykiss newberrii*]); however, many of the measures proposed to compensate for impacts to federal land allocations such as Riparian Reserves and LSRs, listed species and their habitats, aquatic and riparian habitats, and state-specific protected species or habitats would also benefit the Forest Service sensitive species discussed here.

The Forest Service has proposed the re-allocation of nearly 1,200 acres of forested lands within the matrix land allocation be added to existing LSRs to replace the habitat impacted by the Project. This reallocation would address the "neutral to beneficial" standard for new developments in LSRs (Forest Service and BLM, 1994) to offset the long-term loss of acres and habitat from the construction and operation of the Project. This reallocation of matrix land to LSR would benefit Forest Service sensitive species associated with LO forests over time by

providing additional habitat that is managed to create late successional–old growth stand conditions.

As re-allocations do not specifically mitigate for direct habitat losses or indirect effects within LSRs, the Forest Service has proposed additional projects in the CMP to mitigate for habitat losses within LSRs, in other NWFP allocated lands, and within specific habitats utilized by species listed under the ESA. These potential projects include aquatic habitat restoration (including in-stream LWD, road surfacing and drainage repair, road decommissioning, fish passage and culvert replacement) and terrestrial habitat restoration (including fuel breaks, fuel reduction projects, snag creation, weed control and treatments, and meadow restoration). These proposed mitigation projects would benefit Forest Service sensitive species by improving habitat and reducing future disturbance. These Projects are described in Table 1 and Attachment 2 of the CMP (Appendix O of the BA).

In order to replace matrix lands reallocated to LSRs as required under the various LRMPs, Pacific Connector would fund the acquisition of private land for conversion to matrix land under federal management. Although these lands would be mananged for timber harvest as described, riparian and aquatic habitats within these new matrix areas would be converted to Riparian Reserves and would be subject to more stringent protections under federal management than they currently are under private ownership as dictated by state regulations (Oregon Department of Forestry 2006). Therefore these conversions of private to matrix land would benefit Forest Service sensitive species associated with riparian and aquatic habitats.

As a result of these proposed mitigation measures designed to achieve LSR objectives and standards, late-successional-old growth and aquatic habitat would benefit overall from the Project, as would the Forest Service sensitive species associated with these habitats.

6.2 Species Accounts and Analysis of Impacts

Species presented in this section were determined to require a detailed analysis of impacts based on a preliminary impact analysis. The impact determination for all species discussed here is MIIH, as defined above.Where suitable habitat was documented for a species but species-specific surveys were not conducted for that species, presence was assumed and the potential effects of the Project are analyzed here. Sensitive species observed within the Project area during surveys are also discussed here. Species that were not detected during species-specific surveys, or did not receive targeted surveys but were determined not to have any suitable habitat within the Project area, were assumed to be absent from the Project area; these species are not discussed in this section, but are listed in Table 1 and discussed in Appendix A.

Each species-specific section below is organized as follows:

1. *Species Status in the Project Area*

This section provides information on the species' range, habitat, life history, and potential presence in the Project area. *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson and O'Neil 2001) was used as a guide to provide habitat associations for mammals, birds, amphibians, and reptiles; for fish, invertebrates, vascular plants, bryophytes, fungi, and

lichens, habitat associations were inferred from the data sources described above in Section 3.0. Additionally, if the species was not listed in Johnson and O'Neil (2001) then primary or peer-reviewed literature was used to describe the life history characteristics and determine habitat associations. These inferred habitat associations provide the basis for the impact analysis for each species by allowing quantification of the amount of habitat potentially impacted by the Project (Table 5). Johnson and O'Neil (2011) use two definitions to describe wildlife-habitat associations:

> ***Closely Associated.*** *A species is widely known to depend on a habitat or structural condition for part or all of its life history requirements. Identifying this association implies that the species has an essential need for this habitat or structural condition for its maintenance and viability.*
>
> ***Generally Associated.*** *A species exhibits a high degree of adaptability and may be supported by a number of habitat or structural conditions. In other words, the habitats or structural conditions play a supportive role for its maintenance and viability.*

Johnson and O'Neil (2001) also include "Present" as a degree of association between wildlife and habitats. This association was not included in this analysis as it indicates that a species demonstrates only occasional use of a habitat or structural condition and the habitat or structural conditions provides marginal support to the species for its maintenance and viability.

Observations of species discussed in this section were also reviewed to determine the extent of each species within each National Forest and with respect to the Project (Forest Service NRIS database -Forest Service 2006, SBS 2008, 2010, 2011a, 2011b, 2011c, ORBIC 2012). An ORBIC Element Occurrence or Forest Service Wildlife Observation is defined as evidence that an animal or group of animals was present within a certain location at a point in time; the number of individuals per observation ranges from one to many, and the same individual may elicit several observations over time (Forest Service 2006, ORBIC 2012). Similarly, plant sites in the Forest Service and ORBIC database reflect locations containing one to many individuals. These records were analyzed to determine the proportion of each species' known locations that have the potential to be impacted by the Project, and thus the likelihood of population-level impacts resulting from the Project.

If a species was documented during field surveys, these field observations are also discussed here. The location of each observation in relation to the Project is presented, where applicable, in order to determine the effect the Project would have on the species.

2. Analysis of Effects

This section provides an analysis of direct, indirect, and cumulative effects to each species in addition to the global discussion of impacts above.

3. Conservation Measures

This section describes the proposed minimization and off-site compensatory mitigation measures that apply to each species. These measures conform to applications 2 through 5 in Section 6.1.3, above and do not reiterate the avoidance measures (application measure 1)

discussed in the action alternatives Section 2.0. For a detailed discussion of conservation measures and off-site mitigation, see the Conservation Measures (Appendix N of the BA) and the CMP (Appendix O of the BA). These measures as they apply to the Forest Service sensitive species are also summarized above in Section 6.1.3, including a list of the various environmental plans developed to guide construction, post-construction restoration, and operation practices.

4. Impact Determination

This section lists the impact determination made for each species based on the above analysis. There are four possible outcomes for each sensitive species. No Impact (NI), May Impact Individuals or Habitat but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species (MIIH), Will Impact Individuals or Habitat with a consequence that the action will contribute to a trend toward Federal listing or cause a loss of viability to the population or species (WOFV), or Beneficial Impact (BI).

6.2.1 Mammals

Surveys were not conducted specifically for sensitive mammals except for the red tree vole (*Arborimus longicaudus*). The red tree vole is designated as a Survey and Manage species and discussed in a separate report. The information on sensitive species occurrence is based on several GIS data sources including ORBIC occurrence records (ORBIC 2012), Johnson and O'Neil (2001) habitat associations, and the Forest Service Natural Resource Information System (NRIS) database (Forest Service 2006).

6.2.1.1 Pallid bat (Antrozous pallidus)

Species Status in the Project Area

The pallid bat ranges from central Mexico and north to the southern Okanagan Valley of British Columbia (Orr 1954, Hermanson and O'Shea 1983, Verts and Carraway 1998). In Oregon, pallid bats have been documented in the western interior valleys and east of the Cascades excluding the Blue Mountains (McLaren 2001). As shown in Table 1, the species has been detected on the Umpqua, Winema, and Rogue River national forests. The pallid bat has been observed twice within 1 mile and three times within 1-5 miles of the Project in the Umpqua National Forest (Forest Service 2006, ORBIC 2012).

The pallid bat inhabits arid regions, and is less abundant in evergreen and mixed conifer woodlands. Pallid bats typically use cliff-faces, caves, mines, or buildings for roosts (Csuti et al. 2001). While night roosts can include buildings, rock overhangs, bridges, caves and mines, Lewis (1996) found a high proportion of his study individuals in Oregon under bridges. Pallid bat maternity roosts have been found in ponderosa pine snags (Rabe et al. 1998), in rock crevices, within spaces behind exfoliating rock, and "potholes" in rock-overhangs (Lewis 1996). Young are born in May and June, fly at 6 weeks, and are weaned in 6 to 8 weeks. This species is thought to hibernate in the winter (NatureServe 2013).

Habitat loss from urbanization, conversion of sagebrush-steppe, and agricultural expansion is likely a limiting factor on pallid bats, particularly due to reduction of foraging habitats (Chapman et al. 1994). In addition to direct habitat loss, the indirect effects from fire suppression modify the forest-valley transition area.

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable pallid bat habitats within 3,200 feet of the proposed pipeline, within the three national forests crossed by the Project. While pallid bats are particularly associated with habitats that include edges where snags, cliffs, caves, and tree cavities are present, Table 13 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 13. Pallid Bat Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Southwest Oregon Mixed Conifer-Hardwood Forests	Generally Associated	Feeds and Breeds	335.02	96.54	11,980.17	3.60%
Ponderosa Pine Forests and Woodlands	Generally Associated	Feeds and Breeds	0.01	0	957.70	0.00%
Western Juniper/Mountain Mahogany Woodlands	Generally Associated	Feeds and Breeds	0	0	0	0.00%
Shrub-steppe	Closely Associated	Feeds and Breeds	6.49	0.51	9.26	75.6%
Eastside Grasslands	Generally Associated	Feeds and Breeds	1.3	0	2.57 [3]	50.58% [3/]
Herbaceous wetlands	Closely Associated	Feeds	0.15	0	28.18	0.53%
Westside Riparian Wetlands	Generally Associated	Feeds	0.09	0	263.37	0.03%
Eastside Riparian-Wetlands	Closely Associated	Feeds and Breeds	0.26	0	223.81	0.12%
Agriculture, Pastures, and Mixed Environs	Generally Associated	Feeds and Breeds	0	0	0	0.00%
Open Water-Lakes, Rivers, and Streams	Closely Associated	Feeds	0.51	0.09	206.93	0.29%
Total			**343.83**	**97.14**	**13,671.99**	**3.23%**

Table 13. Pallid Bat Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted

1/ Totals taken from Table 5 for all three national forests in which the species has been documented to occur.

2/ Totals taken from Table 3 for all three national forests in which the species has been documented to occur; does not include habitat located on other federal or non-federal lands.

3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

Overall, about 3 percent of available habitat within the analysis area would be impacted by the Project (Table 13). There are no known hibernacula or maternity colonies near the Project. Pallid bats could be directly killed by ROW clearing if bats were in a tree that was cleared. As noted above, pallid bats have been documented using ponderosa pine snags as maternity colonies. A minimal amount of ponderosa pine habitat would be impacted by the Project (0.01 acres) so the threat of direct mortality to maternity roosts by felling a tree is minimal. Pallid bats are also associated with other forested habitats that would be more greatly impacted. It is possible that timber clearing in these areas could cause direct mortality of roosting bats, and clearing could cause loss of potential roost trees.

Bats could be disturbed by noise during timber clearing and construction if they were roosting nearby. This disturbance could have negative energetic effects if bats needed to relocate to avoid the disturbance.

As described in Section 6.1.2.1 above, construction in a given location would take approximately 8 weeks including all phases. As shown in Figure 2, timber clearing and construction could occur throughout the year. Pallid bats could partially benefit from ROW clearing as they forage in open areas.

Cumulative Effects

The pallid bat cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua, Winema, and Rogue River national forests (Table 12). Past harvest techniques removed large trees that may have served as pallid bat roosts, maternity colonies and winter hibernacula. Suitable foraging habitat may also have decreased due to past clearcut forest management.

Construction of the pipeline and associated facilities would affect 2,181 acres within the pallid bat cumulative effects analysis area (Table 12). This reflects 0.4 percent of the total watershed area. Although trees and snags would be cleared during Project construction, these represent a small portion of the species' overall available roost sites, and these would be replaced through 1,029 acres of snag creation. Replacement would be immediate, though there would be up to a 10-year delay as snag decay occurs. Approximately 467 acres outside of the 30-foot maintenance corridor would be restored following construction and allowed to return to pre-construction conditions where not on Matrix lands. Forested areas impacted during construction,

including potential roosting habitat, would take decades to recover, while open habitats such as grasslands would recovery relatively quickly. Of the 467 acres that would be restored after construction, 89 percent are forested, and the remaining 11 percent are grassland or otherwise non-forested. Construction noise disturbance to roost sites, though of short duration (approximately 8 weeks at a given location), could impact individuals locally. However, as no known communal roost sites or colonies have been documented within the Project area, impacts to large numbers of roosting bats are not expected.

Proposed mitigation actions on federal lands that would affect resources used by the pallid bat include snag creation, road closure, fuels reduction, fire suppression, reallocation of matrix to LSR, riparian vegetation planting, and LWD upland placement projects. Mitigation actions on federal lands would affect 7,734 acres within the pallid bat cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12). There could be some negative short-term impacts of these actions, including disturbance during implementation, such as during fuels reduction projects. However, overall, these projects would benefit the pallid bat through habitat improvements and a reduction in disturbance over the long term. Snag creation projects would result in the creation of potential roost sites, road closures would reduce disturbance to individuals if present, fuels reduction and fire suppression projects would result in a reduction of potential habitat loss through fire, and planting of riparian vegetation would improve habitat quality for the pallid bat at these sites. These proposed mitigation projects are described in detail in Appendix F of the DEIS (FERC 2014).

Planned projects within the pallid bat cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). They would affect 12,849 acres, or 2.4 percent of the cumulative effects analysis area. The pre-commercial thinning and timber projects in the national forests would most likely contribute to the long term health of the forest ecosystems; similarly, the fuel break project would improve habitat quality for pallid bats through improved fire management. Under the NWFP, LSRs and Riparian Reserves in the area are likely to improve habitat for this species over time.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the pallid bat cumulative effects analysis area includes 22,321 acres, or 4.1 percent of the total watershed area (Table 12). The proposed action, as well as reasonably foreseeable actions, would not result in additional habitat loss from urbanization, conversion of sagebrush-steppe, and agricultural expansion, which are likely the limiting factors for pallid bats (Chapman et al. 1994). Therefore, cumulative impacts on the pallid bat are expected to be insignificant, because the combined impacts to the 4.1 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts include revegetating the understory with grasses and shrubs, restoring wetlands, and encouraging insect recolonization (see Appendices C and F of the BA). Noise disturbance from blasting

would be minimized with the use of blast mats or other devices. Timber removal, pipeline construction and blasting, or helicopter activity would be avoided within 0.25 miles of an NSO activity center between March 1 and July 15 and would benefit any roosting bats and maternity colonies in those areas (approximately 30 percent of route, see Appendix N and P of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the NWFP Aquatic Conservation Strategy. Riparian Reserves provide suitable foraging and roosting habitat. For a full description of CMP activities that would benefit the bat species see Appendix O of the BA. Proposed mitigation actions on federal lands that would benefit the pallid bat are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the pallid bat because of the minimal percentage of available habitat to be impacted (about 3 percent) with which the species is associated.

6.2.1.2 Townsend's big-eared bat (Corynorhinus townsendii)

Species Status in the Project Area

The Townsend's big-eared bat occurs throughout western North America (Woodruff and Ferguson 2005). Townsend's big-eared bats are a common species in Oregon and can be found wherever suitable habitat exists, excluding the Blue Mountains and West Basin Range (McLaren 2001). As shown in Table 1, the species has been documented in all three national forests crossed by the Project. Townsend's big-eared bat has been observed three times within 1 mile of the Project in the Rogue River National Forest; there have been no observations of the Townsend's big-eared bat within 5 miles of the Project in either the Winema or the Umpqua National Forest (Forest Service 2006, ORBIC 2012).

Use of roost sites by Townsend's big-eared bats is variable within seasons and among years (Piaggio 1998). Townsend's big-eared bats roost primarily in caves, cracks or crevices in rocks, abandoned mines, abandoned buildings and open attics (Barbour and Davis 1969, Nagorsen and Brigham 1993, Pierson et al. 1996). Although caves and mines are considered to be preferred day roosts (Pierson et al. 2001), Keely and Tuttle (1999) reported high use of bridges as day and night roosts by Townsend's big-eared bats in southwestern Oregon. Townsend's big-eared bats show little fidelity to interim roosts, but the species is highly loyal to maternity roosts (Fellers and Pierson 2002). In Washington and Oregon, this species is known to utilize individual caves for both maternity roosts and winter hibernation (Woodruff and Ferguson 2005). Young are born from mid-April through late July, fly within a month, and are weaned within two months. This species hibernates from early fall through early spring (NatureServe 2013).

The primary threat to the Townsend's big-eared bat is disturbance and destruction of roost sites through recreational caving, mine exploration, mine reclamation and renewed mining in

historical districts. Studies in Oregon and California indicate that current and historical colonies exhibited moderate to sizable decreases in numbers following human visitation and renewed mining (Piaggio 1998). Additionally, the loss of old buildings, barns, warehouse, silos and other buildings and the physical closure or reactivation of mines reduces available roost sites (Woodruff and Ferguson 2005).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable Townsend's big-eared bat habitats within 3,200 feet of the proposed pipeline, in the three national forests crossed by the Project. While Townsend's big-eared bats are particularly associated with habitats that include ecotones where cliffs and caves are present, Table 14 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 14. Townsend's big-eared Bat Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside Lowland Conifer-Hardwood Forests	Generally Associated	Feeds and Breeds	0	0	0	0.00%
Montane Mixed Conifer Forests	Generally Associated	Feeds and Breeds	81.04	26.33	833.40	12.88%
Southwest Oregon Mixed Conifer-Hardwood Forests	Generally Associated	Feeds and Breeds	335.02	96.54	11,980.17	3.60%
Ponderosa Pine Forests And Woodlands	Generally Associated	Feeds and Breeds	0.01	0	957.70	0.00%
Westside Oak-Dry Douglas-fir Forests and Woodlands	Generally Associated	Feeds and Breeds	0	0	0	0.00%
Western Juniper/Mountain Mahogany Woodlands	Generally Associated	Feeds and Breeds	0	0	0	0.00%
Shrub-Steppe	Generally Associated	Feeds and Breeds	6.49	0.51	9.26	75.60%
Westside Grasslands	Generally Associated	Feeds	3.37	0.46	10.17 [3]	37.66% [3/]
Eastside Grasslands	Generally Associated	Feeds and Breeds	1.30	0	2.57[3]	50.58%[3/]
Herbaceous Wetlands	Generally Associated	Feeds	0.15	0	28.18	0.53%
Westside Riparian Wetlands	Generally Associated	Feeds	0.09	0	39.56	0.23%
Eastside Riparian Wetlands	Generally Associated	Feeds	0.26	0	223.81	0.12%

Table 14. Townsend's big-eared Bat Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Agriculture, Pastures, and Mixed Environs	Generally Associated	Feeds and Breeds	0	0	0	0.00%
Open Water-Lakes, Rivers, and Streams	Closely Associated	Feeds	0.51	0.09	206.93	0.01%
Total			**428.24**	**123.93**	**14,291.75**	**3.86%**

1/ Totals taken from Table 5 for all three national forests in which the species has been documented to occur.
2/ Totals taken from Table 3 for all three national forests in which the species has been documented to occur; does not include habitat located on other federal or non-federal lands.
3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

There are no known hibernaculum or maternity roosts within the analysis area, but they could potentially occur and not be documented. Approximately 4 percent of the habitat available to this species within the analysis area would be impacted by the Project (Table 14). Cave roost sites are sparsely located across the Project area and are not likely to be encountered during construction activities.

Construction noise could disturb roosting bats. Particularly sensitive to disturbance, females have been known to permanently abandon summer roosts when disturbed. Nursery colonies, located in caves, mines, or buildings, can contain up to several hundred bats, and thus a large number of individuals could potentially be affected if noise disturbance causes a group to abandon its roost, particularly the young which may not yet be able to live independently of their mothers (Nagorsen and Brigham 1993). Noise disturbance would only be temporary, however, and habitat would become suitable once the noise ceased. Due to this species' mobility and wide habitat preferences, it should be able to temporarily relocate to other areas during construction fairly easily and without population-scale impacts. Townsend's big-eared bats could be directly affected during pipeline construction if hibernating bats are disturbed and aroused from torpor as this could possibly lower their fitness during winter, potentially increasing mortality, and decreasing fecundity.

Cumulative Effects

The Townsend's big-eared bat cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua, Winema, and Rogue River national forests (Table 12). Suitable habitat for this species, including forested and wetland habitats, have decreased in complexity and abundance from historical conditions due to widespread timber clearing, settlement patterns, and fire suppression.

Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12).

Approximately 467 acres disturbed during pipeline construction would be revegetated following construction, and be allowed to return to its pre-construction condition outside of the 30-foot maintenance corridor (excluding Matrix lands). Construction noise disturbance to roost sites, though of short duration (approximately 8 weeks at a given location), could impact individuals locally. However, as no known communal roost sites or colonies have been documented within the Project area, impacts to large numbers of roosting bats are not expected.

Mitigation actions proposed for federal lands that affect resources used by the Townsend's big-eared bat include road closure, fuels reduction, fire suppression, reallocation of matrix to LSR, riparian vegetation planting, and LWD upland placement projects. Mitigation actions on federal lands would affect 7,734 acres within the cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12). Potential negative impacts include disturbance during implementation of these projects, such as during fuels reduction projects. However, these projects would overall benefit the Townsend's big-eared bat through habitat improvements and a reduction in disturbance over the long term. Road closures would reduce disturbance to individuals if present; fuels reduction and fire suppression projects would result in a reduction of potential habitat loss through fire; and planting of riparian vegetation would improve habitat quality for the Townsend's big-eared bat at these sites. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). They would affect 12,849 acres, or 2.4 percent of the watersheds. The pre-commercial thinning and timber projects in the national forests would most likely contribute to the long term health of the forest ecosystems; similarly, the fuel break project would improve habitat quality for Townsend's big-eared bats through improved fire management. Under the NWFP, LSR's and Riparian Reserves in the area are likely to improve habitat for this species over time.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres overlapping reasonably foreseeable activities, approximately 22,321 acres within the cumulative effects analysis area would be affected, or 4.1 percent of the total watershed area (Table 12). The proposed action as well as the actions described above would not contribute to disturbance of caves which is the primary threat to this species. Additionally, impacts to unidentified roost sites, if any, would be short term, lasting a maximum of approximately 8 weeks through Project construction. Therefore, cumulative impacts on the Townsend's big-eared bat are expected to be insignificant because the combined impacts to the 4.1 percent of the watershed area, including short-term disturbance effects, are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts include revegetating the understory with grasses and shrubs, restoring wetlands, and encouraging insect recolonization (see Appendices C and F of the BA). Noise disturbance from blasting would be minimized with the use of blast mats or other devices. Timber removal, pipeline

construction and blasting, or helicopter activity would be avoided within 0.25 miles of an NSO activity center between March 1 and July 15, which would benefit any roosting bats and maternity colonies in those areas (approximately 30 percent of route, see Appendix N and P of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the NWFP Aquatic Conservation Strategy. Riparian Reserves provide suitable foraging and roosting habitat. For a full description of CMP activities that would benefit the bat species see Appendix O of the BA. Proposed mitigation actions on federal lands that would benefit the Townsend's big-eared bat are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for Townsend's big-eared bat because of the minimal percentage of available habitat to be impacted (about 4 percent) with which the species is associated, and the lack of impact to caves which is the primary threat to this species.

6.2.1.3 Fringed myotis (Myotis thysanodes)

Species Status in the Project Area

The fringed myotis ranges throughout much of western North America from southern British Columbia to Mexico, and from California, east to South Dakota (Bradley and Ports 1998, Rabe et al. 1998, Cryan et al. 2000). In Oregon, fringed myotis can be found in the Coast Range and in the northeastern corner of the state (McLaren 2001). Although widely distributed throughout western North America, the fringed myotis is considered rare in the northern portion of its range (Barbour and Davis 1969, USDA and USDI 1993, McLaren 2001). As shown in Table 1, the species has been documented in all three national forests crossed by the Project. The fringed myotis has been observed once within 1 mile and once within 1-5 miles of the Project in the Rogue River National Forest and once within 1-5 miles of the Project in the Winema National Forest; it has not been observed within 5 miles of the Project in the Umpqua National Forest (Forest Service 2006, ORBIC 2012).

Fringed myotis roost in crevices in buildings, underground mines, rocks, cliffs faces, and bridges (Bradley and Ports 1998, Cryan et al. 2001). Roosting in decadent trees and snags, particularly large ones, is common throughout its western range. In the Pacific Northwest, the fringed myotis is not considered a tree-roosting bat (Nagorsen and Brigham 1993). Fringed myotis in the Pacific Northwest generally roost in more abundant albeit less permanent abandoned buildings and caves (Lewis 1995), although Weller and Zabel (2001) found fringed myotis roosted primarily in snags in northern California. Maternity roosts are colonial with colonies ranging from 10-2,000 individuals, though large colonies are exceedingly rare. Much less information is available on roosts of males, but it is thought that they roost singly or in small groups (Weller

2005). Fringed myotis move within roost sites, maximizing their thermoregulation and reproductive behavior (O'Farrell and Studier 1980). Young are born in late June to mid-July and young can fly at 16-17 days. Colonies begin to disperse by October, and bats are likely hibernating after September (NatureServe 2013).

Threats to the fringed myotis primarily consist of loss or modification of roosting habitat, including closure or renewed activity at abandoned mines, recreational caving and mine exploration, loss of large, decadent trees and replacement of buildings and bridges with non-bat-friendly structures (Bradley and Ports 1998). Removal of large blocks of forest habitat also threatens the fringed myotis by removing foraging habitat (Bradley and Ports 1998).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable fringed myotis habitats within 3,200 feet of the proposed pipeline, in the three national forests crossed by the Project. While fringed myotis are particularly associated with habitats that include edges, snags, cliffs, caves, and tree cavities, Table 15 shows the habitat types in the analysis area with which the species is generally or closely associated, and the acreages of those habitats impacted by the Project.

Table 15. Fringed Myotis Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside-Lowland-Conifer-Hardwood Forests	Generally Associated	Feeds and Breeds	0	0	0	0.00%
Southwest Oregon Mixed Conifer-Hardwood Forests	Generally Associated	Feeds and Breeds	335.02	96.54	11,980.17	3.60%
Ponderosa Pine Forests and Woodlands	Generally Associated	Feeds and Breeds	0.01	0	957.70	0.00%
Westside Oak-Dry Douglas-Fir Forests and Woodlands	Generally Associated	Feeds and Breeds	0	0	0	0.00%
Shrub-Steppe	Generally Associated	Feeds and Breeds	6.49	0.51	9.26	75.51%
Eastside Grasslands	Generally Associated	Feeds	1.3	0	2.57 [3]	50.58% [3/]
Herbaceous Wetlands	Generally Associated	Feeds	0.15	0	28.18	0.53%
Westside Riparian Wetlands	Generally Associated	Feeds and Breeds	0.09	0	39.56	0.23%

Table 15. Fringed Myotis Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Eastside Riparian Wetlands	Generally Associated	Feeds and Breeds	0.26	0	223.81	0.12%
Open Water-Lakes, Rivers, and Streams	Generally Associated	Feeds	0.51	0.09	206.93	0.29%
Total			**343.83**	**97.14**	**13,448.18**	**3.28%**

1/ Totals taken from Table 5 for all three national forests in which the species has been documented to occur.

2 Totals taken from Table 3 for all three national forests in which the species has been documented to occur; does not include habitat on other federal or non-federal lands.

3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

There are no known hibernaculum or maternity roosts within the analysis area, but they could potentially occur and not be documented. Cave roost sites are sparsely located across the Project area and are not likely to be encountered during construction activities. Approximately 3 percent of the habitat available to this species within the analysis area would be impacted by the Project (Table 15). In terms of potential roosting habitat, approximately 0.8 percent of late-successional old-growth in the analysis area would be impacted (Tables 3 and 5), and 1.65 percent of snags present within the analysis area would be impacted by the Project (Appendix D). About 3.6 percent of forested habitats available in the analysis area would be impacted that could serve as potential foraging habitat Individuals could be killed or injured if snags are removed or destroyed while occupied by roosting bats. These percentages of habitats impacted represent a small portion of habitat available in the analysis area. Additionally, trees and snags are not typically primary roost habitats for fringed myotis, as they more typically use caves, buildings, and bridges for roosting.

Construction of the Project and associated noise would extend approximately 8 weeks at any given location, and could occur at any time of the year. Fringed myotis are sensitive to disturbance, particularly at maternity colonies. Disturbance of hibernating bats could cause a reduction in fitness during winter when they must use their body reserves to survive. While disturbance cound render habitat temporarily unsuitable or have adverse energetic impacts on bats; these impacts would be temporary and occur in a narrow swath of otherwise suitable habitat.

Cumulative Effects

The fringed myotis cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua, Winema, and Rogue River national forests (Table 12).This species is widespread in western North America and population trend is stable, but its abundance appears to be low (NatureServe 2013). Suitable habitat for this species including

forested and wetland habitats have decreased from historical conditions due to widespread timber clearing and settlement patterns in the region.

Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Although trees and snags would be cleared during Project construction, these represent a small portion of the species' overall available roost sites and would be replaced through mitigation efforts. Specifically, as described above under the pallid bat, snag creation would be implemented across 1,029 acres as mitigation for snags removed by the Project. Forested areas impacted by construction of the pipeline, including potential roosting habitat, are expected to take decades to recover, while open habitats such as grasslands would recovery relatively quickly. Approximately 467 acres outside of the 30-foot maintenance corridor would be restored following construction and allowed to return to pre-construction conditions where not on Matrix lands. This area consists primarily of forested habitat (89 percent), as well as some non-forested habitat (11 percent). Construction noise disturbance to roost sites, though of short duration, could impact individuals locally. However, as no known communal roost sites or colonies have been documented within the Project area, impacts to large numbers of roosting bats are not expected.

Mitigation actions proposed for federal lands that affect resources used by the fringed myotis include snag creation, road closure, fuels reduction, fire suppression, reallocation of matrix to LSR, riparian vegetation planting, and LWD upland placement projects. Mitigation actions on federal lands would affect 7,734 acres within the cumulative effect analysis area, or 1.4 percent of the total watershed area (Table 12). Potential negative impacts include disturbance during implementation of these projects, such as during fuels reduction projects. However, these projects would overall benefit the fringed myotis through habitat improvements and a reduction in disturbance over the long term. Snag creation projects would result in the creation of potential roost sites; road closures would reduce disturbance to individuals if present; fuels reduction and fire suppression projects would result in a reduction of potential habitat loss through fire; and planting of riparian vegetation would improve habitat quality for the fringed myotis at these sites. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). They would affect 12,849 acres, or 2.4 percent of the watersheds. The pre-commercial thinning and timber projects in the national forests would most likely contribute to the long term health of the forest ecosystems, although they could represent additional loss of habitat for this species through loss of large trees and snags. Under the NWFP, LSR's and Riparian Reserves in the area are likely to improve habitat for this species over time.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres overlapping reasonably foreseeable activities, approximately 22,321 acres within the cumulative effects analysis area, or 4.1 percent of the total watershed area (Table 12). The proposed action as well as the actions described above would not

contribute to the closure or renewed activity at abandoned mines, recreational caving and mine exploration, and replacement of buildings and bridges with non-bat-friendly structures, which are threats to this species (Bradley and Ports 1998). The proposed Project as well as planned projects would contribute to the loss of large, decadent trees, as well as result in the removal of foraging habitat which are also threats to this species; however, these impacts would be mitigated through snag creation and other habitat enhancements. Therefore, cumulative impacts on the fringed myotis are expected to be insignificant because the combined impacts to the 4.1 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts include revegetating the understory with grasses and shrubs, restoring wetlands, and encouraging insect recolonization (see Appendices C and F of the BA). Noise disturbance from blasting would be minimized with the use of blast mats or other devices. Timber removal, pipeline construction and blasting, or helicopter activity would be avoided within 0.25 miles of an NSO activity center between March 1 and July 15 and would benefit any roosting bats and maternity colonies in those areas (approximately 30 percent of the route, see Appendix N and P of the BA).

In the Umpqua and Rogue River national forests, approximately 7,500 snags would be created in LSR and matrix lands by blasting the tops off live trees or inoculating trees with heart rot decay fungi. Increased snags densities would provide bats with more roost opportunities. For a full description of CMP activities that would benefit the bat species see Appendix O of the BA. Proposed mitigation actions on federal lands that would benefit the fringed myotis are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for fringed myotis because of the low percentage of potential habitat in the analysis area being impacted (about 3 percent) and mitigation efforts to create snags.

6.2.2 Birds

Surveys were not conducted specifically for special status birds except for the great gray owl (*Strix nebulosa*); however, special status species were documented if observed during other survey activities. The information on sensitive species occurrence is based on several GIS data sources including ORBIC occurrence records (ORBIC 2012), Johnson and O'Neil (2001) habitat associations, and the Forest Service NRIS databases (Forest Service 2006).

6.2.2.1 Red-necked grebe (Podiceps grisegena)

Species Status in the Project Area

This waterbird breeds throughout southern and central Alaska and much of Canada, to the northern U.S. Their winter range is along the Pacific coast from the Aleutian Islands to Los Angeles, California, the Atlantic coast from Newfoundland to North Carolina, and the shores of Lake Ontario. The only consistent breeding in Oregon is by a group of five to 20 birds in Upper Klamath Lake National Wildlife Refuge (NWR). During the winter, red-necked grebes can be found in larger numbers along the coast, and are rarely found away from the coast (Spencer 2003a). As shown in Table 1, the species has been documented in the Umpqua and Winema national forests; and has not been documented and is not suspected to occur in the Rogue River National Forest. Neither the Forest Service nor ORBIC location database records contained observations of the red-necked grebe within 5 miles of the Project on NFS lands (Forest Service 2006, ORBIC 2012).

Historical information on this species is limited; breeding populations in Oregon were first documented in 1945 (Marshall et al. 2003). Breeding habitat consists of clear, deep marshy lakes and ponds in timbered regions (Table 17; Johnson and O'Neil 2001). At Upper Klamath Lake, emergent vegetation is dominant, and pondweed and waterweed are common (Spencer 2003a). Winter habitat consists of estuaries and protected waters along the coast (Spencer 2003a). Fish make up 50 to 75 percent of adults' diets. Other important foods are insects, crustaceans, and occasionally vegetation (Spencer 2003a).

As predators, red-necked grebes are susceptible to bioaccumulation of pollutants such as organochlorides and heavy metals, and they are also vulnerable to oil spills. A potentially important source of mortality to this diving bird is bycatch in commercial fishing nets. Other threats to red-necked grebes are degradation of habitat and disturbance. Farming, road-building, and development have destroyed breeding habitat, while pollution is a problem at some wintering areas. Disturbance has associated with reduced productivity at some sites (Stout and Neuchterlein 1999). Within the western region, populations have increased 1.2 percent annually between 2001 and 2011 (Sauer et al. 2012).

Analysis of Effects

Direct and Indirect Effects

The analysis area for this species includes all suitable red-necked grebe habitat within 3,200 feet of the proposed pipeline, in Umpqua and Winema national forests. Table 16 shows the habitat types in the analysis area with which the species is generally or closely associated, and the acreages of those habitats impacted by the Project.

Table 16. Red-necked Grebe Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Herbaceous Wetlands	Closely Associated	Feeds and Breeds	0.15	0	28.12	0.53%
Westside Riparian Wetlands	Closely Associated		0.09	0	5.64	1.56%
Eastside Riparian Wetlands	Closely Associated		0.26	0	223.81	0.12%
Open Water-Lakes, Rivers, and Streams	Closely Associated	Feeds and Breeds	0.37	0	152.19	0.24%
Total			**0.87**	**0**	**409.76**	**0.21%**

1/ Totals taken from Table 5 for the Umpqua and Winema national forests in which the species has been documented to occur.

2/ Totals taken from Table 3 for the Umpqua and Winema national forests in which the species has been documented to occur; does not include habitat located in the Rogue River National Forest or on other federal or non-federal lands.

While this table represents impacts to general habitats that red-necked grebe may use that would be impacted by the Project, areas of known use by red-necked grebes would not be impacted by the Project. Specifically, the population at Upper Klamath Lake NWR and the few records from Howard Prairie Reservoir would not be impacted by the Project because both of these locations occur well away (greater than 10 miles) from any Project impacts. One bird summered on Fish Lake in Jackson county in 1989, but this lake would also be avoided by about 2 miles by the Project centerline. However, Fish Lake is a proposed hydrostatic test water source, with locations proposed for both the east and west ends of the lake. The Project should also not contribute to pollution of either of these waterbodies, which could pose an added threat to the species.

If red-necked grebes were to occur near the Project, they could be disturbed by pipeline construction that could render habitats temporarily unsuitable. However, because grebes are a mobile species, they should be able to move away from Project construction activities and not be directly affected.

Cumulative Effects

The red-necked grebe cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua and Winema national forests (Table 12). Development activities that degrade foraging and nesting habitat as well as indirect effects such as noise disturbance continue to threaten the red-necked grebe. Development has concentrated around bodies of water, increasing disturbance, eliminating habitat, and encouraging the spread of mesopredators. Though one-third of Oregon wetlands are estimated to have been lost since the late 1700s, wetlands are now protected under federal law, and loss of estuarine wetlands has slowed substantially since the mid-1900s (ODSL and OPRD 1989, Dahl 1990). Additionally, although the Klamath Basin has lost nearly 80 percent of its wetlands, 15,000 acres of wetlands

and open water within the Upper Klamath NWR where this species is known to occur are protected. FWS manages the site for the conservation and recovery of endangered, threatened, sensitive species and the habitats on which they depend, including the red-necked grebe.

Construction of the pipeline and associated facilities would affect 1,450 acres within the cumulative effects analysis area (Table 12). However, no red-necked grebe nesting or overwintering sites are known from within these 5th field watersheds, so Project effects are expected to be limited.

Mitigation actions proposed for federal lands that affect resources used by the red-necked grebe include fish passage, road storm proofing, road decommissioning, in stream LWD placement, stream crossing repair, and riparian planting projects. Mitigation actions on federal lands would affect 7,031 acres the cumulative effects analysis area, or 2.7 percent of the total watershed area (Table 12). Potential negative impacts include noise disturbance and the potential for increased sediment during implementation. However, these projects would overall benefit the red-necked grebe, if present, through habitat improvements and a reduction in disturbance over the long term. Fish passage and riparian planting projects would reconnect aquatic habitats and restore riparian vegetation, which would reduce sediment and restore shade over time. Road storm proofing and decommissioning, and stream crossing repair projects would reduce future sediment inputs; road decommissioning would additionally reduce future noise disturbance by limiting human access. Placement of LWD in streams would add structural complexity to aquatic systems, trap fine sediments, and contribute to reductions in stream temperatures over time which would improve habitat quality for the horned grebe. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects withinthe cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). They would affect 10,044 acres, or 3.8 percent of the watersheds. The aquatic restoration projects include in-stream restoration activities that benefit water quality, bank stability and road decommissioning actions that would benefit grebe habitat within the watershed. Under the NWFP, Riparian Reserves in the area are likely to improve habitat for this species over time. Further, standards and guidelines within the NWFP limit livestock grazing around aquatic areas and provide measures to minimize impacts from timber harvest. These actions would likely lead to improved quantity and quality of suitable red-necked grebe habitat on NFS lands.

The proposed Project, including mitigation actions, would affect approximately 8,481 acres. Combined with 10,044 acres overlapping reasonably foreseeable activities, approximately 18,388 acres within the cumulative effects analysis area would be affected, or 7 percent of the total watershed area (Table 12). The proposed action as well as the actions described above could affect a minimal amount of potential habitat, but would not impact known red-necked grebe use areas. Therefore, cumulative impacts on the red-necked grebe are expected to be insignificant because the combined impacts to the 7 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize any potential Project-related impacts are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA). For a full description of CMP activities that would benefit the the species see Appendix O of the BA. Proposed mitigation actions on federal lands that would benefit the red-necked grebe are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the red-necked grebe because all known breeding sites are being avoided, and if birds were encountered, only 0.2 percent of habitat available within the analysis area would be impacted by the Project.

6.2.2.2 Horned grebe (Podiceps auritus)

Species Status in the Project Area

This small grebe breeds in Alaska and parts of western Canada south to eastern Oregon and Idaho. During winter, in the west, it can be found along the Pacific coast from the Aleutians to Mexico, and inland to New Mexico and Colorado. In Oregon, horned grebes have been present in late June at Upper Klamath Lake, uncommonly along lakes, reservoirs, and large rivers in the spring and fall, and commonly along the coast in winter (Marshall et al. 2006). As shown in Table 1, the species has been documented on the Umpqua and Winema national forests; it has not been documented and is not suspected to occur in the Rogue River National Forest. Neither the Forest Service nor ORBIC location database records contained observations of the horned grebe within 5 miles of the Project on Forest Service lands (Forest Service 2006, ORBIC 2012).

Breeding habitat consists of small (< 25 acres), semi-permanent, shallow freshwater ponds and marshes with emergent vegetation, especially sedges, rushes, and cattails, and areas of open water (Table 17; Stedman 2000, Johnson and O'Neil 2001, Spencer 2003b). Slightly brackish areas can also be used. During winter, they are usually found on saltwater, often inshore, though also on fresh water (Stedman 2000). In the summer, horned grebes eat aquatic arthropods, and in the winter they eat fish and crustaceans.

The most serious threats to winter range suitability are oil spills and pesticide accumulation. Losses of breeding habitat are also serious in some areas due to mowing of aquatic vegetation and eutrophication due to fertilizer runoff (Stedman 2000). Horned grebes will also abandon lakes heavily used by humans for recreation. Substantial losses are reported due to incidental take in fishing nets, and some losses have been reported due to toxins including pesticides, and oil spills (Stedman 2000). Within the western region, populations have declined 4.5 percent annually between 2001 and 2011 (Sauer et al. 2012).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable horned grebe habitats within 3,200 feet of the proposed pipeline, in the Umpqua and Winema national forests. Table 17 shows the habitat types in the analysis area with which the species is generally or closely associated, and the acreages of those habitats impacted by the Project.

Table 17. Horned Grebe Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Herbaceous Wetlands	Closely Associated	Feeds and Breeds	0.15	0	28.12	0.53%
Open Water-Lakes, Rivers, and Streams	Closely Associated	Feeds and Breeds	0.37	0	152.19	0.00%
Total			**0.52**	**0**	**180.31**	**0.29%**

1/ Totals taken from Table 5 for the Umpqua and Winema national forests in which the species has been documented to occur.

2/ Totals taken from Table 3 for the Umpqua and Winema national forests in which the species has been documented to occur; does not include habitat located in the Rogue River National Forest or on other federal or non-federal lands.

While this table represents impacts to general habitats that horned grebe may use that would be impacted by the Project, areas of known use by horned grebes would not be impacted by the Project. Specifically, the potentially breeding population at Upper Klamath Lake NWR is about 15 miles from the Project. The Project should also not contribute to pollution of waterbodies, which could contribute to existing threats to the species.

Wintering birds could potentially be disturbed by Project construction; however, they should be able to move away from Project construction activities and would only be temporarily affected. Disturbance at any given location would last approximately 8 weeks over the entire construction period, and could occur at any time of year (Section 6.1.2.1).

Cumulative Effects

The horned grebe cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua and Winema national forests (Table 12). Breeding habitat in Oregon has been decreased from historical levels due to filling of wetlands and development. Though one-third of Oregon wetlands are estimated to have been lost since the late 1700s, wetlands are now protected under federal law, and loss of estuarine wetlands has slowed substantially since the mid-1900s (ODSL and OPRD 1989, Dahl 1990). Additionally, similarly to the red-necked grebe, the wetland conservation and species management at the Upper Klamath NWR has, and should continue to benefit the horned grebe (FWS 2013).

Construction of the pipeline and associated facilities would affect 1,450 acres within the 5th field watersheds where the Project crosses national forests where this species has been documented, or 0.6 percent of the total watershed area (Table 12). However, no areas of known horned grebe use occur within these 5th field watersheds.

Mitigation actions proposed for federal lands that affect resources used by the horned grebe include fish passage, road storm proofing, road decommissioning, in stream LWD placement, stream crossing repair, and riparian planting projects. Mitigation actions on federal lands would affect 7,031 acres within the cumulative effects analysis area, or 2.7 percent of the total watershed area (Table 12). Potential negative impacts include noise disturbance and the potential for increased sediment during implementation. However, these projects would overall benefit the horned grebe, if present, through habitat improvements and a reduction in disturbance over the long term. Fish passage and riparian planting projects would reconnect aquatic habitats and restore riparian vegetation, which would reduce sediment and restore shade over time. Road storm proofing and decommissioning, and stream crossing repair projects would reduce future sediment inputs; road decommissioning would additionally reduce future noise disturbance by limiting human access. Placement of LWD in streams would add structural complexity to aquatic systems, trap fine sediments, and contribute to reductions in stream temperatures over time which would improve habitat quality for the horned grebe. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). They would affect 10,044 acres, or 3.8 percent of the watersheds. The aquatic restoration projects include in-stream restoration activities that benefit water quality, bank stability and road decommissioning actions that could potentially benefit grebe habitat within the watershed. The NWFP protects streams, rivers, and wetlands, and land use designations including Riparian Reserves and associated management practices on Forest Service land would likely increase the amount and integrity of these habitats used by horned grebes.

The proposed Project, including mitigation actions, would affect approximately 8,481 acres. Combined with 10,044 acres overlapping reasonably foreseeable activities, approximately 18,388 acres within the cumulative effects analysis area would be affected, or 7 percent of the total watershed area (Table 12). The proposed action as well as the actions described above could affect a minimal amount of potential habitat, but would not impact known horned grebe use areas.

Therefore, cumulative impacts on the horned grebe are expected to be insignificant given the distance away from the forests at which breeding or wintering horned grebes would typically spend time, and because the combined impacts to the 7 percent of the watershed area are not expected to have a measureable effect on the species.actions associated with this Project

Conservation Measures and Mitigation

As noted above, contamination of waterbodies is a noted threat to horned grebes. Specific conservation measures that would help minimize any potential Project-related impacts from spills are described in Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). For a full description of CMP activities that would benefit the the species see Appendix O of the BA. Proposed mitigation actions on federal lands that would benefit the horned grebe are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for horned grebe because they are not known to breed near the Project, and only 0.3 percent of potential habitat in the analysis area where birds could experience winter disturbance would be impacted.

6.2.2.3 American white pelican (Pelecanus erythrorhynchos)

Species Status in the Project Area

The breeding range of the American white pelican includes scattered locations in the Great Plains region of Canada and the U.S. During winter, they are found in California south of the San Francisco Bay, and along the coast south to the Yucatan peninsula. In Oregon, they regularly breed at Malheur, Lower Klamath, and Upper Klamath NWRs. Postbreeding, birds are found throughout eastern Oregon and occasionally in western Oregon. As shown in Table 1, the species has been documented in the Rogue River and Winema national forests; it has not been documented and is not suspected to occur in the Umpqua National Forest. Multiple observations of the American white pelican have been documented within within 1-5 miles of the Project in the Rogue River National Forest near Fish Lake (Forest Service 2006, ORBIC 2012, Colyer 2014)

During breeding, typical habitat is isolated islands or floating reed mats in freshwater lakes (Table 18; Johnson and O'Neil 2001). Nesting has been recorded on islands vegetated with greasewood, saltgrass, and Great Basin wild rye (Paullin et al. 1988). The diet of the American white pelican is largely made up of fish. Foraging habitat is shallow marshes, lakes, rivers, and canals, especially near dams, gates, and pipes, where fish congregate (Knopf and Evans 2004).

There are many threats to this species; deaths at Malheur NWR resulted from botulism, powerline strikes, and possibly starvation (Herziger and Ivey 2003). Fluctuating water levels have caused chick stranding, nest flooding, and can contribute to erosion of nesting islands (Herziger and Ivey 2003). Pelicans are also highly sensitive to disturbance; over 800 nests were abandoned at Malheur Lake in 1988 after trespassers visited a colony by canoe (Herziger and Ivey 2003). In Oregon, populations have declined 4.19 percent annually between 2002 and 2011 (Sauer et al. 2012).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable American white pelican habitats within 3,200 feet of the proposed pipeline, in the Rogue River and Winema national forests. Table 18 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 18. American White Pelican Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Herbaceous Wetlands	Generally Associated	Feeds	0.15	0	27.29	0.55%
Open Water-Lakes, Rivers, and Streams	Closely Associated	Feeds and Breeds	0.19	0.09	185.87	0.15%
Total			**0.34**	**0.09**	**213.16**	**0.20%**

1/ Totals taken from Table 5 for the Rogue River and Winema national forests in which the species has been documented to occur.

2/ Totals taken from Table 3 for the Rogue River and Winema national forests in which the species has been documented to occur; does not include habitat located in the Umpqua National Forest or on other federal or non-federal lands.

While this table represents impacts to general habitats that the American white pelican may use that would be impacted by the Project, areas of known use by pelicans would not be impacted by the Project. Specifically, known breeding locations are about 8 to 10 miles from the Project (Lower Klamath and Upper Klamath NWR, respectively), so no impacts would be expected.

Pelicans have also been observed multiple times at Fish Lake (Colyer 2014) which is located about 2 miles north of the Project centerline. Fish Lake is also a proposed hydrostatic test water source, with locations proposed for both the east and west ends of the lake. Pacific Connector would use locally-sourced water for hydrostatic testing. To allay concerns about lowering water levels and associated impacts on pelicans, we note that Pacific Connector would need a permit from the Oregon Water Resources Department, and the application would be reviewed by ODFW for concerns related to wildlife species and their habitat.

Nonbreeding American white pelicans could be disturbed by pipeline construction if they are present in the area. However, they should be able to move away from Project construction activities and would only be temporarily affected. Disturbance at any given location would last approximately 8 weeks over the entire construction period, and could occur at any time of year (Section 6.1.2.1). Of habitat that American white pelicans could potentially use in the analysis area, 0.2 percent would be impacted by the Project.

Cumulative Effects

The American white pelican cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Winema and Rogue River national forests (Table 12). Though one-third of Oregon wetlands are estimated to have been lost since the late 1700s, loss of estuarine wetlands has slowed substantially since the mid-1900s with increased protection (ODSL and OPRD 1989, Dahl 1990). Areas near lakes, rivers, and streams have historically been among the most intensively developed, for easy access to water. Coastal rivers and estuaries have been highly altered by humans; they have been drained, had their natural hydrologic processes such as tides and flows altered, and have been generally reduced in complexity. Streams and rivers have also been degraded by timber clearing practices (OPB 2000).

Construction of the pipeline and associated facilities would affect 962 acres within the cumulative effects analysis area, or 0.3 percent of the total watershed area (Table 12). The only location where the American white pelican has been observed within these watersheds is at Fish Lake; as they are not known to breed at this site, impacts to breeding individuals are not expected.

Mitigation actions proposed for federal lands that affect resources used by the American white pelican include fish passage, road storm proofing, road decommissioning, in stream LWD placement, stream crossing repair, and riparian planting projects. Mitigation actions on federal lands would affect 1,100 acres within the cumulative effects analysis area, or 0.3 percent of the total watershed area (Table 12). Potential negative impacts include noise disturbance and the potential for increased sediment during implementation. However, these projects would overall benefit the American white pelican, if present, through habitat improvements and a reduction in disturbance over the long term. Fish passage and riparian planting projects would reconnect aquatic habitats and restore riparian vegetation, which would reduce sediment and restore shade over time. Road storm proofing and decommissioning, and stream crossing repair projects would reduce future sediment inputs; road decommissioning would additionally reduce future noise disturbance by limiting human access. Placement of LWD in streams would add structural complexity to aquatic systems, trap fine sediments, and contribute to reductions in stream temperatures over time which would improve habitat quality for the American white pelican. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within watersheds where the proposed action crosses the cumulative effects analysis areainclude a variety of timber, fuel, grazing and biological projects (Table 11). They would affect 2,875 acres, or 0.9 percent of the watersheds. These projects would not likely have additional harmful or beneficial impacts to American white pelican. Additionally, federal laws protect streams, rivers, and wetlands, and land use designations such as Riparian Reserves, and associated management practices on Forest Service land would likely increase the amount and integrity of these habitats used by American white pelicans over time.

The proposed Project, including mitigation actions, would affect approximately 2,062 acres. Combined with 2,875 acres overlapping reasonably foreseeable activities, approximately 4,631

acres within the cumulative effects analysis area would be affected, or 1.4 percent of the total watershed area (Table 12). The proposed action as well as the actions described above would not result in fluctuating water levels or disturbance at nest sites, which have been identified as threats to the American white pelican. Therefore, cumulative impacts on the American white pelican are expected to be insignificant because the combined impacts to the 1.4 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize any potential Project-related impacts are described in the Hydrostatic Test Plan (Appendix U of the BA) and the Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA). For a full description of CMP activities that would benefit the the species see Appendix O of the BA. Proposed mitigation actions on federal lands that would benefit the American white pelican are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for American white pelican because breeding areas would be avoided by at least 8 miles, and other areas that could experience disturbance from Project construction represent 0.2 percent of habitat available in the analysis area. Additionally, the Project should not contribute to known threats to American white pelican, such as fluctuating water levels.

6.2.2.4 Harlequin duck (Histrionicus histrionicus)

Species Status in the Project Area

In the west, harlequin duck breeding occurs in Alaska, Yukon, western Northwest Territories, British Columbia, western Washington, Idaho, western Montana, and northwestern Wyoming. Wintering areas are from the Aleutians along the coast down to northern California (Robertson and Goudie 1999). In Oregon, they are found in the Willamette River basin and along the coast during winter. As shown in Table 1, the species has been documented in the Umpqua and Rogue River national forests; it has not been documented and is not suspected to occur in the Winema National Forest. Neither the Forest Service nor ORBIC location database records contained observations of the Harlequin duck within 5 miles of the Project on Forest Service lands (Forest Service 2006, ORBIC 2012).

Habitat for the harlequin duck is unique among ducks. They can be found along turbulent, fast-flowing rivers and streams during the breeding season, and shallow intertidal zones of rocky coastlines during winter (Table 19; Robertson and Goudie 1999, Johnson and O'Neil 2001). In the west Cascades, they are most often associated with fast-moving, unbraided, low to moderate (1–7 percent) gradient, third- to fifth-order streams in western hemlock forests

(Dowlan 2003). Rocky streams are preferred, as in-stream rocks can be used as resting sites. Eggs are laid in scrapes on the ground under stumps, logs, or cliff ledges, lined with needles, mosses, and down. Nests are built from mid-April to early June, and eggs hatch from late May to late June (Dowlan 2003). Winter habitat is along rocky headlands, offshore rocks, jetties, and occasionally sandy beaches on the coast. Their diet is varied, and consists of amphipods, snails, small crabs, barnacles, and fish eggs (Robertson and Goudie 1999).

Although it has a wide global distribution, this species has experienced declines over most of its range, including substantial declines in the Pacific population. Harlequin ducks may be vulnerable to local extirpations due to high breeding and wintering site fidelity and small local breeding populations (NatureServe 2013). Hunting has historically been a factor decreasing populations, though harvest rates are currently low. Several environmental toxins affect this species, including creosote leaking from piers, diesel soot, oil spills, and bioaccumulating heavy metals (Robertson and Goudie 1999). Timber clearing activities degrade harlequin duck habitat by altering suitable riparian habitat, disrupting stream flow, and increasing silt loads (Robertson and Goudie 1999). Because of their low population numbers, statistically reliable population trends are difficult to calculate, but the population trend in Oregon appears stable to increasing (Wiggins 2005).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable harlequin duck habitats within 3,200 feet of the proposed action in the jurisdictional boundaries discussed above. Table 19 shows the habitat types within the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 19. Harlequin Duck Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside Riparian Wetlands	Closely Associated	Feeds and Breeds	0.09	0	39.56	0.23%
Eastside Riparian Wetlands	Closely Associated	Feeds and Breeds	0	0	0	0.00%
Open Water-Lakes, Rivers, and Streams	Closely Associated	Feeds	0.46	0.09	75.80	0.73%
Bays and Estuaries	Generally Associated	Feeds	0	0	0	0.00%
Total			**0.55**	**0.09**	**115.36**	**0.55%**

1/ Totals taken from Table 5 for the Rogue River and Umpqua and national forests in which the species has been documented to occur.

2/ Totals taken from Table 3 for the Rogue River and Umpqua national forests in which the species has been documented to occur; does not include habitat located in the Winema National Forest or on other federal or non-federal lands.

While harlequin ducks have been documented on the Rogue River and Umpqua forests, no locations have been documented within 5 miles of the Project. Given that harlequin ducks have high fidelity to breeding locations, we can assume that no breeding locations would be impacted by the Project. Of available non-breeding habitat within the analysis area, approximately 0.5 percent would be impacted by the Project.

Harlequin ducks could potentially be disturbed by Project construction if they were in the area of a stream or river crossing. Construction activities are estimated to last about 8 weeks at a given location and could occur at any time of the year. We assume that while birds may be disturbed, as these birds would not be associated with a nearby nest, they would be able to move away from the disturbance.

Project construction could negatively impact potential breeding habitat by altering suitable riparian habitat; however, this impact would be mitigated as described below.

Cumulative Effects

The harlequin duck cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua and Rogue River national forests (Table 12). Harlequin duck habitat in the cumulative effects analysis area has been degraded by development and alteration since European settlement began in the late 1700s. Development has concentrated around lakes, rivers, streams, and coasts and an estimated one-third of historical wetlands in Oregon have been lost, largely due to draining for agricultural use (ODSL and OPRD 1989, Dahl 1990). Harlequin duck habitat is currently threatened by timber clearing activities which modify stream flow and riparian habitat and increase sediment. Within the last few decades, federal laws have been enacted that protect waters and wetlands. The NWFP identifies restoration and maintenance of Riparian Reserves as a goal on Forest Service land. Riparian Reserves include the hydrologic, geologic or ecological features within a watershed that affect stream processes. These protections and management practices would likely enhance the quantity and quality of nesting habitat available to harlequin ducks in the cumulative effects analysis area in the future.

Construction of the pipeline and associated facilities would affect 1,950 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). However, no areas of known harlequin duck use occur within these 5th field watersheds.

Mitigation actions proposed for federal lands that affect resources used by the harlequin duck include fish passage, road storm proofing, road decommissioning, in stream LWD placement, stream crossing repair, and riparian planting projects. Mitigation actions on federal lands would affect 7,337 acres within the cumulative effects analysis area, or 1.5 percent of the total watershed area (Table 12). Potential negative impacts include noise disturbance and the potential for increased sediment during implementation. However, these projects would overall benefit the harlequin duck, if present, through habitat improvements and a reduction in disturbance over the long term. Fish passage and riparian planting projects would reconnect aquatic habitats and restore riparian vegetation, which would reduce sediment and restore shade and riparian structure over time. Road storm proofing and decommissioning, and stream

crossing repair projects would reduce future sediment inputs; road decommissioning would additionally reduce future noise disturbance by limiting human access. Placement of LWD in streams would add structural complexity to aquatic systems, trap fine sediments, and contribute to reductions in stream temperatures over time which would improve habitat quality for the harlequin duck. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). They would affect 12,779 acres, or 2.6 percent of the watersheds. The aquatic restoration projects include in-stream restoration activities that benefit water quality, bank stability and road decommissioning actions that would benefit harlequin duck nesting habitat within the watershed.

The proposed Project, including mitigation actions, would affect approximately 9,287 acres. Combined with 12,779 acres overlapping reasonably foreseeable activities, approximately 21,623 acres within the cumulative effects analysis area would be affected, or 4.4 percent of the total watershed area (Table 12). The proposed action would contribute to effects from timber clearing activities that degrade harlequin duck habitat by altering suitable riparian habitat, disrupting stream flow, and increasing silt loads (Robertson and Goudie 1999); however, the mitigation actions proposed would offset these impacts as described above. The Project is not expected to contribute environmental toxins, which is also noted as a threat to this species (Robertson and Goudie 1999). Additionally, neither the Project nor reasonably forseeable Projects are expected to impact breeding harlequin ducks. Therefore, cumulative impacts on the harlequin duck are expected to be insignificant because the combined impacts to the 4.4 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), the Erosion Control and Revegetation Plan (Appendix F of the BA), and the Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings which would contribute to the stability of the streambank and reduce erosion (Appendix N of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the the NWFP Aquatic Conservation Strategy. Several projects within the Rogue River and Umpqua national forests would benefit the species and include the repair of over 30 stream crossings, riparian plantings and in-stream placement of woody debris that would provide nesting cover and improve stream integrity. For a full description of CMP activities that would benefit the the species see Appendix O of the BA. Proposed mitigation actions on federal lands that would benefit the harlequin duck are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for Harlequin duck because no known breeding areas would be impacted, and other areas that could experience disturbance from Project construction represent 0.5 percent of habitat available in the analysis area.

6.2.2.5 Bufflehead (Bucephala albeola)

Species Status in the Project Area

The breeding range for buffleheads is interior Alaska, southern Northwest Territories, northeast and southern British Columbia, northern Alberta and Saskatchewan, and at scattered, isolated locations in Washington, Oregon, California, Idaho, Montana, and Wyoming. The highest breeding densities recorded are in central British Columbia (Gauthier 1993). During the nonbreeding season, buffleheads range from southern Alaska, down the Pacific coast, and throughout most of the continental U.S. In Oregon, they are found at scattered locations throughout the state, and they could potentially be found along most of the proposed pipeline route (Scheuering 2003). Breeding is recorded in the central and south Cascades, including in Klamath County (Scheuering 2003). As shown in Table 1, the species has been documented in Umpqua and Rogue River national forests; it has not been documented and is not suspected to occur in the Winema National Forest. The bufflehead has been observed multiple times within within 1-5 miles of the Project centerline in the Rogue River National Forest near Fish Lake; it has not been documented within 5 miles of the Project in the Umpqua or Winema national forests (Forest Service 2006, ORBIC 2012, Colyer 2014).

The species breeds at high-elevation forested lakes, with nests built in cavities or artificial nests boxes in trees next to water (Table 20; Johnson and O'Neil 2001, Scheuering 2003). During migration and winter, buffleheads use small freshwater lakes and ponds with little or no vegetation, sewage treatment ponds, and slow-moving rivers. Food habits consist of diving for aquatic invertebrates such as insects, crustaceans, and mollusks, and seeds (Gauthier 1993).

Numbers of buffleheads had decreased by 1930 due to overshooting. Once the species gained protection under the Migratory Bird Treaty Act, its numbers began to increase. However, human disturbance from recreation and a decrease in suitable nesting cavities due to forestry practices are believed to be contributing to its continued low population numbers in Oregon, which show a decline of 7 percent annually between 2001 and 2011 (Scheuering 2003, Sauer et al. 2012).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable bufflehead habitats within 3,200 feet of the proposed action in the jurisdictional boundaries discussed above. Table 20 shows the habitat types within

the analysis area with which the species is generally or closely associated, and the acreages of those habitats impacted by the Project.

Table 20. Bufflehead Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Herbaceous Wetlands	Closely Associated	Feeds	0.15	0	28.12	0.53%
Open Water-Lakes, Rivers, and Streams	Closely Associated	Feeds	0.37	0	152.19	0.24%
Bays and Estuaries	Closely Associated	Feeds	0	0	0	0%
Total			**0.52**	**0.09**	**180.31**	**0.34%**

1/ Totals taken from Table 5 for the Winema and Umpqua national forests in which the species has been documented to occur.
2/ Totals taken from Table 3 for the Winema and Umpqua national forests in which the species has been documented to occur; does not include habitat located in the Rogue River National Forest or on other federal or non-federal lands.

While bufflehead have been documented on the Rogue River and Umpqua national forests, no locations have been documented within 1 mile of the Project centerline. On the Rogue River National Forest, this species has been documented multiple times near Fish Lake, which occurs about 2 miles from the Project centerline, but is also a proposed hydrostatic test water source. Based on the lack of documented occurrences and lack of ideal high-mountain lake habitat being impacted, we assume that no breeding locations would be impacted by the Project. Of available non-breeding habitat within the analysis area, approximately 0.3 percent would be impacted by the Project.

Bufflehead could potentially be disturbed by Project construction if they were in the area of a stream or river crossing during construction. Construction activities are estimated to last about 8 weeks at a given location and could occur at any time of the year. We assume that while birds may be disturbed, as these birds would not be associated with a nearby nest, they would be able to move away from the disturbance.

Project construction could negatively impact potential breeding habitat by removing snags. In they analysis area, approximately 1.65 percent of snags estimated to be present would be impacted by the Project (Appendix D).

Cumulative Effects

The bufflehead cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua and Rogue River national forests (Table 12). Potential bufflehead habitat in this analysis area has been degraded by development and alteration since European settlement began in the late 1700s. Human development has a pattern to concentrate around lakes, rivers, streams, and coasts. An estimated one-third of historical wetlands in Oregon have been lost, largely due to draining for agricultural use (ODSL and OPRD 1989, Dahl 1990).

Streams and rivers have been degraded by timber clearing practices, hydrologic processes such as tides and floods have been altered, and the complexity of aquatic habitats in Oregon has generally been reduced (OPB 2000). However, within the last few decades, federal laws have been enacted that protect waters and wetlands. The NWFP identifies restoration and maintenance of Riparian Reserves as a goal on Forest Service land. Riparian Reserves include the hydrologic, geologic or ecological features within a watershed that affect stream processes. These protections and management practices should enhance the quantity and quality of habitat available to buffleheads in the analysis area in the future.

Construction of the pipeline and associated facilities would affect 1,950 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). No known breeding areas have been identified within these 5th field watersheds. Project effects would primarily be from disturbance during construction, removal of non-breeding habitat, and removal of potential breeding habitat through snag removal. However, disturbance during construction would be short-term, lasting approximately 8 weeks at any given location. Removal of non-breeding habitat would be minimal, as only approximately 0.4 percent of the cumulative effects analysis area would be affected. Additionally, snags removed during construction would be replaced through approximately 331 acres of snag creation on the Umpqua National Forest.

Other mitigation actions proposed for federal lands that would benefit buffleheads include aquatic restoration and riparian planting projects, as well as road decommissioning projects. The restoration projects would improve potential nesting habitat, and the road decommissioning projects would result in decreased disturbance long-term. Mitigation actions on federal lands would affect 7,337 acres within the cumulative effects analysis area, or 1.5 percent of the total watershed area (Table 12). These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects on the Umpqua and Rogue River national forests include projects within the Elk Creek, Upper Cow Creek, Trail Creek, and Little Butte Creek watersheds (Table 11). The aquatic restoration projects include in-stream restoration activities that benefit water quality, bank stability and road decommissioning actions that would benefit bufflehead nesting habitat within the watershed. Livestock grazing within the Fish Lake Allotment are unlikely to degrade bufflehead habitat.

The proposed Project, including mitigation actions, would affect approximately 9,287 acres. Combined with 12,779 acres overlapping reasonably foreseeable activities, approximately 21,623 acres within the cumulative effects analysis area would be affected, or 4.4 percent of the total watershed area (Table 12). The proposed action could contribute to a decrease in suitable nesting cavities similar to the foresty practices that currently threaten this species. However, no known nest sites would be impacted by the Project, and snag creation would increase suitable nest sites. The Project could also increase human disturbance similar to the effects of recreation that are believed to be contributing to its continued low population numbers in Oregon. However, disturbance from construction would be short-term, and would be mitigated through road decommissioning. Additionally, neither the Project nor reasonably forseeable Projects are expected to impact breeding buffleheads. Therefore, cumulative impacts on the bufflehead are

expected to be insignificant because the combined impacts to the 4.4 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), the Erosion Control and Revegetation Plan (Appendix F of the BA), and the Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings which would contribute to the stability of the streambank and reduce erosion (Appendix N of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the the NWFP Aquatic Conservation Strategy. Several projects within the Rogue River and Umpqua national forests would benefit the species and include the repair of stream crossings, riparian plantings and in-stream placement of woody debris that would provide nesting cover and improve stream integrity. For a full description of CMP activities that would benefit the the species see Appendix O of the BA. Proposed mitigation actions on federal lands that would benefit the bufflehead are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for bufflehead because no breeding locations would be impacted by the Project, and of available non-breeding habitat within the analysis area, approximately 0.3 percent would be impacted by the Project.

6.2.2.6 Upland sandpiper (Bartramia longicauda)

Species Status in the Project Area

The upland sandpiper breeds within a contiguous area in the Great Plains and Great Lakes regions of the U.S. and Canada, as well as some locations in Alaska, the Yukon Territory, and a small relict population in Oregon and Idaho. Upland sandpipers winter in South America (Houston and Bowen 2001). This species has been documented in Klamath County, and is a rare breeder in large montane meadows within forests of eastern Oregon. Upland sandpipers are almost never observed away from the breeding grounds in Oregon (Marshall et al. 2006). As shown in Table 1, the species has been documented in the Winema National Forest; it has not been documented and is not suspected to occur in the Rogue River nor the Umpqua National Forest. Neither the Forest Service nor ORBIC location database records contained observations of the upland sandpiper within 5 miles of the Project on NFS lands (Forest Service 2006, ORBIC 2012).

The upland sandpiper is an obligate grassland species often found in native prairie (Vickery et al. 1999). In Oregon, this sandpiper is found in large montane meadows at 3,400-5,060 feet elevation, generally surrounded by lodgepole and sometimes ponderosa pine forest. Upland sandpipers mostly eat small invertebrates, especially insects, but a small percentage of their diet consists of weed seeds (Houston and Bowen 2001, Stern 2003). Foraging habitat consists of vegetation shorter than 2.5 inches (Stern 2003). Nesting takes place in 6 to 12-inch tall vegetation that provides concealment cover (Kirsch and Higgins 1976). In Oregon, birds appear on breeding grounds during the first week of May, egg-laying occurs from mid-May until mid-June, and fledging takes place from mid-July until mid-August.

Initial declines in upland sandpiper populations were caused by hunting in the late 1800s. The species' continued decline has been linked to conversion of prairie habitat to agriculture and rangeland, encroachment of pine onto meadows, and the use of herbicides that reduce forb cover in nesting habitats (Stern 2003). Because of their low population numbers, statistically reliable population trends are difficult to calculate, but the population trend in the western breeding bird survey region appears stable (Sauer et al. 2012).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes suitable habitat within 3,200 feet of the proposed action within the Winema National Forest. Table 21 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 21. Upland Sandpiper Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Eastside Grasslands	Closely Associated	Feeds and Breeds	0.91	0	1.96 [3]	46.43% [3/]
Herbaceous Wetlands	Generally Associated	Feeds and Breeds	0.15	0	27.23	0.55%
Total			**1.06**	**0**	**29.19**	**3.63%**

1/ Totals taken from Table 5 for the Winema National Forest in which the species has been documented to occur.

2/ Totals taken from Table 3 for the Winema national forests in which the species has been documented to occur; does not include habitat located in the Rogue River and Umpqua national forests or on other federal or non-federal lands.

3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

While this table represents impacts to general habitats that the upland sandpiper may use that would be impacted by the Project, areas of known use by upland sandpiper would not be impacted by the Project. Specifically, the closest known breeding location, Sycan Marsh, is approximately 50 miles from the Project. Additionally, ODFW maps the closest potential habitat for the upland sandpiper approximately 40 miles northeast of the Project, in the vicinity of Sycan Marsh (INR 2011).

If upland sandpipers were to occur near the Project, we assume that they would be nonbreeders and they could be disturbed by pipeline construction that could render habitats temporarily unsuitable. However, because upland sandpipers are a mobile species, they should be able to move away from Project construction activities.

Cumulative Effects

Native grasslands are one of the most imperiled habitats in the western U.S., including Oregon, due to conversion to agriculture, development, invasion by non-native plant species, and fire suppression (Vickery et al. 1999). In the Coast Range and West Cascades of Oregon, grassland loss since historical times is estimated at 99 percent (ODFW 2006). Sustainable grazing practices help maintain existing grasslands. Allotment management plans within national forests control the number of cattle and available forage, thus minimizing the degradation of suitable upland sandpiper habitat.

The upland sandpiper cumulative effects analysis area includes the only fifth field watershed crossed by the Project on the Winema National Forests: Spencer Creek (Table 12). Overall, construction of the project and associated facilities would affect 231 acres within the Spencer Creek watershed, or 0.4 percent of the watershed. Other than these minor potential habitat effects, potential impacts to upland sandpipers are expected to be limited to disturbance of nonbreeding individuals as no known breeding sites have been documented within 5 miles of the Project. No mitigation projects that would benefit upland sandpiper habitat on the Winema National Forest directly, although restoration of grassland areas following contruction could benefit the upland sandpiper through habitat creation and/or restoration if the species is present.

Livestock grazing on the Winema National Forest (Table 11) could further degrade potential upland sandpiper habitat; however, given the very limited range of the upland sandpiper in Oregon at this time, this would likely be a minimal impact. Additionally, sustainable grazing practices can actually help maintain grasslands by limiting forest succession of meadow habitats. The Project would not contribute to the conversion of prairie habitat to agriculture and rangeland, encroachment of pine onto meadows, or the use of herbicides that reduce forb cover in nesting habitats which currently threaten this species (Stern 2003). Therefore, cumulative impacts on the upland sandpiper are expected to be insignificant.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize any potential Project-related impacts include the use of native grass mixes during site restoration and habitat enhancements. These measures and other conservation measures are described in the Upland Erosion Control,

Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), the Erosion Control and Revegetation Plan (Appendix F of the BA), and the Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). The Blasting and Helicopter Noise Analysis and Mitigation Plan identifies measures to minimize noise disturbance if the species was present (Appendix P of the BA).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for upland sandpiper because of the low likelihood of encountering this species as the nearest breeding location is approximately 50 miles from the Project and this species is rarely documented outside of those areas in Oregon (Marshall et al. 2006).

6.2.2.7 Bald eagle (Haliaeetus leucocephalus)

Species Status in the Project Area

Bald eagles occur throughout the state and nest in 32 of 36 Oregon counties including the countries crossed by the Project. As shown in Table 1, the species has been documented in all three national forests crossed by the Project. The bald eagle has been observed twice within 1-5 miles of the Project in the Rogue River National Forest and four times within 1-5 miles of the Project on the Wimena National Forest (Forest Service 2006, ORBIC 2012). No observations of the bald eagle have been documented within 5 miles of the Project in the Umpqua National Forest. On NFS lands, two bald eagle nests have been documented in the vicinity of the Project, both on the Winema National Forest near Fish lake; both are more than one mile away from the Project centerline.

Bald eagles primarily nest in forested areas near the ocean, along rivers, and at estuaries, lakes, and reservoirs (Table 22; Johnson and O'Neil 2001). Consequently, shoreline is an important component of nesting habitat; 84 percent of Oregon nests were within 1 mile of water (Isaacs and Anthony 2001). Nest building and repair occur any time of year, but are most often observed from February-June (Isaacs and Anthony 2001). The usual clutch size is two. Eggs are incubated by both parents for 35-46 days. Young are usually flying at about 3 months of age (Csuti et al. 2001). Eagles consume a variety of prey that varies by location and season. Fish, carrion, birds, and mammals are among the most common prey.

Although delisted, the bald eagle remains protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) that prohibits "take" of bald and golden eagles, which includes disturbance. Oregon has over 550 breeding pairs which ranks seventh highest in the continental U.S. (Isaacs and Anthony 2011). In Oregon, populations have increased 6.6 percent annually between 2002 and 2011 (Sauer et al. 2012). Of the current threats to the bald eagle, removal of trees used for nesting or roosting or disturbance related-impacts during construction are relevant to the Project. Contaminants have been implicated in reduced productivity of nesting pairs on the Columbia River downstream of Portland (Anthony et al. 1993, Buck 1999).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable bald eagle habitats within 3,200 feet of the proposed action in the jurisdictional boundaries discussed above. Table 22 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 22. Bald Eagle Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside-Lowlands Conifer-Hardwood Forest	Generally Associated	Reproduces	0	0	0	0%
Montane Mixed Conifer Forest	Generally Associated	Reproduces	81.04	26.33	833.40	12.88%
Southwest Oregon Mixed Conifer-Hardwood Forest	Generally Associated	Reproduces	335.02	96.54	11,980.17	3.60%
Ponderosa Pine Forest and Woodlands	Generally Associated	Reproduces	0.01	0	957.70	0.00%
Westside Oak and Dry Douglas-fir Forest and Woodlands	Generally Associated	Reproduces	0	0	0	0%
Open Water-Lakes, Rivers, and Streams	Closely Associated	Feeds	0.51	0.09	206.93	0.29%
Herbaceous Wetlands	Generally Associated	Feeds	0.15	0	28.18	0.53%
Westside Riparian Wetlands	Generally Associated	Feeds and Breeds	0.09	0	39.56	0.23%
Eastside Riparian-Wetlands	Generally Associated	Feeds and Breeds	0.26	0	223.81	0.12%
Agriculture, Pastures and Mixed Environs	Generally Associated	Feeds	0	0	0	0%
Developed-Urban and Mixed Environs	Generally Associated	Feeds and Breeds	20.82	0	20.85	99.86%
Bays and Estuaries	Generally Associated	Feeds and Breeds	0	0	0	0%
Total			**437.90**	**122.96**	**14,290.60**	**3.92%**

1/ Totals taken from Table 5 for all three national forests in which the species has been documented to occur.

2/ Totals taken from Table 3 for all three national forests in which the species has been documented to occur; does not include habitat located on other federal or non-federal lands.

Cumulative Effects

The bald eagle cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Rogue River, Umpqua, and Winema national forests (Table 12). Threats to bald eagles include habitat loss and human disturbance. The proposed Project could contribute

to these threats, although disturbance to breeding individuals and removal of known nest sites are not anticipated. Two nests have been documented at Fish Lake, which is a proposed hydrostatic test water source. However, hydrostatic testing is projected to occur in the late summer to early fall immediately following pipeline construction. In Oregon, eagles typlically begin nest building in January, and young typically fledge from June through August (FWS 2007). Therefore, activity during water withdrawl at Fish Lake is not expected to disturb breeding bald eagles.

Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Approximately 467 acres disturbed during pipeline construction would be revegetated following construction, and be allowed to return to its pre-construction condition outside of the 30-foot maintenance corridor (excluding Matrix lands). Removal of potential nest sites could occur, although no known sites have been documented within the Project ROW. Additionally, any potential nest sites removed during construction would be replaced through 1,029 acres of snag creation.

Mitigation actions proposed for federal lands that affect resources used by the bald ealge include road closure, fuels reduction, fire suppression, reallocation of matrix to LSR, riparian vegetation planting, and snag creation projects. Mitigation actions on federal lands would affect 7,734 acres within the cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12). Potential negative impacts include disturbance during implementation of these projects, such as during fuels reduction projects. However, these projects would overall benefit bald eagles through habitat improvements and a reduction in disturbance over the long term. Road closures would reduce disturbance to individuals if present; fuels reduction and fire suppression projects would result in a reduction of potential habitat loss through fire; and planting of riparian vegetation would improve habitat quality for bald eagles at these sites. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). Projects could potentially remove potential nesting habitat, although this would be unlikely as any silvicultural treatments conducted by the Forest Service would likely leave any large trees that eagles would potentially use. Projects on NFS lands would comply with the Bald and Golden Eagle Protection Act which would include avoiding disturbance of breeding birds.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres overlapping reasonably foreseeable activities, approximately 22,321 acres within the cumulative effects analysis area would be affected, or 4.1 percent of the total watershed area (Table 12). The proposed action as well as the actions described above could contribute to habitat loss and human disturbance which have been identified as threats to bald eagles. However, these effects would be avoided, minimized and otherwise mitigated as described above. Additionally, only approximately 4.1 percent of the cumulative effects analysis

area would be affected the the proposed Project and other planned projects. Therefore, cumulative impacts on the bald eagle are expected to be insignificant.

Conservation Measures and Mitigation

Pacific Connector would avoid known nests, thereby eliminating potential impact. Specific conservation measures that would help minimize Project-related impacts are identified in the Blasting and Helicopter Noise Analysis and Mitigation Plan identifies measures to minimize noise disturbance (Appendix P of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the the NWFP Aquatic Conservation Strategy. Several projects within the Rogue River, Winema and Umpqua national forests would benefit the species and include the repair of over 30 stream crossings. For a full description of CMP activities that would benefit the the species see Appendix O of the BA. Proposed mitigation actions on federal lands that would benefit bald eagles are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for bald eagle because of its increasing population and because of the low likelihood of encountering this species as known nests will be avoided and about 4 percent of potential habitat in the analysis area would be impacted by the Project.

6.2.2.8 American peregrine falcon (Falco peregrinus anatum)

Species Status in the Project Area

Peregrine falcons breed on every continent except Antarctica (Henny and Pagel 2003). Distribution is increasing rapidly, and in North America the American peregrine falcon is found locally across most of the continent (White et al. 2002). In Oregon, species presence has been confirmed in the southern Cascade Mountains, the Coast Range in southwest Oregon, and in the Wallowa Mountains in the northeast corner of the state (Henny and Pagel 2003). As shown in Table 1, the species has been documented in all three national forests crossed by the Project. The peregrine falcon has been observed once within 1 mile of the Project in the Umpqua National Forest; there have been no documented observations of the peregrine falcon within 5 miles of the Project in the Winema or Rogue River national forests (Forest Service 2006, ORBIC 2012). A peregrine falcon eyrie on the Umpqua National Forest within the vicinity of the proposed action has been active for several years. The eyrie is approximately 0.2 mile southwest of PCGP MP 112.32 (T32S, R2W, Section 35).

Global use of pesticides, especially DDT, from the late 1940s to early 1970s, reduced eggshell thickness among peregrine falcons, causing massive population declines. With the ban of DDT in 1972 in the United States and federal protection of remnant populations under the ESA, the

peregrine falcon population began increasing in the late 1970s. The American peregrine falcon was de-listed in 1999 (64 FR 46541).

Habitat preferences for this species are very diverse. They use or pass through all terrestrial ecosystems and nearby waters, making generalizations about habitat use difficult. The species is generally associated with woodlands, grassland and aquatic systems (Table 23; Johnson and O'Neil 2001, Henny and Pagel 2003). In some circumstances, individuals have adapted well to urban environments, using buildings and bridges as nest structures and preying on feral pigeons. A common feature of nesting habitat is cliffs, although peregrines also use nests constructed by other raptor species (Henny and Pagel 2003). Prey species are also extremely diverse, and include birds, mammals, reptiles, insects, and fish, and ranging in size from mayflies to mountain beavers (Henny and Pagel 2003).

In 1998, there were at least 3,400 breeding American peregrine falcon individuals rangewide, and their short-term trend indicates that the global population as stable to increasing (NatureServe 2013). Primary threats to American peregrine falcons are habitat loss, human disturbance, illegal take, and environmental contaminants (NatureServe 2013). Although DDT, the pesticide responsible for the initial decline in American peregrine falcon populations in the 1940s, has been outlawed in the U.S. since 1972, eggshell thickness of this species is still affected by environmental contaminants (Steidl et al. 1991, Court 1993), which is possibly due to the pesticide's continued use in Latin America where the birds winter (NatureServe 2013).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable American peregrine falcon habitats within 3,200 feet of the proposed action in the jurisdictional boundaries discussed above. Table 23 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 23. American Peregrine Falcon Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside Lowlands Conifer-Hardwood Forest	Generally Associated	Feeds and Breeds	0	0	0	0
Montane Mixed Conifer Forest	Generally Associated	Feeds and Breeds	81.04	26.33	833.40	12.88%
Southwest Oregon Mixed Conifer-Hardwood Forest	Generally Associated	Feeds and Breeds	335.02	96.54	11,980.17	3.60%
Ponderosa Pine Forest and Woodlands	Generally Associated	Feeds and Breeds	0.01	0	957.70	0.00%
Westside Oak and Dry Douglas-fir Forest and Woodlands	Generally Associated	Feeds and Breeds	0	0	0	0

Table 23. American Peregrine Falcon Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Western Juniper and Mountain Mahogany Woodlands	Generally Associated	Feeds and Breeds	0	0	0	0
Shrub-Steppe	Generally Associated	Feeds and Breeds	6.49	0.51	9.26	75.59%
Westside Grasslands	Generally Associated	Feeds	3.37	0.46	10.67 [3]	35.90% [3/]
Eastside Grasslands	Generally Associated	Feeds and Breeds	1.3	0	2.57 [3]	50.58% [3/]
Herbaceous Wetlands	Generally Associated	Feeds	0.15	0	28.18	0.53%
Westside Riparian Wetlands	Generally Associated	Feeds	0.09	0	39.56	0.23%
Eastside Riparian Wetlands	Generally Associated	Feeds and Breeds	0.26	0	223.81	0.12%
Developed-Urban and Mixed Environs	Generally Associated	Feeds and Breeds	20.82	0	20.85	99.86%
Coastal Dunes and Beaches	Generally Associated	Feeds	0	0	0	0
Open Water-Lakes, Rivers, and Streams	Generally Associated	Feeds	0.51	0.09	206.93	0.29%
Bays and Estuaries	Generally Associated	Feeds	0	0	0	0
Total			**449.06**	**123.93**	**14,313.10**	**4.01%**

1/ Totals taken from Table 5 for all three national forests in which the species has been documented to occur.

2/ Totals taken from Table 3 for all three national forests in which the species has been documented to occur; does not include habitat located on other federal or non-federal lands.

3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

While this table represents impacts to general habitats that peregrine falcons may use that would be impacted by the Project, areas of known use would not be impacted by the Project. The only known active nest site in the vicinity of the Project is 0.2 miles southwest of the Project on the Umpqua National Forest. The Umpqua Forest Plan includes spatial and temporal restrictions to protect peregrine falcon eyries, and prohibits disturbances within 1.5 miles of active nest sites from January 1 through July 31. Consequently, Pacific Connector has indicated they would not perform timber clearing or construction activities between MP 111.10 and MP 113.43 between January 1 and July 31 to avoid impacts to nesting peregrine falcon.

If nonbreeding peregrine falcons were to occur near the Project, they could be disturbed by pipeline construction that could render habitats temporarily unsuitable. However, they should be able to move away from Project construction activities into nearby suitable habitat and not be directly affected.

Cumulative Effects

The American peregrine falcon cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Rogue River, Umpqua, and Winema national forests (Table 12). Two threats to peregrine falcons are habitat loss and human disturbance. The proposed Project could contribute to these threats, although disturbance to breeding individuals and removal of known nest sites are not anticipated as the known eyrie would be avoided as described above. Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Approximately 467 acres disturbed during pipeline construction would be revegetated following construction, and be allowed to return to its pre-construction condition outside of the 30-foot maintenance corridor (excluding Matrix lands).

Planned projects within watersheds where the proposed action crosses NFS lands include a variety of timber, fuel, grazing and biological projects (Table 11). Forest Service projects are not expected to have additional impact to peregrine falcons because eyries would be avoided. Similarly, mitigation actions proposed for federal lands within the cumulative effects analysis area are not expected to affect peregrine falcons.

No potential cliff nesting habitat would be directly impacted. Additionally, the Project combined with planned projects in the cumulative effects analysis area would not contribute to illegal take or environmental contaminants which are threats to this species. Under the NWFP, LSR's and Riparian Reserves in the area are likely to improve habitat for this species over time. Therefore, cumulative impacts on the American peregrine falcon are expected to be insignificant.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize impacts to the peregrine falcon include seasonal restrictions to construction activities for helicopter use and blasting activities (see Appendix N and P of the BA). Pacific Connector has indicated they would avoid disturbances within 1.5 miles of active peregrine falcon nest sites from January 1 through July 31. As a result, they would not perform timber clearing or construction activities between MP 111.10 and MP 113.43 between January 1 and July 31 to avoid impacts to nesting peregrine falcons documented on the Umpqua National Forest.

Determination of Impact

In considering potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for American peregrine falcon because known eyries would be avoided, and only about 4 percent of potential habitat in the analysis area would be impacted by the Project.

6.2.2.9 White-headed woodpecker (Picoides albolarvatus)

Species Status in the Project Area

White-headed woodpeckers are found year-round in scattered areas of suitable mountainous coniferous forest from south-central British Columbia through the Cascades of Washington and Oregon, the Ochoco, Blue, and Wallowa Mountains of northeastern Oregon, the Sierra Nevada and Lake Tahoe area, and scattered small locations in southern California, corresponding with the highest mountain ranges in the area. In Oregon, they are most commonly found east of the Cascades. As shown in Table 1, the species has been documented in all three national forests crossed by the Project. The white-headed woodpecker has been observed once within 1-5 miles of the Project in the Wimena National Forest; there are no documented observations of the species within 5 miles of the Project in the Rogue River or the Umpqua national forests (Forest Service 2006, ORBIC 2012).

Open ponderosa pine or mixed-conifer forests dominated by ponderosa pine are the main habitats used by white-headed woodpeckers (Bull et al. 1986, Johnson and O'Neil 2001). They forage among the cones and bark of live ponderosa pines, looking for insects and seeds, with trees greater than 10 inches dbh preferred (Bull et al. 1986, Marshall 2003). Main foods taken are invertebrates, especially ants and beetles, and conifer seeds; the relative importance of these two diet components varies seasonally (Garrett et al. 1996). Nesting is in cavities excavated in snags, down trees, or logs at an average height of 8 feet (Garrett et al. 1996). Cavities excavated by other species are sometimes used (Marshall 2003). Nest excavation takes place in May, with eggs laid late May into the first half of June. Incubation is 14 days.

The major threat to this species is loss of habitat. Less than 10 percent of old-growth ponderosa pine in Oregon and Washington remains from the time of pre-European settlement, and much of what is left is too fragmented to be suitable for white-headed woodpeckers (Marshall 2003). Fire suppression has precluded natural forest thinning, including grass reduction by grazing which inhibits a fire's ability to spread; this leads eventually to the replacement of pines with firs. The resultant increase in shrubby understory resulting from fire suppression may also increase mammalian nest predation on white-headed woodpeckers (Marshall 2003). Timber harvest on federal lands, which targets large-diameter trees, also has contributed to the degradation of white-headed woodpecker habitat.

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable white-headed woodpecker habitats within 3,200 feet of the proposed action in the jurisdictional boundaries discussed above. Table 24 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 24. White-headed Woodpecker Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Ponderosa Pine Forests and Woodlands	Closely Associated	Feeds and Breeds	0.01	0	958.33	0.00%
Westside Riparian Wetlands	Generally Associated	Feeds and Breeds	0.09	0	39.56	0.23%
Eastside Riparian Wetlands	Generally Associated	Feeds and Breeds	0.26	0	223.81	0.12%
Total			**0.36**	**0**	**1,221.70**	**0.03%**

1/ Totals taken from Table 5 for all three national forests in which the species has been documented to occur.

2/ Totals taken from Table 3 for all three national forests in which the species has been documented to occur; does not include habitat located on other federal or non-federal lands.

Of the ponderosa pine habitat that would be impacted within the analysis area, the 0.01 acres are identified as clearcut/regenerating (Table 5) and would thus not meet the criteria for suitable habitat for white-headed woodpecker. While some riparian habitat within the anlaysis area would be impacted by the Project, this acreage represents a small percentage (0.13 percent) of available habitat. The minimal amount of habitat impacted coupled with the single documented occurrence within 5 miles of the Project make impacts to this species from Project construction unlikely.

If an individual were passing through the area, it could be disturbed by Project construction. However, individuals would be able to move away from disturbance into nearby suitable habitat. Project construction would last about 8 weeks at any given location and could occur at any time of the year.

Cumulative Effects

The white-headed woodpecker cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Rogue River, Umpqua, and Winema national forests (Table 12). While ponderosa pines are still common, the key characteristics of historical open ponderosa pine woodlands have changed dramatically, mostly due to timber clearing and fire suppression (ODFW 2006). Only an estimated seven percent of historically-structured ponderosa pine forests remain in the Klamath Mountains province, most of which are greatly reduced in patch size and connectivity (ODFW 2006). The primary threat to this species is habitat loss. Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12); however, only 0.01 acres are ponderosa pine-dominated, so Project effects are expected to be minimal.

Mitigation actions proposed for federal lands that could affect resources used by the white-headed woodpecker include fuels reduction, fire suppression, reallocation of matrix to LSR, riparian vegetation planting, snag creation, and LWD upland placement projects. Potential negative impacts of these mitigation actions include sucession to fir-dominated forests from fire suppression, and loss of forage habitat if live ponderosa pines are converted to snags. However, fire suppression would reduce habitat loss from stand-replacing fires, and snag creation as well as upland LWD placement could result in an increase in available nesting cavities. Fuels reduction projects would clear understory vegetation historically cleared by low-intensity understory fires, and potentially reduce mammalian nest predation. Mitigation actions on federal lands would affect 7,734 acres within the cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12). These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within watersheds where the proposed action crosses NFS lands include a variety of timber, fuel, grazing and biological projects (Table 11). Timber sales and clearcutting on NFS lands could affect this species by removing habitat and disturbing birds year-round, although disturbance is not listed as a threat to this species (Marshall 2003). Anticipated timber clearing on private lands could also result in habitat loss. The pre-commercial thinning in the national forests would most likely contribute to the long term health of the forest ecosystems, and could benefit the white-headed woodpecker if the projects were located in ponderosa pine forest. Under the NWFP, LSRs and Riparian Reserves in the area are likely to improve habitat for this species over time.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres overlapping reasonably foreseeable activities, approximately 22,321 acres within the cumulative effects analysis area would be affected, or 4.1 percent of the total watershed area (Table 12). The proposed action combined with the actions described above would contribute to habitat loss which is listed as the primary threat to this species (Marshall 2003). However, suitable habitat removed by the Project is expected to be minimal, and the proposed mitigation actions would compensate for this loss. Construction noise disturbance to potential habitat in the analysis area would be of short duration, lasting about 8 weeks in any location. Therefore, cumulative impacts on the white-headed woodpecker expected to be insignificant because the combined impacts to the 4.1 percent of the watershed area, including short-term disturbance effects, are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Noise disturbance from blasting and helicopter activity would be minimized with use of blast mats or other devices. For a full description of CMP activities that would benefit this bird species see Appendix O of the BA.

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a**

trend toward federal listing or loss of viability of the species" for white-headed woodpecker because of the limited amount of suitable habitat the Project would effect (0.03 percent of habitat available within the analyisis area), and the mobility of the species to escape disturbance.

6.2.2.10 Lewis's woodpecker (Melanerpes lewis)

Species Status in the Project Area

The Lewis's woodpecker is found in mountainous areas of the western U.S. During winter, they shift to the southern portion of their range. In Oregon, they are found in most parts of the state, especially the Cascade, Wallowa, and Blue Mountains. Along the potential pipeline route, they have been documented in Coos, Douglas, Jackson, and Klamath Counties. As shown in Table 1, the species has been documented in all three national forests crossed by the Project. Neither the Forest Service nor ORBIC location database records contained observations of the Lewis's woodpecker within 5 miles of the Project on Forest Service lands (Forest Service 2006, ORBIC 2012). However, there is one record of a Lewis's woodpecker documented 1.1 miles from the ROW on private land (ORBIC 2012).

Breeding habitat for Lewis's woodpecker is predominantly open Douglas fir or oak forests, open riparian woodland dominated by cottonwood, and logged or burned pine forest (Table 25; Johnson and O'Neil 2001). Important characteristics are an open canopy, a brushy understory, dead and LWD material, perches, and abundant insects (Tobalske 1997). Nests are in tree cavities, and soft dead or dying trees are required (Vierling 1997). Species used vary and in Oregon include Oregon white oak (*Quercus garryana*), ponderosa pine, cottonwoods, and juniper (Galen 2003, Thomas et al. 1979). Eggs are laid in May and June, and incubation lasts 12 to 16 days (Tobalske 1997). Lewis's woodpeckers are opportunistic feeders, consuming largely insects during the spring and summer, and acorns and ripe fruits during fall and winter (Galen 2003). Typical winter habitat is oak woodlands and commercial orchards, and birds depend on acorn crops during this time of year (Vierling 1997).

In Oregon, the species was once considered abundant but populations have declined 0.5 percent annually between 2001 and 2011 (Sauer et al. 2012). Lewis's woodpeckers are declining throughout their range, probably due to loss of suitable lowland oak habitat and loss of snags for nesting; only 2 to 8 percent of open ponderosa pine stands remain in eastern Oregon compared to presettlement conditions (Tobalske 1997). Another factor contributing to habitat degradation is timber clearing practices and fire suppression which result in denser forest types (Tobalske 1997). Other factors are competition for nest holes with European starlings (*Sterna vulgaris*) and pesticide application.

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable Lewis's woodpecker habitats within 3,200 feet of the proposed action in the jurisdictional boundaries discussed above. Table 25 shows the habitat

types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 25. Lewis' Woodpecker Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Southwest Oregon Mixed Conifer-Hardwood Forests	Generally Associated	Feeds and Breeds	335.02	96.54	11,980.17	3.60%
Ponderosa Pine Forests and Woodlands	Generally Associated	Feeds and Breeds	0.01	0	957.70	0.00%
Westside Oak and Dry Douglas-fir Forest and Woodlands	Closely Associated	Feeds	0	0	0	0%
Westside Grasslands	Generally Associated	Feeds and Breeds	3.37	0.46	10.67 [3]	35.90% [3/]
Eastside Riparian Wetlands	Generally Associated	Feeds and Breeds	0.26	0	223.81	0.12%
Agriculture, Pastures, and Mixed Environs	Generally Associated	Feeds and Breeds	0	0	0	0
Total			**338.75**	**97.00**	**13,211.91**	**3.30%**

1/ Totals taken from Table 5 for all three national forests in which the species has been documented to occur.
2/ Totals taken from Table 3 for all three national forests in which the species has been documented to occur; does not include habitat located on other federal or non-federal lands.
3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

Of potential habitat available within the analysis area, 3.3 percent would be impacted by the Project. 1.65 percent of snags present within the analysis area would be impacted by the Project (Appendix D). Project construction could potentially disturb breeding birds. During construction, adults would be able to temporarily relocate in order to avoid direct impacts, but incubating adults could be induced to abandon an active nest, leaving eggs or chicks vulnerable to predation and the elements. Chicks could also be killed directly if the tree or snag containing their nest is felled while occupied. However, because Lewis's woodpecker is most closely associated with westside oak woodlands, and this habitat does not exist in the area impacted by the Project, direct impacts are expected to be minimal (Table 5). An indirect effect of Project activities could be disturbance to wintering birds, possibly lowering their fitness at a colder time of year. ROW clearing and pipeline construction could also modify habitat, for example by removing snags, altering tree species composition in forests, and changing the seral stage of the habitat.

Project impacts would contribute to existing threats by removing snags (albeit not in the most suitable breeding habitat for Lewis's woodpecker), and using some pesticide application. However, pesticide application will be limited, and would be used in accordance with Pacific

Connector's Integrated Pest Management Plan that was developed in coordination with the Forest Service.

Cumulative Effects

The Lewis' woodpecker cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua, Winema, and Rogue River national forests (Table 12). While ponderosa pines are still common, the key characteristics of historical open ponderosa pine woodlands have changed dramatically, mostly due to timber clearing and fire suppression (ODFW 2006). Only an estimated seven percent of historically-structured ponderosa pine forests remain in the Klamath Mountains province, most of which are greatly reduced in patch size and connectivity (ODFW 2006).

Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Approximately 467 acres disturbed during pipeline construction would be revegetated following construction, and be allowed to return to its pre-construction condition outside of the 30-foot maintenance corridor (excluding Matrix lands), 89 percent of which is currently forested. The Project would contribute to the habitat loss and modification that has caused Lewis' woodpecker numbers to decline, and could also disturb breeding individuals if present. However, as described above, these impacts would be minimal because very little oak and pine habitat would be impacted by the Project.

Mitigation actions proposed for federal lands that could affect resources used by the Lewis' woodpecker include fuels reduction, fire suppression, reallocation of matrix to LSR, riparian vegetation planting, snag creation, and LWD upland placement projects. Potential negative impacts of these mitigation actions include forest sucession from fire suppression that results in a more full overstory less suitable to Lewis' woodpecker, and fuels reduction projects that would clear the thick understory required by Lewis' woodpeckers. However, both fire suppression and fuels reduction projects would also reduce habitat loss from stand-replacing fires. Snag creation as well as upland LWD placement could result in an increase in available nesting cavities. Mitigation actions on federal lands would affect 7,734 acres within the cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12). These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). The pre-commercial thinning projects in the national forests would most likely contribute to the long-term health of the forest ecosystems. However, the anticipated clear cutting on private lands would result in habitat loss from tree removal, especially because the forests that regenerate tend to be denser and thus less suitable for Lewis's woodpeckers. Under the NWFP, LSR's and Riparian Reserves in the area are likely to improve habitat for this species over time.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres overlapping reasonably foreseeable activities, approximately 22,321 acres within the cumulative effects analysis area would be affected, or 4.1 percent of the

total watershed area (Table 12). The proposed action combined with the actions described above would contribute to habitat loss. However, suitable habitat removed by the Project is expected to be minimal, and the proposed mitigation actions would compensate for this loss. Construction noise disturbance to potential habitat in the analysis area would be of short duration, lasting about 8 weeks in any location. Therefore, cumulative impacts on the Lewis's woodpecker expected to be insignificant because the combined impacts to the 4.1 percent of the watershed area, including short-term disturbance effects, are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Amendments to the NWFP discuss specific mitigation measures that would help minimize impacts to Lewis's woodpecker and include planting of trees and creation of snagsNoise disturbance from blasting and helicopter activity would be minimized with use of blast mats or other devices. Timber removal, pipeline construction and blasting or helicopter activity would be avoided within 0.25 miles of an NSO activity center between March 1 and July 15 and would benefit cavity nesting species (approximately 30 percent of the route, Appendix N and P of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the NWFP Aquatic Conservation Strategy. Riparian Reserves provide suitable foraging and nesting habitat. In the Umpqua and Rogue River National Forest, approximately 7,500 snags would be created in LSR and matrix lands by blasting the tops off live trees or inoculating trees with heart rot decay fungi. Increased snags densities would provide cavity nesters with more nesting and foraging opportunities. For a full description of CMP activities that would benefit this bird species see Appendix O of the BA.

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for Lewis's woodpecker because primary breeding habitats, including oak woodlands, would not be impacted by the Project, 3.3 percent of habitat available within the analysis area would be impacted by the Project, and 1.65 percent of snags present within the analysis area would be impacted by the Project.

6.2.2.11 Purple martin (Progne subis)

Species Status in the Project Area

The breeding range of the purple martin extends east of the Rocky Mountains to the coast, and also along the Pacific Northwest coast and in parts of the southwestern U.S. They winter in South America. Within Oregon, the purple martin inhabits the Coast Range, Willamette Valley, and numerous colonies along the Columbia River (Marshall et al. 2003). As shown in Table 1, the species is suspected to occur in all three national forests crossed by the Project (Table 1).

Neither the Forest Service nor ORBIC location database records contained observations of the purple martin within 5 miles of the Project on Forest Service lands (Forest Service 2006, ORBIC 2012).

The timing of spring migration for western populations is uncertain; however, they likely begin arriving in Oregon around March and April and continue to arrive until sometime in June (Rosenberg et al. 1991, Gilligan et al. 1994, Marshall et al. 2003). Historically, martins nested primarily within snags in a variety of forested woodland types and are closely associated with water (Table 26; Johnson and O'Neil 2001, Marshall et al. 2003). Due to a reduction in natural cavities and competition with non-native species currently only 5 percent of martins in Oregon nest in non-man-made structures (Horvath 1999). Breeding groups within Oregon vary from solitary nesting pairs to colonial nesting pairs inhabiting a single snag or martin box. They have been found to nest in snags, old pilings, nest-boxes, gourds set on poles within fields, and crevices in man-made structures (Marshall et al. 2003). Nest building occurs from May through July, and fledging occurs in July or August. Purple martins forage over open areas such as rivers, lakes, marshes, and fields. Fall migration typically occurs after fledging, with the last martin leaving Oregon about mid-September (Marshall et al. 2003).

Current population sizes within Oregon are unknown; however, a study conducted by the ODFW in 1998 found 784 purple martin pairs distributed within known colony locations (Horvath 1999). In Oregon, populations have increased 5.6 percent annually between 2001 and 2011 (Sauer et al. 2012). Current threats to the purple martin include activities that increase European starling and house sparrow populations, as these species compete with purple martins for nest cavities.

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable purple martin habitat within 3,200 feet of the proposed action in the three national forests crossed by the Project. Table 26 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 26. Purple Martin Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside-Lowland Conifer-Hardwood Forests	Generally Associated	Feeds and Breeds	0	0	0	0%
Southwest Oregon Mixed Conifer-Hardwood Forest	Generally Associated	Feeds and Breeds	335.02	96.54	11,980.17	3.60%
Westside Oak and Dry Douglas-fir Forests And Woodlands	Generally Associated	Feeds and Breeds	0	0	0	0%

Table 26. Purple Martin Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Herbaceous Wetlands	Generally Associated	Feeds	0.15	0	28.18	0.53%
Westside Riparian Wetlands	Generally Associated	Feeds and Breeds	0.09	0	39.56	0.23%
Developed-Urban and Mixed Environs	Generally Associated	Feeds and Breeds	20.82	0	20.85	99.86%
Coastal Dunes and Beaches	Generally Associated	Feeds	0	0	0	0
Open Water-Lakes, Rivers, and Streams	Closely Associated	Feeds	0.51	0.09	206.93	0.29%
Bays and Estuaries	Closely Associated	Feeds and Breeds	0	0	0	0
Total			**356.59**	**96.63**	**12,275.69**	**3.69%**

1/ Totals taken from Table 5 for all three national forests in which the species has been suspected to occur.
2/ Totals taken from Table 3 for all three national forests in which the species has been suspected to occur; does not include habitat located on other federal or non-federal lands.

Pipeline construction could negatively impact this species by reducing the availability of nesting habitat by removing snags, or by directly destroying nests. 1.65 percent of snags available within the analysis area would be removed by the Project. Of potential habitat within the analysis area, about 4 percent would be impacted by Project construction. As noted above, no records of purple martins have been documented within 5 miles of the Project area. Additionally, only 5 percent of martins in Oregon nest in non-man-made structures. Given the minimal amount of habitat impacted and common use of man-made nesting sites, there is a low possibility of encountering nesting martins in the Project area.

If nonbreeding martins were present in the area of Project construction, they could be disturbed, but would likely move away into nearby suitable habitat. Project construction would take place over about 8 weeks at any given location. As shown in Figure 2, construction activities, including timber removal, would take place during the breeding season in some areas.

As noted above, European starling and house sparrow populations compete with purple martins for nest cavities. Increased edge created by the Project could assist in these nuisance species expanding their range into previously unoccupied areas.

Cumulative Effects

The purple martin cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua, Winema, and Rogue River national forests (Table 12). Human encroachment within national forests has increased non-native bird populations such as European starling that are adaptable to development and can out-compete purple martin for food and nest resources. However, purple martins are able to use a wide variety of habitats, especially if man-made nest structures that exclude invasive species are provided.

Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Project impacts would include removal of potential nest sites as a result of snag removal, disturbance during construction, and increases in populations of non-native species that compete with purple martins as result of increased edge. However, purple martins may also benefit from the cleared ROW as they forage over clearcuts (ODFW 2014). Additionally, snag creation would compensate for potential nest sites removed during construction.

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). The pre-commercial thinning and timber projects in the national forests could potentially remove snags but would most likely contribute to the long term health of the forest ecosystems. Under the NWFP, LSR's and Riparian Reserves in the area are likely to improve habitat for this species over time.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres overlapping reasonably foreseeable activities, approximately 22,321 acres within the cumulative effects analysis area would be affected, or 4.1 percent of the total watershed area (Table 12). The proposed action as well as the actions described above would contribute to snag removal and increased competition from European starlings, which are the primary threats to this species (ODFW 2014). However, snags removed during construction would be replaced through 1,029 acres of snag creation. Therefore, cumulative impacts on the purple martin are expected to be insignificant because the combined impacts to the 4.1 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts include ensuring that all construction contractors practice appropriate and responsible trash disposal every day in order to avoid attracting species such as the European starling, creation of snags in large trees strategically left on the edge of the construction ROW by topping and/or girdling trees, and placement of nesting boxes with no perches and cavities small enough to encourage use by native species.

Noise disturbance from blasting and helicopter activity would be minimized with use of blast mats or other devices. Timber removal, pipeline construction and blasting or helicopter activity would be avoided within 0.25 miles of an NSO activity center between March 1 and July 15 and would benefit cavity nesting species (approximately 30 percent of the route, Appendix N and P of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the NWFP Aquatic Conservation Strategy. Riparian Reserves provide suitable foraging and nesting habitat. In the Umpqua and Rogue River National Forest, approximately 7,500 snags would be created in LSR and matrix lands by blasting the tops off live trees or inoculating trees with heart rot decay fungi. Increased snags densities would provide cavity nesters with more nesting and foraging opportunities. For a full description of CMP activities that would benefit this bird species see Appendix O of the BA.

Impact Determination

In considering the potential direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for purple martin because while some nests could be destroyed, the likelihood of encountering nests is low. 1.65 percent of snags available within the analysis area would be removed by the Project, and of potential habitat within the analysis area, about 4 percent would be impacted by Project construction.

6.2.2.12 Tricolored blackbird (Agelaius tricolor)

Species Status in the Project Area

More than 99 percent of the restricted range of this blackbird is in California. In Oregon, there are scattered, intermittent breeding colonies, most consistently in Klamath and Jackson Counties, but also in Lake, Crook, and Umatilla Counties (Spencer 2003c). As shown in Table 1, the species has been documented in the Rogue River and Winema national forests; it has not been documented and is not suspected to occur in the Umpqua National Forest. Neither the Forest Service nor ORBIC location database records contained observations of the tricolored blackbird 5 miles of the Project on NFS lands (Forest Service 2006, ORBIC 2012). However, two records of this species near the proposed ROW are known, one 1.0 mile from the pipeline and one 1.8 miles away; these records are located on state and private land, respectively (Forest Service 2006, ORBIC 2012).

Nesting colonies are established in freshwater marshes dominated by cattails or hardstem bulrush, nettles, thistles, willows (Table 27; Johnson and O'Neil 2001). Himalayan blackberries, and other substrates are also used (Beedy and Hamilton 1999, Spencer 2003c). Colonies can be huge and include up to 100,000 nests, with nests only a foot apart from each other (Beedy and Hamilton 1999, Spencer 2003c). Males arrive and begin defending territories in late February. Eggs are laid mid-March through early April, hatching occurs in June and July, and breeding colonies are usually abandoned by mid-August (Beedy and Hamilton 1999). Important foraging habitats are dairies, feedlots, irrigated pastures, lightly grazed rangelands, dry seasonal pools, and mowed alfalfa fields (Beedy and Hamilton 1997). Tricolored blackbirds will follow and consume any locally abundant insect resource including grasshoppers, and also take grains, snails, and small clams (Beedy and Hamilton 1999).

Adults in California numbered at least 162,000 in 2000, and there are 3,000 to 4,000 estimated tricolored blackbirds in Oregon (NatureServe 2013). In western breeding bird survey region, populations have increased 3.3 percent annually between 2001 and 2011; however, these estimates have a high degree of uncertainty (Sauer et al. 2012). Threats to the species include conversion of nesting habitat to agriculture, predation and destruction of nesting colonies during agricultural activities and wetland dewatering (Churchwell et al. 2005).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable tricolored blackbird habitats within 3,200 feet of the proposed action in the jurisdictional boundaries discussed above. Table 27 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 27. Tricolored Blackbird Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed 1/	Total Acres Modified 1/	Total Acres in Analysis Area 2/	Percentage Impacted
Herbaceous Wetlands	Closely Associated	Feeds and Breeds	0.15	0	27.29	0.53%
Agriculture, Pastures, and Mixed Environs	Generally Associated	Feeds and Breeds	0	0	0	0
Total			**0.15**	**0**	**27.29**	**0.53%**

1/ Totals taken from Table 5 for the Rogue River and Winema national forests in which the species has been documented to occur.
2/ Totals taken from Table 3 for the Rogue River and Winema national forests in which the species has been documented to occur; does not include habitat located in the Umpqua National Forest or on other federal or non-federal lands.

The closest documented occurrence of this species is 1 mile from the Project area, outside of NFS lands. Additionally, only 0.15 acres of wetland are expected to be impaced by the Project. Given the large colonial nesting habits of this species, and the lack of documented occurrence and minimal habitat impacted, we would not expect breeding birds to be impacted by the Project.

Pipeline construction could affect nonbreeding tricolored blackbirds if they are in the area by disturbing birds. We assume that birds would be able to move away from the disturbance into nearby suitable habitat without significant effects.

Cumulative Effects

The tricolored blackbird cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Winema and Rogue River national forests (Table 12). The quality and quantity of tricolored blackbird habitat has been reduced with fire, agricultural development, and pesticide application (Spencer 2003c). Although one-third of Oregon wetlands, the main type of habitat used by tricolored blackbirds, are estimated to have been lost since the late 1700s, wetlands are now protected under federal law, and loss of estuarine wetlands has slowed substantially since the mid-1900s (ODSL and OPRD 1989, Dahl 1990). The NWFP protects wetlands through land use allocations and directed management techniques; this should improve the quantity and quality of tricolored blackbird habitat in the future.

Construction of the pipeline and associated facilities would affect 962 acres within the cumulative effects analysis area, or 0.3 percent of the total watershed area (Table 12). As noted above, very little tricolored blackbird habitat would be impact, and no known breeding sites would be impacted. Mitigation actions proposed for federal lands are not expected to affect tricolored blackbirds. Noxious weed treatments could potentially affect tricolored blackbirds as Himalayan blackberries can be used as nests; however, herbicides would not be used in or within 100 feet of waterbodies, which is where nesting occurs, so no effects are anticipated. Planned projects within the cumulative effects analysis area are not expected to impact wetlands, and thus are unlikely to have negative impacts on tricolored blackbirds. Lightly grazed rangelands are an important foraging habitat (Beedy and Hamilton 1997); the proposed grazing projects within the cumulative effects analysis area could benefit tricolored blackbirds by providing such habitat (Table 11).

The proposed action as well as other planned projects are not expected to contribute to conversion of nesting habitat to agriculture, predation and destruction of nesting colonies during agricultural activities, and wetland dewatering, which are threats to this species (Churchwell et al. 2005). Project impacts to non-breeding individuals would be short-term, if any. Therefore, cumulative impacts on the tricolored blackbird are expected to be insignificant.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts include the restoration and protection of wetlands and the surrounding landscapes that facilitate the hydrology and function of wetlands. These measures are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), the Erosion Control and Revegetation Plan (Appendix F of the BA), and the Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings which would contribute to the stability of the streambank and reduce erosion (Appendix N of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the the NWFP Aquatic Conservation Strategy. Road decommissioning would reduce erosion and fragmentation that facilitates establishement of non-native species such as European starling. For a full description of CMP activities that would benefit the the species see Appendix O of the BA.

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for tricolored blackbird because breeding habitat is very unlikely to be impacted, and 0.5 percent of available habitat within the analysis area would be impacted by the Project.

6.2.3 Amphibians

Surveys were not conducted specifically for special status amphibians; however, special status species were documented if observed during other survey activities. The information on sensitive species occurrence is based on several GIS data sources including ORBIC occurrence records (ORBIC 2012), Johnson and O'Neil (2001) habitat associations, and the Forest Service NRIS database (Forest Service 2006).

6.2.3.1 Foothill yellow-legged frog (Rana boylii)

Species Status in the Project Area

The range of the foothill yellow-legged frog extends from the Willamette Valley to southwestern Oregon to northwestern California and down the coastal ranges and Sierra Nevada Mountains to the Los Angeles area (Fellers 2005). As shown in Table 1, the species has been documented in the Umpqua and Rogue River national forests; it has not been documented and is not suspected to occur in the Winema National Forest. The foothill yellow-legged frog has been observed twice within 1-5 miles of the Project in the Umpqua National Forest and once within 1 mile of the Project in the Rogue River National Forest (Forest Service 2006, ORBIC 2012). Three fifth-field watersheds crossed by the Project on NFS land contain current documented sightings of the foothill yellow-legged frog: Upper Cow Creek, Trail Creek, and Little Butte Creek (Olson and Davis 2009 and Appendix C to this BE).

Primary habitat typically includes a variety of conifer and hardwood forest types, typically located in the western and southwestern Cascade Mountains (Table 30; Johnson and O'Neil 2001). Within these habitats the species is typically found in large, 4-5th order streams in forested riparian corridors (Olson and Davis 2009). The species stays very close to permanent streams with rocky, gravelly, or sandy bottoms (Leonard et al. 1993), though cobble-sized rocks are necessary for egg-laying (Fellers 2005). They breed from early April to early June (Leonard et al. 1993, Fellers 2005). Diets include flies, moths, hornets, ants, beetles, grasshoppers, water striders, and snails (Fellers 2005). Overwintering appears to occur within and along the edges of streams and rivers, under various loose substrates (e.g., woody debris, rocks, etc.) and in seeps along the stream margin (Rombough 2006a).

In Oregon, the foothill yellow-legged frog appears to be extirpated from 55 percent of its historical range (Csuti et al. 2001). Olson and Davis (2009) identify three primary threats including, 1) stream habitat loss or alteration from water impoundments that inundate habitats or alter natural flow regimes, causing fluctuations in water levels and altering water temperatures, 2) introduced species such as smallmouth bass and bullfrogs due to predation and competition, and 3) stream habitat loss or alteration from agricultural practices including re-routing stream channels and fluctuations in water levels caused by irrigation.

Analysis of Effects

Direct and Indirect Effects

The analysis area includes aquatic areas within the above listed habitat types, within 3,200 feet of the proposed action on the Umpqua and Rogue River national forests. Table 28 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 28. Foothill Yellow-Legged Frog Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside-Lowland Conifer-Hardwood Forests	Generally Associated	Feeds	0	0	0	0%
Southwest Oregon Mixed Conifer and Hardwood Forests	Generally Associated	Feeds	284.75	92.47	11,718.15	3.22%
Westside Riparian Wetlands	Generally Associated	Feeds and Breeds	0.09	0	39.56	0.23%
Total			**285.10**	**92.47**	**11,757.71**	**3.21%**

1/ Totals taken from Table 5 for the Umpqua and Rogue River national forests in which the species has been documented to occur.

2/ Totals taken from Table 3 for the Umpqua and Rogue River national forests in which the species has been documented to occur; does not include habitat located in the Winema National Forest or on other federal or non-federal lands.

Based on these habitat associations, approximately 3 percent of available habitat within the analysis area would be affected by the Project.

According to Olson and Davis (2009), 113 of 177 known sites for this species (64 percent) occur on federal lands. Of these sites, 79 (70 percent of federal sites) occur within LSR, and all occur within Riparian Reserves. Within the analysis area, 16.82 acres of the forested habitat identified above that would be removed is within Riparian Reserves (Table 6), and 3.39 of these acres would be maintained in an early seral stage within the 30-foot Project corridor (Table 7). These forested habitats include LO, MS, and CR habitats (Table 6 and 7). These areas likely represent high quality habitat as they are forested and adjacent to water, which are important habitat components for the foothill yellow-legged frog.

During construction, adults and juveniles could suffer direct mortality from trampling during water body crossings. Within the three fifth-field watersheds crossed by the Project on NFS land where foothill yellow-legged frogs are known to occur (Upper Cow Creek, Trail Creek, and Little Butte Creek), the Project would affect ten streams. Eight of these streams would be crossed using the dry open-cut methods, one ephemeral drainage is located within a TEWA but the drainage itself would be avoided by construction, and one stream is located within a TEWA, but

would be crossed using an existing culvert (Appendix C). Olson and Davis (2009) recommend timing activities at foothill yellow-legged frog sites to avoid the breeding season (early April to early June) in order to maintain these local populations. Within the range of the NSO, Pacific Connector has indicated that they would remove timber outside of the entire northern spotted owl breeding season (after September 30 and before February 28) within at least 0.25 miles of activity centers. As the analysis area for foothill yellow-legged frog is within the range of the NSO, these construction restrictions would also minimize impacts to breeding foothill yellow-legged frogs.

This species could also experience habitat loss and modification due to construction. Removing timber for the Project could impact the foothill yellow-legged frog even if it occurs outside the breeding season. Timber removal may contribute to elevated stream water temperatures and sedimentation of downstream reaches, which may adversely affect frogs. Loss of standing green trees reduces the future potential for down wood recruitment in streams, which function to provide complex instream habitats including slow water areas that may be preferred by frogs for breeding (Olson and Davis 2009). As new trees regenerate, their smaller sizes likely would not provide the same functions as large down wood, and larger wood may not be available for several decades to centuries. However, foothill yellow-legged frogs have been found in stream reaches with limited down wood, so the importance of large wood is uncertain across the range of the species (Olson and Davis 2009). Additionally, the Project would clear a narrow corridor across streams so LWD recruitment would still occur from upstream and downstream habitat, and the associated increases in temperature and sediment would be minimal. Sedimentation would occur during Project construction and would be a short-term impact. The two habitat-based primary threats to foothill yellow-legged frogs are related to permanent diversions or impoundments that alter natural flow regimes (Olson and Davis 2009), which differ from the Project's short-term impacts on sedimentation and potential long-term impacts on instream LWD and temperature.

Other impacts include the potential for the ROW corridor to facilitate the spread of bullfrogs, which may prey on foothill yellow-legged frog larvae, juveniles or adults, and compete with foothill yellow-legged frog larvae for algae (Kupferberg 1997, Olson and Davis 2009). Introduced species are listed as a primary threat to foothill yellow-legged frogs due to predation and competition. Although Pacific Connector has indicated in their Integrated Pest Management Plan (Appendix N to the POD) that they would control for noxious plant species as well as forest pathogens and soil pests, they have not developed measures to prevent bullfrog invasions into waterbodies crossed by the Project. Therefore, the spread of bullfrogs to waterbodies crossed by the Project may adversely affect the foothill yellow-legged frog populations at these locations.

Cumulative Effects

The foothill yellow-legged frog cumulative effects analysis area includes the three fifth field watersheds crossed by the Project on NFS lands where this species occurs: Cow Creek, Trail Creek, and Little Butte Creek. Foothill yellow-legged frog habitat has been negatively impacted by human activities over the last 200 years. Development has tended to concentrate around bodies of water, increasing disturbance, eliminating habitat, and encouraging the spread of

mesopredators where these frogs live. Wetlands have also been lost due to draining and conversion to other land uses. Though one-third of Oregon wetlands are estimated to have been lost since the late 1700s, wetlands are now protected under federal law, and loss of estuarine wetlands has slowed substantially since the mid-1900s (ODSL and OPRD 1989, Dahl 1990).

Suitable foothill yellow-legged frog habitat would be removed during construction. Construction of the pipeline and associated facilities would affect 984 acres within the cumulative effects analysis area, or 0.3 percent of the total watershed area (Table 12). The Project could also facilitate the spread of bullfrogs, which is listed as one of three primary threats to this species (Olson and Davis 2009). However, the Project would not contribute to the other primary threats to this species, stream habitat loss from water impoundments as well as from agricultural practices (Olson and Davis 2009).

Mitigation actions proposed for federal lands that affect resources used by the foothill yellow-legged frog include fish passage, fuels reduction, noxious weed treatment, road storm proofing, road decomissioning, in stream LWD placement, and stream crossing repair projects. Mitigation actions on federal lands would affect 3,967 acres within the cumulative effects analysis area, or 1.3 percent of the total watershed area (Table 12). Potential negative effects include detrimental effects from herbicide if used during noxious weed treatments; however BMPs and avoidance of waterbodies during use should limit these impacts. Sediment could be mobilized into waterbodies during fish passage, road decommissioning, and stream crossing repair projects, especially where culverts are removed or replaced; however, long term beneficial effects include reconnection of aquatic habitats, sediment reduction, and shade restoration. Fuels reduction and in-stream LWD placement projects would also benefit the foothill yellow-legged frog. Placement of LWD in streams adds structural complexity to aquatic systems, traps fine sediments and can contribute to reductions in stream temperatures over time. Fuels reduction projects would lower the risk of loss of mature stands and other valuable habitats to high-intensity fire, which can contribute substantial sediment to streams and result in flooding and and erosion during post-fire precipitation events. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing, and biological projects (Table 11). Planned projects on the Umpqua National Forest include seven projects within the Upper Cow Creek and Trail Creek watersheds (Table 11). Forest Service projects include several timber treatments, a livestock grazing allotment, a fuelbreak project, and various aquatic restoration projects; other projects include clearcutting on private lands, and a BLM timber sale and highway realignment (Table 11). On the Rogue River National Forest, there are 9 planned projects within the Little Butte Watershed that consist of 8 grazing allotments and one quarry (Table 11). These Projects would be implemented across 10,727 acres, or approximately 3 percent of the three watersheds (Table 12).

The thinning and aquatic habitat restoration projects would most likely contribute to the long term health of the ecosystems, and could improve habitat conditions for the foothill yellow-legged frog. However, the clearcuts, timber sales, highway realignment, and livestock grazing

allotments could contribute to the further loss or degradation of foothill yellow-legged frog habitat. Specifically, similarly to the Project, timber removal from clearcuts and timber sales could remove upland habitat, and degrade instream habitat by increasing sedimentation and temperature in streams and reducing LWD recruitment. The highway realignment could also contribute sediment to streams and adversely affect frogs. Livestock grazing may result in bank erosion, degrading shorelines and increasing stream sedimentation, and thus could directly impact instream habitats for frogs (Olson and Davis 2009).

Management guidelines under the NWFP are integral to species conservation (Olson and Davis 2009). The NWFP protects wetlands and Riparian Reserves; this protection provides connectivity between subpopulation and allows dispersal, minimizes impacts from livestock use, and prohibits timber harvest (Forest Service and BLM 2001). In the Olson and Davis (2009) population analysis, of the 177 current sites at the 500-meter spatial scale, 113 sites (64 percent) occur on federal lands. Of these, 79 (70 percent of federal sites) occur within the LSR land-use allocation and 34 (30 percent) sites occur within the Matrix or Adaptive Management Area land-use allocations, where timber management is a priority. However, all 113 sites are within Riparian Reserves, and are thus protected. The species also occurs in 17 of 34 federally designated Key Watersheds which form a system of large refugia for maintaining and recovering habitat for at-risk fish species and providing high quality water (Olson and Davis 2009). Federal protection of water bodies, wetlands, and Riparian Reserves would likely increase the quantity and quality of foothill yellow-legged frog habitat in the future.

The proposed Project, including mitigation actions, would affect approximately 4,951 acres. Combined with 10,727 acres overlapping reasonably foreseeable activities, approximately 15,678 acres within the cumulative effects analysis area would be affected, or 5.0 percent of the total watershed area (Table 12). The proposed action could facilitate the spread of bullfrogs, which is listed as a primary threat to this species. The Project is not expected to contribute stream habitat loss from water impoundments and agricultural practices, which are also listed as primary threats to this species (Olson and Davis 2009). Additionally, both the Project mitigation and the reasonably forseeable Projects are expected to benefit the foothill yellow-legged frog. Therefore, cumulative impacts on the foothill yellow-legged frog are expected to be insignificant because the combined impacts to the 5.0 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific mitigation measures that would help minimize impacts include the containment and safe disposal of hazardous materials and pollutants as discussed in Pacific Connector's Spill Prevention, Containment, and Countermeasures Plan (see Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings (Appendix N of the BE).

As part of the CMP, Riparian Reserves would be restored or maintained through the NWFP Aquatic Conservation Strategy. Additionally, restrictions to construction activities that avoid NSO nesting periods would also reduce noise disturbances during the breeding period for this

species (see Appendix L, N, O and P of the BA). Proposed mitigation actions on federal lands that would benefit the harlequin duck are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Impacts Determination

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for foothill yellow-legged frog since the proposed Project would cross only eight streams on NFS lands in watersheds occupied by this species, would affect only approximately 3 percent of suitable habitat within the analysis area, and would affect only 16.82 acres of forested habitat within Riparian Reserves within the analysis area.

6.2.4 Reptiles

Surveys were not conducted specifically for special status reptiles; however, special status species were documented if observed during other survey activities. The information on sensitive species occurrence is based on several GIS data sources including ORBIC species occurrence records (ORBIC 2012), Johnson and O'Neil (2001) habitat associations, and the Forest Service NRIS database (Forest Service 2006).

6.2.4.1 Western pond turtle (Actinemys marmorata)

Species Status in the Project Area

The Western pond turtle is found in the Puget Sound region, the Willamette Valley of Oregon, southwest Oregon, and the western half of California including the Central Valley. In Oregon, they have been found up to elevations of 3,000 feet (Storm and Leonard 1995). Western pond turtles are most common in large river basins in southern Oregon (Storm and Leonard 1995). As shown in Table 1, the species has been documented in all three national forests crossed by the Project (Table 1). The Western pond turtle has been observed twice within 1-5 miles of the Project in the Umpqua National Forest and three times within 1-5 miles of the Project in the Rogue River National Forest; there are no documented observations of the species within 5 miles of the Project on the Winema National Forest (Forest Service 2006, ORBIC 2012).

The Western pond turtle is found in a variety of woodland and grassland habitats and is associated with wetlands and other waters (Table 29; Johnson and O'Neil 2001). Within these habitats, Western pond turtles prefer permanent or intermittent mud-bottomed lakes, marshes, sloughs, and slow-moving rivers that have basking sites such as logs or rocks, which are important for thermoregulation (Storm and Leonard 1995, St. John 2002). Nests can be several hundred feet from water in a variety of vegetation types, and adults sometimes hibernate as far as 1,600 feet from water (Csuti et al. 2001). Their diet includes crayfish, insects, amphibian eggs and larvae, and aquatic plants (St. John 2002).

Numbers of Western pond turtles are apparently declining, especially in the northern part of their range. They are no longer present throughout most of the historical range. Many turtle populations were depleted in the early 1900s when they were harvested for food.

Threats include habitat alteration and fragmentation, and disease (Storm and Leonard 1995). Eggs and young are also vulnerable to increasing predation by introduced bullfrogs, fish species, and raccoons, which are drawn to some areas where pond turtles live by human activity at campsites, resorts, and other developments (St. John 2002).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable Western pond turtle habitats within 3,200 feet of the proposed action in three national forests crossed by the Project. Table 29 shows the habitat types in the analysis area with which the species is closely or generally associated, and the acreages of those habitats impacted by the Project.

Table 29. Western Pond Turtle Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed [1/]	Total Acres Modified [1/]	Total Acres in Analysis Area [2/]	Percentage Impacted
Southwest Oregon Mixed Conifer and Hardwood Forests	Generally Associated	Feeds and Breeds	335.02	96.54	11,980.17	3.60%
Ponderosa Pine Forest and Woodlands	Generally Associated	Feeds and Breeds	0.01	0	957.70	0.00%
Westside Grassland	Generally Associated	Feeds and Breeds	3.37	0.46	10.67 [3]	35.90% [3/]
Herbaceous Wetlands	Closely Associated	Feeds	0.15	0	28.18	0.53%
Westside Riparian Wetlands	Closely Associated	Feeds and Breeds	0.09	0	39.56	0.23%
Open Water-Lakes, Rivers, and Streams	Closely Associated	Feeds	0.51	0.09	206.93	0.29%
Total			**339.15**	**97.09**	**13,223.21**	**3.30%**

1/ Totals taken from Table 5 for all three national forests in which the species has been documented to occur.
2/ Totals taken from Table 3 for all three national forests in which the species has been documented to occur; does not include habitat located on other federal or non-federal lands.
3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

Based on these habitat associations, approximately 3 percent of available habitat within the analysis area would be affected by the Project. However, these acreages may overestimate suitable habitat as these areas are not necessarily in close enough proximity to water to be

used by Wester pond turtles. According to Stone (2009c), the majority of Western pond turtle populations on NFS and BLM land in Oregon and Washington occur within Riparian Reserves. Excluding altered habitat, 23.75 acres within Riparian Reserves would be removed by the Project within the analysis area (Table 6), and 5.13 of these acres would be maintained in an early seral stage within the 30-foot Project corridor (Table 7). These habitats include LO, MS, CR forested habitats, as well as unaltered non-forested habitats (Tables 6 and 7). These areas likely represent high quality habitat as they are adjacent to water, which is an important habitat components for Western pond turtles.

Habitat destruction, alteration, and fragmentation is listed as the single greatest threat to Western pond turtles (Stone 2009c). The Project would impact habitat as described above; however, these impacts would be minor and affect habitat only minimally compared to the activities listed by Stone (2009c) as causing habitat impacts, including conversion of wetlands to farmland, water diversions and dams, channelization, mining, timber clearing, and urbanization.

The proposed action could cause direct mortality if individuals were not able to get out of the way of construction, or if emerging juveniles, nests, or eggs were in the proposed ROW. However, only three western pond turtle sites have been documented within 3 miles of the Project on NFS lands, both on the Umpqua National Forest greater than 1 mile from the Project (Forest Service 2006, ORBIC 2012). These sites are 1.8 miles northeast of MP 105.24, and 1.5 miles southwest of MP 109.68, and include 6-20 observations of Western pond turtle at each site (Forest Service 2006, ORBIC 2012, Stone 2009c). Although western pond turtles travel across terrestrial habitat to nest and overwinter, these movements are generally limited to within 1,600 feet of water (0.3 mi, Csuti et al. 2001, Reese and Welsh 1997), so individuals traveling from the known sites on the Umpqua National Forest to nest or overwinter would not be impacted by the Project. Pond turtles additionally disperse over land and along waterways, but long distance movement patterns are still poorly understood (Rosenburg et al. 2009). Dispersing individuals could be present along the ROW, and be impacted by equipment or Project vehicles.

Other impacts include the potential for the ROW corridor to facilitate the spread of nonnative and native predators such as bullfrogs, raccoons, spotted skunks, coyote, fox, feral and domestic dogs, black bear, river otter, mink, osprey, bald eagle, and largemouth bass (Holland 1994). Stone (2009c) list predation as a threat the Western pond turtles; however, they note that many large populations of turtles occur in the presence of these predators so the threat does not appear to be universal (Stone 2009c). All trash, food waste, and other items attractive to predators would be picked up and removed from the Project area on a daily basis to minimize potential predation of Western pond turtles.

Cumulative Effects

The Western pond turtle cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua, Winema, and Rogue River national forests (Table 12). Most of the habitats used by these turtles have been impacted severely in the past 200 years. Development has concentrated around bodies of water, increasing disturbance, eliminating habitat, and encouraging the spread of mesopredators. Wetlands have been drained and

converted to agriculture and huge amounts of grassland habitat has been lost. The NWFP addresses many of these issues, and management activities taking place within the analysis area should increase the quality of Western pond turtle habitat in the future.

Suitable Western pond turtle habitat would be removed during construction. Construction of the pipeline and associated facilities would affect 2,181 acres within cumulative effects analysis area, which constitutes 0.4 percent of the total watershed area (Table 12). The Project could also facilitate the spread of predators such as bullfrogs and raccoons. Both habitat alteration and fragmentation, and increasing predation by introduced species are listed as a threat to this species (St. John 2002).

Mitigation actions proposed for federal lands that affect resources used by the Western pond turtle include fish passage, fuels reduction, road storm proofing, road decomissioning, in stream LWD placement, and stream crossing repair projects. Mitigation actions on federal lands would affect 7,734 acres within the cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12). Sediment could be mobilized into waterbodies during fish passage, road decommissioning, and stream crossing repair projects, especially where culverts are removed or replaced; however, long term beneficial effects include reconnection of aquatic habitats, sediment reduction, and shade restoration. Fuels reduction and in-stream LWD placement projects would also benefit the Western pond turtle. Placement of LWD in streams adds structural complexity to aquatic systems, traps fine sediments and can contribute to reductions in stream temperatures over time. Fuels reduction projects would lower the risk of loss of mature stands and other valuable habitats to high-intensity fire, which can contribute substantial sediment to streams and result in flooding and erosion during post-fire precipitation events. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). They would affect 12,849 acres, or 2.4 percent of the cumulative effects analysis area. Planned projects on the Umpqua National Forest include 13 projects within the Elk Creek, Upper Cow Creek and Trail Creek watersheds (Table 11). Forest Service projects include a weed treatment project, several timber treatments, a grazing allotment, a fuelbreak project, and various aquatic restoration projects; other projects include clearcutting on private lands, and a BLM timber sale and highway realignment (Table 11). On the Rogue River National Forest, there are 9 planned projects within the Little Butte Watershed that consist of 8 grazing allotments and one quarry (Table 11). On the Winema National Forest, there are 7 planned projects within the Spencer Creek Watershed that consist of several grazing allotments, road maintenance, noxious weed treatments and reclamation activities associated with this Project (Table 11). The large number of thinnings combined with the aquatic habitat restoration would most likely contribute to the long term health of the ecosystem. However, the timber sales, grazing allotments, and clearcuts could contribute to habitat alteration and disturbance within the vicinity of the proposed Project.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres of overlapping reasonably foreseeable activities described above,

acreage impacted within the Western pond turtle cumulative effects analysis area includes 22,321 acres, or 4.1 percent of the total watershed area (Table 12). The proposed action, as well as reasonably foreseeable actions, would contribute to habitat loss and alteration, as well as the potential to increase predation from non-native species. However, Project mitigation is expected to benefit the Western pond turtle. Additionally, construction BMPs that require all trash to be removed daily would minimize potential predation of Western pond turtles. Therefore, cumulative impacts on the Western pond turtle are expected to be insignificant, because the combined impacts to the 4.1 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize impacts include the containment and safe disposal of hazardous materials and pollutants as discussed in Pacific Connector's Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings.

As part of the CMP, Riparian Reserves would be restored or maintained through the NWFP Aquatic Conservation Strategy. Additionally, restrictions to construction activities that avoid NSO nesting periods would also reduce noise disturbances during the breeding period for this species (see Appendix L, N, O, and P of the BA). Also, all trash, food waste, and other items attractive to predators would be picked up and removed from the Project area on a daily basis to minimize potential predation of Western pond turtles. Proposed mitigation actions on federal lands that would benefit the Umpqua chub are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action **"may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the Western pond turtle because impacts would be limited to dispersing individuals as there are no known nesting or overwintering sites within 1 mile of the Project on NFS land, and the Project would impact only approximately 3 percent of potentially suitable habitat within the analysis area.

6.2.5 Fish

Surveys were not conducted specifically for special status fish. The information on sensitive species occurrence is based on several GIS data sources including ORBIC occurrence records (ORBIC 2012), the StreamNet database (StreamNet 2008), and the Forest Service NRIS database (Forest Service 2006).

6.2.5.1 Umpqua chub (Oregonichthys kalawatseti)

Species Status in the Project Area

Umpqua chub can be found throughout most of the Umpqua River in Douglas County; from the mouth of the Smith River in the north to Cow Creek and the South Umpqua River, near the boundary of the Umpqua National Forest, in the south (Markle et al. 1991). As shown in Table 1, the species has been documented in the Umpqua National Forest; it has not been documented and is not suspected to occur in the Winema or the Rogue River National Forest.

The Umpqua chub inhabits areas which contain eroded or depositional substrates with moderate to low flowing waters. They gather near the banks in shallow waters, and prefer habitats with riparian cover and abundant aquatic vegetation. Spawning occurs primarily in rocky areas. The Umpqua chub's diet consists of bottom-dwelling chironomids and other organisms (Markle et al. 1991).

The main threat to this species is the increasing population of invasive smallmouth bass (NatureServe 2013).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes waterbodies crossed within the South Umpqua sub-basin, where this species is found. Umpqua chub are assumed to be present in 4 of the 7 streams within the analysis area that would be impacted by the Project (Table 30; further detail in Appendix C). One of those streams would be within a TEWA and not directly affected; it currently flows through a culvert under a road that would be part of the TEWA. The other affected waterbodies would be crossed using a dry open cut during the in-water work window recommended by ODFW. The dry open cut method used would either be flume or dam and pump, both of which maintain downstream flows and isolate the construction area from the streamflow. Construction across small or intermediate waterbodies generally takes seven days using these methods. Some mortality could occur to eggs with this process, but adults and juveniles would likely stay with the streamflow and avoid negative effects. Turbidity increases are generally low using this crossing method but could increase temporarily. Indirect effects could occur through the harvest of riparian vegetation on either side of the stream for the width of the ROW, potentially increasing sedimentation.

The Project would not contribute to the main threat to this species, the increasing population of invasive smallmouth bass.

Table 30. Umpqua Chub Potential Habitat					
Waterbodies Crossed and Waterbody ID	**Identification Number (LLID) and Jurisdiction**	**Approximate Pipeline MP**	**Waterbody Type Size**	**Proposed Crossing Method Scour Level**	**Chub Potentially Present**
Trib. to East Fork Cow Creek (GW014/FS-HF-C)	1229383427835 Forest Service – Umpqua NF	109.17	Perennial (FS – Interpretation) Intermediate	Dry Open-Cut	No
Trib. to East Fork Cow Creek (GSI016/FS-HF-F)	1229369427819 Forest Service – Umpqua NF	109.33	Intermittent Minor	Dry Open-Cut	No
East Fork Cow Creek (GSP019/FS-HF-G)	1229918428021 Forest Service – Umpqua NF	109.47	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12]	Assumed
East Fork Cow Creek (GSP022/FS-HF-G ASP297)	1229918428021 Forest Service – Umpqua NF	109.69	Perennial Intermediate	Adjacent to centerline within TEWA-flows through culvert	Assumed
Trib. to East Fork Cow Creek (FS-HF-J/AW298)	1229332427779 Forest Service – Umpqua NF	109.69	Perennial Minor	Dry Open-Cut	Assumed
Trib. to East Fork Cow Creek (FS-HF-K/AW299)	1229332427781 Forest Service – Umpqua NF	109.78	Perennial Minor	Dry Open-Cut	Assumed
Trib. to East Fork Cow Creek (ESI068/FS-HF-N)	Forest Service – Umpqua NF	110.98	Intermittent Intermediate	Dry Open-Cut	No

Cumulative Effects

The Umpqua chub cumulative effects analysis area includes the fifth field watersheds crossed by the Project within the South Umpqua subbasin: Upper Cow Creek, Elk Creek, and Days Creek. Construction of the pipeline and associated facilities would affect 979 acres within the cumulative effects analysis area, or 0.5 percent of the total watershed area (Table 12). Project impacts would primarily be from potential increases in sediment following construction, and removal of riparian vegetation at the ROW crossing. Neither of these impacts are listed as threats to this species.

Mitigation actions proposed for federal lands that could affect resources used by the Umpqua chub include fish passage, fuels reduction, road storm proofing, road decomissioning, in stream LWD placement, riparian planting, and stream crossing repair projects. Mitigation actions on federal lands would affect 5,374 acres within the cumulative effects analysis area, or 3.0 percent of the total watershed area (Table 12). Sediment could be mobilized into waterbodies during fish passage, road decommissioning, and stream crossing repair projects, especially where culverts are removed or replaced; however, long term beneficial effects include reconnection of aquatic habitats, sediment reduction, and shade restoration. Fish passage projects could also be detrimental to the Oregon chub if barriers are removed that currently prevent or limit the spread of smallmouth bass (Simon 2008). Restoration of these crossings includes riparian planting as a mitigation which would help offset the impact of shade removal where the Project affects streams and riparian areas. Fuels reduction and in-stream LWD placement projects would benefit the Oregon chub. Placement of LWD in streams adds structural complexity to aquatic systems, traps fine sediments and can contribute to reductions in stream temperatures over time. Fuels reduction projects would lower the risk of loss of mature stands and other valuable habitats to high-intensity fire, which can contribute substantial sediment to streams and result in flooding and and erosion during post-fire precipitation events. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). Forest Service projects that could additionally impact the Umpqua chub include a grazing allotment that could cause direct mortality of eggs by crushing, and several timber treatments that could potentially increase sedimentation and disturb riparian vegetation. Multiple aquatic restoration projects within the South Umpqua sub-basin would benefit water quality and fish habitat within the watershed. Restoration projects include culvert replacements, Riparian Reserve timber thinning and road decommissioning.

The NWFP identifies restoration and maintenance of Riparian Reserves as a goal on Forest Service land. Riparian Reserves include the hydrologic, geologic or ecological features within a watershed that affect stream processes. Actions to improve aquatic habitat surrounding Riparian Reserves includes limiting livestock grazing and commercial timber harvest. These management activities may result in improved quantity and quality of Umpqua chub habitat in the analysis area in the future.

The proposed Project, including mitigation actions, would affect approximately 6,353 acres. Combined with 3,919 acres overlapping reasonably foreseeable activities, approximately 10,272 acres within the cumulative effects analysis area would be affected, or 5.8 percent of the total watershed area (Table 12). The proposed action as well as planned projects could temporarily increase sediment and remove riparian vegetation; however, Project impacts would be mitigated as described above, and planned aquatic restoration projects would also benefit the Umpqua chub. The Project would be unlikely to contribute to the main threat to this species, the increasing population of invasive smallmouth bass. Therefore, cumulative impacts on the Umpqua chub are expected to be insignificant because the combined impacts to the 5.8 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), the Erosion Control and Revegetation Plan (Appendix F of the BA), and the Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings which would contribute to the stability of the streambank and reduce erosion (Appendix N of the BA).

Specific conservation measures to minimize impacts to the Umpqua chub include backfill of perennial waterbodies. Material would be removed from the trench, with the upper 1-foot of the trench backfilled with clear gravel or native cobbles appropriate for resident fish. The bottom and banks would be returned to preconstruction contours, banks would be stabilized, and temporary sediment barriers would be installed before returning flow to the waterbody channel. If fish are present, a fish salvage plan would be followed to reduce mortality from construction. These activities are described in the Conservation Measures and Fish Salvage Plan documents (see Appendix N and T of the BA). Proposed mitigation actions on federal lands that would benefit the Umpqua chub are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for Umpqua chub because the waterbody crossings would be conducted with minimal damage to the species, and the Project would be unlikely to contribute to the major threat to this species, which is the spread of smallmouth bass.

6.2.5.2 Upper Klamath redband trout (Oncorhynchus mykiss newberrii)

Species Status in the Project Area

The distribution of Upper Klamath redband trout is limited to various streams within the Upper Klamath Lake basin (ODFW 2005). As shown in Table 1, the species has been documented in the Winema National Forest; it has not been documented and is not suspected to occur in the Rogue River or the Umpqua National Forest.

The Klamath redband trout is found within mid-size or small streams located in highly erosive landscapes with high gradients, steep slopes, high solar radiation, and mean annual air temperatures less than 48ºF (Thurow et al. 2007). Their diet consists primarily of smaller fish.

Threats to this species include habitat alteration resulting in low flows and high temperatures and stream blockage such as dams (NatureServe 2013).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes waterbodies crossed within the Upper Klamath River sub-basin where this species may be found. Upper Klamath redband trout are assumed to be present in the four streams within the analysis area that would be impacted by the Project (Table 31; further detail in Appendix C). The affected waterbodies would be crossed using a dry open cut during the in-water work window recommended by ODFW. The dry open cut method used would either be flume or dam and pump, both of which maintain downstream flows and isolate the construction area from the streamflow. Construction across small or intermediate waterbodies generally takes seven days using these methods. Some mortality could occur to eggs with this process, but adults and juveniles would likely stay with the streamflow and avoid negative effects. Turbidity increases are generally low using this crossing method but could increase temporarily. Indirect effects could occur through the harvest of riparian vegetation on either side of the stream for the width of the ROW, potentially increasing sedimentation.

Table 31. Upper Klamath Redband Trout Potential Habitat

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline MP	Waterbody Type Size	Proposed Crossing Method Scour Level	Trout Potentially Present
Spencer Creek (EW085)	1220277421487 Forest Service-Winema NF	171.07	Intermittent Minor	Dry Open-Cut	Redband Trout Possible
Trib. to Spencer Creek (GSP007)	1221988422850 Forest Service-Winema NF	171.57	Perennial Minor	Dry Open-Cut	Unknown
Trib. to Spencer Creek (EW107)	1221837422760 Forest Service-Winema NF	172.48	Intermittent Minor	Dry Open-Cut	Unknown
Trib. to Spencer Creek (ESI106)	Forest Service-Winema NF	173.74	Intermittent Minor	Dry Open-Cut	Assumed

Cumulative Effects

The Upper Klamath redband trout cumulative effects analysis area consists of the Spencer Creek fifth field watershed. Construction of the pipeline and associated facilities would affect 231 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Project impacts would primarily be from potential increases in sediment following construction, and removal of riparian vegetation at the ROW crossing.

Several mitigation projects have been identified in the Spencer Creek watershed that would benefit Upper Klamath redband trout by reducing sedimentation and improving riparian

vegetation conditions in the long term. Riparian planting is proposed for Spencer Creek, downstream of the Project crossing. Shade provided by the plantings would contribute to moderating water temperatures in Spencer Creek, and root strength provided by new vegetation would increase bank stability and decrease erosion and sediment depositions to Spencer Creek. Fencing between the Project ROW and an adjacent grazing allotment has been proposed in order to keep cattle from grazing newly re-vegetated areas in the Project corridor, including areas where the corridor crosses Spencer Creek, thus helping to ensure that erosion control and re-vegetation objectives are met. Approximately 1.0 mile of LWD placement is proposed for Spencer Creek to mitigate Project effects by adding structural complexity to the aquatic system, trapping fine sediments, and potentially reducing the stream temperature over time. Road decommissioning and ford hardening within the cumulative effects analysis area would also improve habitat for the redband trout. Spencer Creek appears on the Oregon DEQ 303(d) list as water quality impaired from increased sedimentation. Improvements along Spencer Creek would immediately benefit all downstream aquatic habitats, including those used by the Upper Klamath redband trout. Mitigation actions on federal lands would affect 397 acres within the cumulative effects analysis area, or 0.7 percent of the total watershed area (Table 12). These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Forest Service projects that could additionally impact the Upper Klamath redband trout include a grazing allotment that could cause direct mortality of eggs by crushing, and several timber treatments that could potentially increase sedimentation and disturb riparian vegetation (Table 11). These proposed projects would affect 70 acres, or 0.1 percent of the cumulative effects analysis area. The NWFP identifies restoration and maintenance of Riparian Reserves as a goal on NFS land. Riparian Reserves include the hydrologic, geologic or ecological features within a watershed that affect stream processes. Actions to improve aquatic habitat surrounding Riparian Reserves, including areas within the cumulative effects analysis area, includes limiting livestock grazing and commercial timber harvest.

The proposed Project, including mitigation actions, would affect approximately 628 acres. Combined with 70 acres overlapping reasonably foreseeable activities, approximately 698 acres within the cumulative effects analysis area would be affected, or 1.3 percent of the total watershed area (Table 12). The proposed action as well as planned projects could temporarily increase sediment and remove riparian vegetation; however, Project impacts would be mitigated as described above, and provide overall benefit to Upper Klamath redband trout and its habitat in Spencer Creek. Therefore, cumulative impacts on the Upper Klamath redband trout are expected to be insignificant because the combined impacts to the 1.3 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), the Erosion Control and Revegetation Plan (Appendix F of the BA), and the Spill Prevention, Containment, and

Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings which would contribute to the stability of the streambank and reduce erosion (Appendix N of the BA).

Specific conservation measures to minimize impacts to the Upper Klamath redband trout include backfill of perennial waterbodies. Material would be removed from the trench, with the upper 1-foot of the trench backfilled with clear gravel or native cobbles appropriate for resident fish. The bottom and banks would be returned to preconstruction contours, banks would be stabilized, and temporary sediment barriers would be installed before returning flow to the waterbody channel. If fish are present, a fish salvage plan would be followed to reduce mortality from construction. These activities are described in the Conservation Measures and Fish Salvage Plan documents (see Appendix N and T of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the the NWFP Aquatic Conservation Strategy. Several projects within the Winema national forests would benefit redband trout and include repair of 26 stream crossings, riparian plantings and in-stream placement of woody debris that would provide cover and improve stream integrity. Road decommissioning would also occur and decrease erosion within the watershed. Within the Spencer Creek watershed, approximately 1 mile of in-stream restoration would occur that directly benefits Upper Klamath redband trout. For a full description of CMP activities that would benefit redband trout see Appendix O of the BA. Proposed mitigation actions on federal lands that would benefit the Upper Klamath redband trout are also described above under cumulative effects, and detailed in Appendix F of the DEIS (FERC 2014).

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for Upper Klamath redband trout because the waterbody crossings that could affect these species would be conducted with minimal damage to the species, and any impacts that resulted would be temporary.

6.2.6 Terrestrial Invertebrates

Surveys were conducted for special status mollusks in accordance with the "Survey Protocol for Survey and Manage Terrestrial Mollusk Species from the NWFP, Version 3.0" (Duncan et al. 2003). In addition to Forest Service designated sensitive species, target species also included federal and state-listed threatened and endangered species and special-status species, and Region 6 Survey and Manage species (Forest Service and BLM 2001). Surveys were conducted between March 17 and May 23, 2007 and October 13 and November 16, 2007 and covered approximately 1,160 total acres in the three national forests. Surveys for route modifications in 2010 were conducted during spring (June 6 and July 1, 2010) and in fall (October 13 and November 16, 2010) and covered approximately 230 acres (SBS 2011b). Project-specific surveys for individual insect species were not conducted. The area considered

for potential terrestrial invertebrate habitat included all Forest Service-managed lands in Douglas and Jackson and Klamath counties (as well as BLM-managed lands crossed by the Project) within 100 feet of the Project capable of supporting special-status terrestrial invertebrate species. Detail on survey methodology and results are provided in the 2008 and 2010 Biological Survey Reports (SBS 2008, 2011b).

6.2.6.1 Traveling sideband (Monadenia fidelis celeuthia)

Species Status in the Project Area

This endemic terrestrial snail is found primarily in Jackson County, Oregon. Stone (2009a) reports occurrences from Medford east and northeast in the eastern Rogue River and Little Butte Creek drainages. As shown in Table 1, the species has previously been documented on the Rogue River National Forest, and was recently documented on the Winema National Forest; it has not been documented and is not suspected to occur on the Umpqua National Forest.

The traveling sideband has previously been observed once within 1-5 miles of the Project in the Rogue River National (Forest Service 2006, ORBIC 2012), and was observed at 8 locations during Project surveys on the Rogue River and Winema national forests (between MP154.9-175.3) During surveys in 2007 and 2010, shells and live individuals were located within and outside the ROW, as well as within proposed TEWAs and UCSAs (SBS 2008, SBS 2011b).

Traveling sideband is found at low to moderate elevation in unaltered, somewhat dry and open forested terrain (Frest and Johannes 2000). The species is associated with dry basalt talus and rock outcrops in areas with oak/maple overstory, and along springs in rock and moist vegetation and moss (Frest and Johannes 2000).

Threats to the traveling sideband include timber clearing and livestock grazing. Removal or reduction of forest canopy and increased sun exposure from timber clearing or other removal activities can result in drying of important subterranean refugia sites, reduction in fungi food sources and loss of dormant individuals. Because many species in this genus are partially arboreal, tree felling may result in direct mortality to individuals (Stone 2009a).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable traveling sideband habitat within 700 feet of the proposed action within the Rogue River and Winema national forests. Based on the habitat description above, we inferred that the traveling sideband is associated with the late successional/old growth (i.e., unaltereted) Johnson and O'Neil habitat types shown below in Table 31, especially where talus or rock outcrops are present. However, these associations likely overestimate suitable habitat as specific habitat information such as overstory species, presence of talus and rock outcrops, and presence of springs in rock and moist vegetation were not available for this analysis. Nonetheless, Table 32 lists the acreages of those habitats impacted by the Project, as well as the total acreage available within the analysis area for the traveling sideband. Because

the biology of this species is not well understood (Stone 2009a), general and close associations, as well as activities associated with each habitat type, have not been inferred.

Table 32. Traveling Sideband Habitat Associations

Habitat Type[1/]	Total Acres Removed[2/]	Total Acres Modified[2/]	Total Acres in Analysis Area[3/]	Percentage Impacted
Westside-Lowland Conifer-Hardwood Forests (LO)	0	0	0	0.00%
Southwest Oregon Mixed Conifer-Hardwood Forest (LO)	98.85	34.54	546.87	24.39%
Ponderosa Pine Forest and Woodlands (LO)	0	0	65.52	0.00%
Westside Oak and Dry Douglas-fir Forest and Woodlands (LO)	0	0	0	0.00%
Westside Riparian Wetlands	0	0	8.34	0.00%
Eastside Riparian Wetlands	0.26	0	17.29	1.50%
Total	**99.11**	**34.54**	**620.73**	**21.53%**

1/ LO, Late Succession/Old Growth assumed to be ≥80 years old.
2/ Totals taken from Table 5 for the Rogue River and Winema national forests in which the species has been documented to occur.
3/ Totals taken from Table 2 for the Rogue River and Winema national forests in which the species has been documented to occur; does not include habitat located in the Umpqua National Forest or on other federal or non-federal lands.

Based on these habitat association assumptions, approximately 22 percent of available potentially suitable habitat within the analysis area would be affected by the Project. Additionally, 4.15 acres of late successional/old growth forested habitat that would be removed within the Rogue River and Winema national forests is within Riparian Reserves (Table 6), and 1.22 of these acres would be maintained in an early seral stage within the 30-foot Project corridor (Table 7). These areas likely represent high quality habitat as they are forested, unaltered, and adjacent to water, which are important habitat components for the traveling sideband. However, as discussed above, these calculations of potentially suitable habitat are likely overestimates due to the lack of available data on specific habitat components such as talus, rock outcrops, and overstory species composition within the analysis area. Additionally, complete surveys were conducted for mollusks on NFS lands, so impacts to the potentially suitable habitat occupied by this species, assumed to be the highest quality habitat, would be minimized as described below.

Direct mortality could occur to individuals if they are located within the ROW, UCSAs, and TEWAs during Project clearing or construction due to their low mobility. Vegetation removal and grading activities in the construction corridor and in TEWAs would disturb vegetation and soils within sites and could result in injury or mortality to individuals. Clearing of the ROW and TEWAs could impact habitat by removing forest overstory, potentially making the area

unsuitable for this species. Indirect effects could result from the alteration of composition and structure of vegetation resulting in changes in microclimate.

Minor route adjustments following the 2007 and 2010 surveys resulted in avoidance of some of the sites observed during Project surveys. Four of the locations within the Rogue River National Forest are outside of the ROW so direct impacts are not expected (MP 157.14, 159.33, 161.36, and 167.10). Two sites within UCSAs and TEWAs are currently proposed to be impacted (MP 154.90 and 164.53); however, it is likely that Project components can be moved to avoid these sites. Pacific Connector has indicated that the site located within a TEWA (MP154.90) would be avoided based on an alignment that they are developing but have not yet filed with FERC (Yamamoto 2014a). Two locations within the ROW on the Winema National Forest are also currently proposed to be impacted (MP 173.38 and 175.30). It is possible that these sites may also be avoided by the Project as they are located in a flat area; however, Pacific Connector will need to work with the Forest Service to determine if minor route adjustments to avoid these sites are feasible.

Indirect effects are expected to the traveling sideband sites observed within the analysis area even if direct impacts to these sites are avoided. Construction of the Project would create an open corridor, which would be dominated by early seral vegetation for approximately 30 years. This is a long-term effect that could modify microclimate conditions around populations or individuals adjacent to the corridor during the early seral vegetation phase. All the sites are within approximately 100 feet of Project disturbance, and thus would be affected by these changes in microclimate conditions.

According to the Forest Service NRIS and BLM GeoBOB databases, approximately 13 traveling sideband sites are known from NFS land in Oregon, including the 8 sites on NFS land identified during Project surveys, and 35 sites are known from BLM land (Yamamoto 2014b). Assuming that these 48 sites comprise all existing traveling sideband sites, on NFS lands the Project would indirectly impact approximately 17 percent of known sites, although not likely affect site persistence at these locations. If Pacific Connector does not avoid directly impacting the 2 sites discussed above (MPs 173.38, 175.30), the Project would affect the site persistence of approximately 4 percent of known sites. However, the 14 sites documented during surveys for the Project (including the 6 sites documented on BLM land, not discussed here) indicate that this species is more abundant and widely distributed than previously thought. Additionally, the Forest Service indicated that there are additional observations of this species that have not yet been added to the NRIS database that would bring the total sites for this species across its range to greater than 48 (Yamamoto 2014b). However, this analysis conservatively assumes that the 48 confirmed sites comprise all existing traveling sideband sites.

Cumulative Effects

The traveling sideband cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Rogue River and Winema national forests: Big Butte Creek, Little Butte Creek, and Spencer Creek (table 12). Current threats to the traveling sideband include timber clearing and livestock grazing (Stone 2009a). Loss of woodlands and increased forest

fragmentation over the past 200 years may have impacted the traveling sideband. Oak woodlands in Oregon have declined precipitously due to conversion to other land uses, invasive species, and fire suppression. Fragmentation decreases connectivity between populations and reduces dispersal between sub-populations. Livestock tend to concentrate around a water source, which can increase disturbance and eliminate habitat. Concentrated use of riparian areas by livestock may also degrade available loose soil and litter habitat used for foraging and breeding (Stone 2009a).

Construction of the pipeline and associated facilities would affect 962 acres within the cumulative effects analysis area, or 0.3 percent of the total watershed area (Table 12). Project impacts would include habitat loss and modification, as well as potential mortality of individuals. However, Project impacts are not expected to affect species persistence as described above.

Proposed mitigation actions in the cumulative effects analysis area include reallocation of Matrix to LSR, road decommissioning, pre-commercial thinning, and riparian planting. Mitigation actions on federal lands would affect 1,100 acres within the cumulative effects analysis area, or 0.3 percent of the total watershed area (Table 12). There could be some negative short-term impacts of these actions, including disturbance and trampling of individuals during implementation. However, overall, these projects would benefit the traveling sideband through habitat improvements and a reduction in disturbance over the long term. Reallocation of Matrix to LSR would offset the long-term loss of LSR acres, and thus ensure future availability of late-successional habitat. Decommissioning and planting of selected roads in conjunction with pre-commercial thinning treatments would block up forested habitat and reduce edge effects and fragmentation in a period of about 40 years. Density management of forested stands would assist in the recovery of late-seral habitat, reduce impacts from fragmentation, reduce edge effects, and enhance resilience of mature stands, all of which would benefit this late-successional obligate species. Planting of riparian vegetation would also improve habitat quality for the traveling sideband at these sites. These proposed mitigation projects are described in detail in Appendix F of the DEIS (FERC 2014).

Planned projects within watersheds where the proposed action crosses NFS lands include a variety of timber, fuel, grazing and biological projects (Table 11). On the Rogue River National Forest, there are 9 planned projects within the Little Butte Watershed that consist of 8 grazing allotments and one quarry (Table 11). On the Winema National Forest, there are 7 planned projects within the Spencer Creek Watershed that consist of several grazing allotments, road maintenance, noxious weed treatments and reclamation activities associated with this Project (Table 11). The proposed grazing allotments could result in habitat destruction or modification, as well as trampling of individuals. The proposed timber projects could also result in impacts to habitat and individuals similar to those expected by the Project. However, these planned projects would affect 2,875 acres, which is only 0.9 percent of the cumulative effects analysis area. Additionally, the NWFP identifies restoration and maintenance of mossy talus slopes and Riparian Reserves as a goal on NFS land. These management activities may result in improved quantity and quality of traveling sideband habitat in the analysis area in the future.

The proposed Project, including mitigation actions, would affect approximately 2,062 acres. Combined with 2,875 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 4,631 acres, or 1.4 percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions would contribute to the threats to this species from timber clearing and grazing. However, Project mitigation would compensate for habitat loss and mortality of individuals during construction. Therefore, cumulative impacts on the traveling sideband are expected to be insignificant, because the combined impacts to the 1.4 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), the Erosion Control and Revegetation Plan (Appendix F of the BA), and the Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings which would contribute to the stability of the streambank and reduce erosion (Appendix N of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through the NWFP Aquatic Conservation Strategy. On the Rogue River National Forest restoration of stream crossings and planting in Riparian Reserves would promote shade and cover for the traveling sideband (see Appendix L, O and P of the BA).

Duncan (2005, in Stone 2009a) recommends harvesting timber where this species is located in the summer or late summer when these mollusks are aestivating underground in order to minimize impacts. Within the range of the NSO, Pacific Connector has indicated that they would remove timber outside of the entire NSO breeding season (after September 30 and before February 28) within at least 0.25 miles of activity centers. As the analysis area for traveling sideband is within the range of the NSO, these construction restrictions may also minimize impacts to the traveling sideband.

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals and habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for traveling sideband because the proposed action would affect approximately 22 percent of potentially suitable available habitat within the analysis area, impact approximately 17 percent of the known sites

(including indirect effects), and directly affect (eliminate) approximately 4 percent of known sites[1], although this species is likely more common than indicated by the NRIS database.

6.2.6.2 Siskiyou hesperian (Vespericola sierranus)

Species Status in the Project Area

In Oregon, this land snail is found in Jackson, Klamath, and Douglas Counties. As shown in Table 1, this species has previously been documented on the Rogue River and Winema national forests, and was recently documented on the Umpqua National Forest.

Prior to observations during Project surveys, this species had not been documented within 5 miles of the Project (Forest Service 2006, ORBIC 2012). During Project surveys in 2007 and 2010 this species was observed at 12 locations on the Rogue River and Umpqua national forests (between MP 110.18-164.69). Shell fragments and live individuals were observed within and outside the ROW, as well as within proposed TEWAs and UCSAs (SBS 2008, SBS 2011b).

The Siskiyou hesperian is associated with riparian areas and other perennially moist habitats and may occur along running water or around permanent ponds and springs (Frest and Johannes 1996, Stone 2009b). The species can be found near spring seeps and deep leaf litter along streambanks and under debris and rocks. Moist valley, ravine, gorge, or talus sites are preferred, near the lower portions of slopes in areas that are not subject to regular flooding. This species has a global status of imperiled (NatureServe 2013). Threats include the diversion or modification of springs for livestock watering and irrigation. Human use may result in loss or degradation of habitat. Removal of forest overstory from timber clearing can dry important subterranean refugia and loss of aestivating individuals. Concentrated use of riparian areas by livestock may also degrade habitat, as can development for agriculture or human use (Frest and Johannes 2000).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable Siskiyou hesperian habitat within 700 feet of the proposed action within the three national forests crossed by the Project. Based on the habitat description above, we inferred that the Siskiyou hesperian is associated the Westside Riparian Wetlands and Eastside Riparian Wetlands Johnson and O'Neil habitat types, as shown below in Table 33, especially near the lower portions of slopes at moist valley, ravine, gorge, or talus sites. These associations likely overestimate suitable habitat as specific habitat information such as location on slope and presence of talus were not available for this analysis. Nonetheless, Table 33 lists the acreages of those habitats impacted by the Project, as well as the total acreage available within the analysis area for the Siskiyou hesperian. Because the biology of

[1] Assuming that Pacific Connector avoids the sites at MPs 154.90, and 164.53 and does not avoid the sites at MPs 173.38 and 175.30.

this species is not well understood (Stone 2009b), general and close associations, as well as activities associated with each habitat type have not been inferred.

Table 33. Siskiyou Hesperian Habitat Associations

Habitat Type	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside Riparian Wetlands	0.09	0	9.46	0.95%
Eastside Riparian Wetlands	0.26	0	17.29	1.50%
Total	**0.35**	**0**	**26.75**	**1.31%**

1/ Totals taken from Table 5 for the Umpqua, Rogue River, and Winema national forests in which the species has been documented to occur.
2/ Totals taken from Table 2 for the Umpqua, Rogue River, and Winema national forests in which the species has been documented to occur; does not include habitat located on other federal or non-federal lands.

Based on these habitat association assumptions, approximately 1 percent of available potentially suitable habitat within the analysis area would be affected by the Project. Additionally, 22.8 acres of forested habitat (of all seral stages) that would be removed within the analysis area is within Riparian Reserves (Table 6), and 4.88 of these acres would be maintained in an early seral stage within the 30-foot Project corridor (Table 7). These areas likely represent high quality habitat as they are forested and adjacent to water, which are important habitat components for the Siskiyou hesperian. However, as discussed above, these calculations of potentially suitable habitat are likely overestimates due to the lack of available data on specific habitat components such as talus and location on slope. Additionally, complete surveys were conducted for mollusks on NFS lands, so impacts to the potentially suitable habitat occupied by this species, assumed to be the highest quality habitat, would be minimized as described below.

Direct mortality to individuals could occur if they are located within the ROW, TEWAs, or UCSAs during Project clearing or construction. Vegetation removal and grading activities in the construction corridor and in TEWAs would disturb vegetation and soils within sites documented during Project surveys, and could result in injury or mortality to individuals. Another potential direct effect is destruction or alteration of hydrology of riparian, wetland, or aquatic habitats used by this species. Indirect effects could result from the alteration of composition and structure of vegetation resulting in changes in microclimate. The increase in sun exposure could reduce moisture levels and potential decrease dispersal between populations or suitable habitat. Additionally, removal of the forest overstory would dry important subterranean refugia and impact aestivating individuals.

Three of the locations within the Rogue River National Forest are outside of the ROW so direct impacts are not expected (MP 157.14, 159.33, 161.34). Four sites within the ROW, UCSAs, or TEWAs within the Rogue River National Forest are currently proposed to be impacted (MP

154.03, 154.50, 162.29, 164.53). It is likely that these Project components can be moved to avoid these sites; however, Pacific Connector will need to work with the Forest Service to develop minor route adjustments to avoid these sites. Five sites within the ROW on the Umpqua and Rogue River National Forest are proposed to be impacted by the Project and avoidance of these sites would not be possible based on the steep slopes at those sites (MP 110.18, 153.90, 156.48, 156.89, and 164.69).

Indirect effects are expected to the Siskiyou hesperian sites observed within the analysis area even where direct impacts to these sites are avoided. Construction of the Project would create an open corridor, which would be dominated by early seral vegetation for approximately 30 years. This is a long-term effect that could modify microclimate conditions around populations or individuals adjacent to the corridor during the early seral vegetation phase, and also result in changes in hydrology where vegetation is no longer present to stabilize soil and reduce the erosional effects of runoff. All the sites are within approximately 100 feet of Project disturbance, and thus would be affected by these changes in microclimate conditions and alterations in hydrology.

According to the Forest Service NRIS databast, at least approximately 32 Siskiyou hesperian sites are known from the Rogue River National Forest, including the 11 observations on this Forest during Project surveys (Forest Service 2014). Project surveys additionally identified 1 site on the Umpqua National Forest, as well as 10 sites on BLM lands (SBS 2008, SBS 2011b: Roseburg and Medford BLM Districts, not discussed here). The Forest Service additionally described this species as common on the Rogue River National Forest and indicated that there are additional observations that have not yet been added to the NRIS database that would likely bring the total sites for this species across its range to over 50 (Yamamoto 2014b). However, this analysis conservatively assumes that the 43 confirmed sites comprise all existing Siskiyou hesperian sites

Based on this information, the Project would affect approximately 28 percent of known sites (including indirect effects), although not likely affect site persistence at all these locations. If Pacific Connector does not avoid directly impacting the 5 sites discussed above (MP 110.18, 153.90, 156.48, 156.89, and 164.69) located on steep slopes, the Project would affect the site persistence of approximately 12 percent of known sites. The 22 sites documented during surveys for the Project as well as personal communication with the Forest Service (Yamamoto 2014b) indicate that this species may be more abundant and widely distributed than previously thought; however, until further surveys map additional Siskiyou hesperian occurrences, the documented occurrences are assumed to comprise all sites for this species.

Cumulative Effects

The Siskiyou hesperian cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Rogue River, Umpqua, and Winema national forests (table 12). Habitat types preferred by the Siskiyou hesperian have been negatively impacted over the past 200 years. Development has concentrated around bodies of water, increasing disturbance and eliminating habitat. Riparian areas have been damaged and removed by timber clearing

practices and conversion to other uses. Wetlands and wet meadows have been drained and trampled by grazing livestock. However, the NWFP has special land use allocations around Riparian Reserves, streams, lakes, ponds, and wetlands that protect these resources. Standards and guidelines within the NWFP limit livestock grazing around aquatic areas and provide measures to minimize impacts from timber harvest. These actions would likely lead to improved quantity and quality of suitable Siskiyou hesperian habitat in Forest Service lands within the analysis area.

Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Project impacts would include habitat loss and modification, as well as potential mortality of individuals. However, Project impacts are not expected to affect species persistence as described above.

Proposed mitigation actions in the cumulative effects analysis area that would affect the Siskiyou hesperian include road decommissioning and riparian planting. Mitigation actions on federal lands would affect 7,734 acres within the cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12). There could be some negative short-term impacts of these actions, including disturbance and trampling of individuals during implementation. However, overall, these projects would benefit Siskiyou hesperian through habitat improvements and a reduction in disturbance over the long term. Decommissioning and planting of selected roads would reduce edge effects and fragmentation. Planting of riparian vegetation would also improve habitat quality for the Siskiyou hesperian at these sites. These proposed mitigation projects are described in detail in Appendix F of the DEIS (FERC 2014).

Planned projects within cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). The planned projects would affect 12,849 acres, or 2.4 percent of the cumulative effects analysis area. Planned projects on the Umpqua National Forest include 13 projects within the Elk Creek, Upper Cow Creek and Trail Creek watersheds (Table 11). Forest Service projects include a weed treatment project, several timber treatments, a grazing allotment, a fuelbreak project, and various aquatic restoration projects; other projects include clearcutting on private lands, and a BLM timber sale and highway realignment (Table 11). On the Rogue River National Forest, there are 9 planned projects within the Little Butte Watershed that consist of 8 grazing allotments and one quarry (Table 11). On the Winema National Forest, there are 7 planned projects within the Spencer Creek Watershed that consist of several grazing allotments, road maintenance, noxious weed treatments and reclamation activities associated with this Project (Table 11).

The proposed grazing allotments could result in habitat destruction or modification, as well as trampling of individuals. The proposed timber projects could also result in impacts to habitat and individuals similar to those expected by the Project. The aquatic restoration projects would likely benefit the Siskiyou Hesperian by improving habitat.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 22,321 acres, or 4.1

percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions would contribute to the threats to this species from timber clearing and grazing. However, Project mitigation would compensate for habitat loss and mortality of individuals during construction. Therefore, cumulative impacts on the Siskiyou hesperian are expected to be insignificant, because the combined impacts to the 4.1 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), the Erosion Control and Revegetation Plan (Appendix F of the BA), and the Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings which would contribute to the stability of the streambank and reduce erosion (Appendix N of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through the NWFP Aquatic Conservation Strategy (see Appendix L, O and P of the BA).

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals and habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the Siskiyou hesperian because the proposed action would affect approximately 1 percent of potentially suitable available habitat within the analysis area, impact approximately 28 percent of the known sites (including indirect effects), and directly affect (eliminate) approximately 12 percent of known sites[2], although this species is likely more common than indicated by the NRIS database.

6.2.6.1 Franklin's bumblebee (Bombus franklini)

Species Status in the Project Area

Franklin's bumblebee is known only from southern Oregon and northern California between the Coast and Sierra-Cascade Ranges. In Oregon, this bumblebee is found in Douglas, Jackson, and Josephine counties. Franklin's bumblebee has the most restricted range of any bumblebee in the world. Its entire distribution can be covered by an oval of about 190 miles north to south and 70 miles east to west. As shown in Table 1, the species has been documented on the Umpqua and Rogue River national forests; it has not been documented and is not suspected to occur in the Winema National Forest. Franklin's bumblebee has been observed twice within 1-5

[2] Assuming Pacific Connector avoids the four sites at MPs 154.03, 154.50, 162.29, 164.53, and cannot avoid the five sites at MPs 110.18, 153.90, 156.48, 156.89, and 164.69.

miles of the Project, once in the Umpqua and once in the Rogue River National Forest (Forest Service 2006, ORBIC 2012).

Franklin's bumblebee is associated with herbaceous grasslands that contain lakes, rivers, streams, and seeps because of the diversity and extended blooming period of wildflowers near these features (Black et al. 2009). Typically found between 1,400-4,000 foot elevations, this bumblebee requires a high amount of pollen and nectar sources such as plants in the genera *Lupinus*, *Eschscholzia*, *Agastache*, *Monardella*, and *Vicia*. Nesting is completed underground in abandoned rodent and wildlife burrows (Thorp and Shepard 2005). The flight period is from May through early September (NatureServe 2013).

According to Black et al. (2009) and Thorp (2005) the major threats to the bumble bee are fire suppression, grazing, pesticides, and habitat fragmentation. In addition, exotic diseases introduced via trafficking in commercial bumblebee queens and nests for greenhouse pollination of tomatoes have caused losses. Because Franklin's bumblebees have such a limited range, areas where they have been known to occur are especially vulnerable.

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable Franklin's bumblebee habitat within 3,200 feet of the proposed action in the Umpqua and Rogue River national forests. Based on the habitat description above, we inferred that Franklin's bumblebee is associated the Westside Grasslands, Eastside Grasslands, and Herbaceous Wetlands Johnson and O'Neil habitat types, as shown below in Table 34, especially those that contain lakes, rivers, streams, and seeps. These associations likely overestimate suitable habitat as specific habitat information such proximity to waterbodies were not available. Additionally, delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate. Nonetheless, Table 34 lists the acreages of those habitats impacted by the Project, as well as the total acreage available within the analysis area for the Franklin's bumblebee.

Table 34. Franklin's Bumblebee Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside Grasslands	Close	Feeds and Breeds	3.37	0.46	10.67[3/]	35.90%[3/]
Eastside Grasslands	Close	Feeds and Breeds	0.39	0	0.61[3/]	63.93%[3/]
Herbaceous Wetlands	General		0.09	0.00	0.95	9.47%
Total			**3.85**	**0.46**	**12.23**	**35.24%**

1/ Totals taken from Table 5 for the Rogue River and Umpqua national forests in which the species has been documented to occur.
2/ Totals taken from Table 3 for the Rogue River and Umpqua national forests in which the species has been documented to occur; does not include habitat located in the Winema National Forest or on other federal or non-federal lands.
3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

Based on these habitat association assumptions, approximately 35 percent of available potentially suitable habitat within the analysis area would be affected by the Project. However, as discussed above, these calculations of potentially suitable habitat are likely overestimates as grassland habitat outside of the Project area was not fully delineated.

Direct mortality could occur during timber clearing, ROW and road construction if individuals are not able to get out of the way, although bumblebees are relatively mobile. Additionally, impacts could occur due to the loss of suitable habitat or as a result of habitat fragmentation. However, grassland habitats affected by the Project are expected to return pre-construction conditions more quickly than forested habitats, and could provide wildflower nectar sources, an important habitat component for the Franklin's bumblebee, relatively quickly following contruction.

Application of herbicides during noxious weed treatments may have an indirect effect on Franklin's bumblebee by reducing nectar and pollen sources. Vegetation at aboveground facilities would be periodically maintained using mowing, cutting, trimming and the selective use of herbicides[3]. Black et al. (2009) do not list herbicide application as a threat to bumblebees, although they note that herbicides can indirectly harm bumblebees by removing the flowers that would otherwise provide the bees with pollen and nectar (Williams 1986; Shepherd et al. 2003, Smallidge & Leopold 1997). However, herbicides would not be used in or within 100 feet of a waterbody's mean high water mark, unless allowed by the appropriate agency; as Franklin's bumblebees are associated with grasslands adjacent to waterbodies, removal of nectar sources by Project application of herbicides would be limited. Additionally, Black et al. (2009) lists invasive and introduced species as a threat to the Franklin's bumblebee because they compete

[3] Pacific Connector would obtain applicable approvals or permits for use of herbicides on federal lands prior to use/treatment. Herbicides approved for use on NFS land include Chlorsulfuron, Glyphosate, Imazapyr, Metsulfuron methyl, Picloram, Sulfometuron methyl, Triclopyr, Sethoxydim, and Imazapic; see Pacific Connector's Integrated Pest Management Plan for details, Attachment 14 to the POD.

with nectar sources, therefore selective use of herbicides greater than 100 feet from water may benefit the Franklin's bumblebee. Black et al. (2009) list pesticide application as a threat to Franklin's bumblebee; however, Pacific Connector has not proposed to use pesticides for the Project.

Cumulative Effects

The cumulative effects analysis area for the Franklin's bumblebee includes the fifth field watersheds crossed by the Project on the Rogue River and Umpqua national forests (Table 12). Major threats to this species are fire suppression, grazing, and habitat fragmentation (Black et al. 2009). Native grasslands are one of the most imperiled habitats in the western U.S., including Oregon (Vickery et al. 1999). In the Coast Range and West Cascades of Oregon, grassland loss since historical times is estimated at 99 percent (ODFW 2006). The reduction in the quality and quantity of grassland is due, in part, to over grazing, conversion to agriculture, human development, invasion by non-native plant species, and fire suppression. Sustainable grazing practices help maintain existing grasslands. Standards and guidelines within the NWFP limit livestock grazing and provide measures to minimize impacts from timber harvest. These habitat management practices would likely lead to improved quantity and quality of suitable habitat in NFS land within the analysis area.

The Project would result in habitat loss and fragmentation as well as potential direct mortality to individuals during construction. However, as described above, impacts are expected to be short-term as the grassland habitats potentially occupied by Franklin's bumblebees would recover relatively quickly following construction. Construction of the pipeline and associated facilities would affect 1,950 acres within the cumulative effects analysis area, which is 0.4 percent of the total watershed area (Table 12). Approximately 12 percent of the Project ROW within the cumulative effects analysis area is currently non-forested; an additional 17 percent is currently forested, but would be maintained in an early seral stage following construction within the permanent 30-foot corridor, and thus could provide additional habitat for Franklin's bumblebee.

Proposed mitigation actions in the cumulative effects analysis area that would affect Franklin's bumblebee include fuels reduction, aquatic restoration, noxious weed treatment, and meadow habitat planting projects. Mitigation actions on federal lands would affect 7,337 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Fuels reduction projects could negatively affect Franklin's bumblebee if they result in greater fire suppression as fire contributes to maintaining open habitats such as the forest meadows used by Franklin's bumblebees. However, fuel treatments would also reduce the probability for stand-replacement fires that could remove bumblebee food sources. Projects that contribute to aquatic restoration such as road closure, decommissioning, and crossing repairs projects, would benefit Franklin's bumblebees by improving habitat quality. Noxious weed treatments would also benefit this species by removing invasive plant species that compete with prefered nectar sources. Additionally, meadow habitat planting designed to benefit other meadow species (Mardon skipper, short-hormed grasshopper) within the ROW on 20 acres in the Rogue River National Forest could also benefit the Franklin's bumblebee. These proposed mitigation projects are described in detail in Appendix F of the DEIS (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). Forest Service projects include a weed treatment project, several timber treatments, grazing allotments, a fuelbreak project, and various aquatic restoration projects; other projects include clearcutting on private lands, and a BLM timber sale and highway realignment (Table 11). The large number of thinnings combined with the aquatic habitat restoration would most likely contribute to the long term health of the ecosystem and thus benefit the Franklin's bumblebee. However, the timber sales, grazing allotments, and clearcuts could contribute to habitat alteration and disturbance within the vicinity of the proposed action. The fuel break would also contribute to fire suppression, which is listed as a threat to this species.

The proposed Project, including mitigation actions, would affect approximately 9,287 acres. Combined with 12,779 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 21,623 acres, or 4.4 percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions would result in fire suppression, habitat fragmentation, and grazing, which are listed as threats to the species. However, Project mitigation and ROW restoration would compensate for habitat loss and fragmentation, and mortality of individuals during construction. Therefore, cumulative impacts on the Franklin's bumblebee are expected to be insignificant, because the combined impacts to the 4.4 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize impacts include site restoration and habitat enhancements. Site restoration includes enhancement of soil productivity and noxious weed treatments. A native grass mix would be used to benefit federally-listed plant and insect species and may also provide food sources for the bumblebee (See Appendix N of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through the NWFP Aquatic Conservation Strategy. Meadows and wetlands would be protected or enhanced with vegetation. Fuel treatments would reduce the probability for stand-replacement fires that could eradicate bumblebee food sources. Species-specific measures that enhance pollen sources for federally-listed butterflies may benefit bumblebees (see Appendix L, O and P of the BA).

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for Franklin's bumblebee since the proposed action would likely affect this species only indirectly, and could create additional suitable habitat for this species by clearing woody vegetation, replanting with native grass and forb species, and controlling potential invasion by noxious weeds post-construction.

6.2.6.2 Western bumblebee (Bombus occidentalis)

Species Status in the Project Area

Historical populations of western bumblebees used to cover much of the western U.S.; however, populations in central California, Oregon, Washington and southern British Columbia have mostly disappeared (Milliron 1971, Andrews 2010a). In Oregon and Washington, Western bumblebee populations are currently largely restricted to high elevation sites (Xerces Society 2012), and the species is no longer found in the western portions of either state where it was once common (Cameron et al. 2011). Despite being nearly extirpated in Oregon, this species has been documented on all three national forests crossed by the Project (Table 1; Thorp et al. 2008; Jepson 2013). However, it is unknown what the current "Documented" status is for many of these field units, as many of the documented sites are considered historic (Jepson 2013). Neither the Forest Service nor ORBIC location database records contained observations of the western bumblebee within 5 miles of the Project on NFS land (Forest Service 2006, ORBIC 2012).

Western bumblebees will visit a range of different plant species and are important generalist pollinators of a wide variety of flowering plants and crops (Goulsen 2003, Heinrich 2004). Bumblebees inhabit a wide variety of natural, agricultural, urban, and rural habitats, although they are closely associated with areas that have continuously-blooming flowers throughout the year (Goulson 2010). Western bumblebees frequently nest in abandoned rodent burrows or bird nests. Queen production is dependent on access to sufficient quantities of pollen, so the amount of pollen available to bumblebee colonies directly affects the number of queens that can be produced (Burns 2004). Because queens are the only bumblebees capable of forming new colonies, pollen availability directly impacts future bumble bee population levels (Thorp et al. 2008). Western bumblebee nests have primarily been observed in underground cavities such as old squirrel or other animal nests and in open west-southwest slopes bordered by trees (Jepson 2013). Very little is known about western bumblebee overwintering sites, although Hobbs (1968) reported western bumblebee overwintering sites that were two inches deep in a steep west slope.

Of the 15,573 bees sampled in extensive surveys throughout Oregon between 1998 and 2007, only 115 (< 1 percent) were western bumblebees (Thorp et al. 2008). According to Jepson (2013), the primary threats to the western bumblebee at the sites where it currently exists in Oregon and Washington include pathogens from commercial bumble bees and other sources, impacts from reduced genetic diversity, and habitat alterations including conifer encroachment (resulting from fire suppression), grazing, and timber clearing. Additional threats include pesticide use, fire, agricultural intensification, urban development and climate change (Jepson 2013).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable western bumblebee habitat within 3,200 feet of the proposed action on the three national forests crossed by the Project. Based on the habitat description above, we inferred that the western bumblebee is closely and generally associated with the Johnson and O'Neil habitat types shown below. Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate. Nonetheless, Table 35 lists the acreages of those habitats impacted by the Project, as well as the total acreage available within the analysis area for the western bumblebee.

Table 35. Western Bumblebee Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Montane Mixed Conifer Forest	General		81.04	26.33	833.4	12.88%
Southwest Oregon Mixed Conifer-Hardwood Forest	General		335.02	96.54	11980.17	3.60%
Ponderosa Pine Forest and Woodlands	General		0.01	0	957.7	0.00%
Westside Oak and Dry Douglas-fir Forest and Woodlands	General		0	0	0	0.00%
Western Juniper and Mountain Mahogany Woodlands	General		0	0	0	0.00%
Shrub-steppe	General		6.49	0.51	9.26	75.59%
Westside Grasslands	Close	Feeds and Breeds	3.37	0.46	10.67[3/]	35.90%[3/]
Eastside Grasslands	Close	Feeds and Breeds	1.30	0	2.57[3/]	50.58%[3/]
Herbaceous Wetland	Close	Feeds	0.15	0	28.18	0.53%
Westside Riparian Wetlands	General		0.09	0	39.56	0.23%
Eastside Riparian Wetlands	General		0.26	0	0	0.12%
Agriculture, Pastures and Mixed Environs	General	Feeds	0	0	0	0.00%
Roads	General		29.18	3.16	116.27	27.81%
Total			**456.91**	**127.00**	**14,201.59**	**4.11%**

1/ Totals taken from Table 5 for the Rogue River, Winema, and Umpqua national forests in which the species has been documented

Table 35. Western Bumblebee Habitat Associations						
Habitat Type	**Association**	**Activities**	**Total Acres Removed[1/]**	**Total Acres Modified[1/]**	**Total Acres in Analysis Area[2/]**	**Percentage Impacted**

to occur.

2/ Totals taken from Table 3 for the Rogue River, Winema, and Umpqua national forests in which the species has been documented to occur.

3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

Based on these habitat association assumptions, approximately 4 percent of available potentially suitable habitat within the analysis area would be affected by the Project.

Direct impacts include construction-related activities that would impact individuals or destroy, alter, fragment, degrade or reduce the bumblebee's food supply, nesting habitat, or hibernation sites for overwintering queens (Andrews 2010a). Direct mortality could occur during clearing and construction if individuals are not able to get out of the way, although bumblebees are relatively mobile. Impacts could occur due to the loss of suitable habitat from Project activities such as road construction.

The Project could impact nest sites and overwintering sites during construction. Assuming that these sites would be primarily located in eastside and westside grassland habitats crossed by the Project, the Project would impact approximately 39 percent of nesting and overwintering habitat available within the analysis area (Table 35). However, as noted above, delineation of grassland habitat outside of Project impacts was limited so this the percentage of acres impacted is likely an overestimate. Additionally, no nest or hibernation sites have been documented within 5 miles of the Project. Although nest sites disturbed during construction would be negatively impacted, Project effects to nesting habitat would be temporary as the ROW would be restored following construction, and grassland habitats disturbed during construction would recover relatively quickly. Additionally, the Project could create additional suitable nesting habitat for this species by clearing woody vegetation, replanting with native grass and forb species, and controlling potential invasion by noxious weeds post-construction.

Application of herbicides during noxious weed treatments may have an indirect effect on nectar and pollen sources. As described above under Franklin's bumblebee, vegetation at aboveground facilities would be periodically maintained using mowing, cutting, trimming and the selective use of herbicides[4]. Project herbicide application could reduce available floral sources for bumblebees, which Jepson (2013) lists as a serious threat. However, herbicides would only be used where they are most appropriate treatment method, and would be applied using spot treatments to minimize impact to native or non-target species. Additionally, in nonforested areas

[4] Pacific Connector would obtain applicable approvals or permits for use of herbicides on federal lands prior to use/treatment. Herbicides approved for use on NFS land include Chlorsulfuron, Glyphosate, Imazapyr, Metsulfuron methyl, Picloram, Sulfometuron methyl, Triclopyr, Sethoxydim, and Imazapic; see Pacific Connector's Integrated Pest Management Plan for details, Attachment 14 to the POD.

Pacific Connector would revegetate the ROW following construction to approximate the original pre-disturbed condition. Jepson (2013) also lists pesticide application as a direct threat to western bumblebee; however, Pacific Connector has not proposed to use pesticides for the Project.

Cumulative Effects

The Western bumblebee cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Rogue River, Winema, and Umpqua national forests (table 12). Major threats to this species include habitat alteration, broad-spectrum herbicides, and invasive plants. Native grasslands are one of the most imperiled habitats in the western U.S., including Oregon, due to conversion to agriculture, development, invasion by non-native plant species, and fire suppression. In the Coast Range and West Cascades of Oregon, grassland loss since historical times is estimated at 99 percent (ODFW 2006). As the habitat becomes more fragmented the genetic diversity decreases due to inbreeding which in turn causes an increase in the risk of population declines. Grazing livestock also negatively affects bumblebee populations by altering the vegetation community, disturbing nest sites, and removing flowering food sources. Standards and guidelines within the NWFP provide measures to minimize impacts from timber harvest. These habitat management practices would likely lead to improved quantity and quality of suitable habitat on NFS lands within the analysis area.

Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). The Project would result in habitat alteration as well as potential direct mortality to individuals during construction. However, as described above, impacts are expected to be short-term as the grassland habitats potentially occupied by Western bumblebees would recover relatively quickly following construction. Approximately 10 percent of the Project ROW within the cumulative effects analysis area is currently non-forested; an additional 18 percent is currently forested, but would be maintained in an early seral stage following construction within the permanent 30-foot corridor, and thus could provide additional habitat for the Western bumblebee.

Proposed mitigation actions in the cumulative effects analysis area that would affect the Western bumblebee include fuels reduction, noxious weed treatment, and meadow habitat planting projects. Mitigation actions on federal lands would affect 7,734 acres within the cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12). Fuels reduction projects could negatively affect the Western bumblebee by allowing conifer encroachment, which is listed as a threat to this species. However, fuel treatments would also reduce the probability for stand-replacement fires that could remove bumblebee food sources. Noxious weed treatments would benefit this species by removing invasive plant species that compete with prefered nectar sources. Additionally, meadow habitat planting designed to benefit other meadow species (Mardon skipper, short-hormed grasshopper) within the ROW on 20 acres in the Rogue River National Forest could also benefit the Western bumblebee. These proposed mitigation projects are described in detail in Appendix F of the DEIS (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). The planned projects would affect 12,849 acres, or 2.4 percent of the cumulative effects analysis area. Forest Service projects include noxious weed treatment projects, several timber treatments, grazing allotments, and a fuelbreak project; other projects include clearcutting on private lands, and a BLM timber sale (Table 11). The large number of thinnings would most likely contribute to the long term health of the ecosystem. However, the timber sales, grazing allotments, and clearcuts could contribute to habitat alteration and disturbance within the vicinity of the proposed action.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 22,321 acres, or 4.1 percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions could result in confier encroashment, habitat alteration, and grazing, which are listed as threats to the species. However, Project mitigation and ROW restoration would compensate for habitat alteration. Therefore, cumulative impacts on the Western bumblebee are expected to be insignificant, because the combined impacts to the 4.1 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize impacts include site restoration and habitat enhancement measures (See Appendix N of the BA). Site restoration includes enhancement of soil productivity and noxious weed treatments. A native grass mix would be used to benefit federally-listed plant and insect species and may also provide food sources for the bumblebee. For a full discussion of conservation plans that promote grassland and insect habitat see Appendix O of the BA.

As part of the CMP, Riparian Reserves would be restored or maintained through the NWFP Aquatic Conservation Strategy. Meadows and wetlands would be protected, or enhanced with vegetation. Species-specific measures that enhance pollen sources for federally-listed butterflies may benefit bumblebees (see Appendix L, O and P of the BA).

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the western bumblebee because the proposed Project would affect only approximately 4 percent of available suitable habitat for this species within the analysis area.

6.2.6.3 Siskiyou short-horned grasshopper (Chloealtis aspasma)

Species Status in the Project Area

Siskiyou short-horned grasshoppers are distributed in two general areas: the Siskiyou and Cascade mountain ranges in Jackson County in southwestern Oregon, and Benton County in

west-central Oregon. As shown in Table 1, the species is suspected to occur in the Umpqua National Forest and has been documented at Dead Indian Plateau in the Rogue River National Forest; it has not been documented and is not suspected to occur in the Winema National Forest. There is one documented observation of the Siskiyou short-horned grasshopper within 1 mile of the Project on the Rogue River National Forest (Forest Service 2006, ORBIC 2012).

This grasshopper lives in grasslands and is dependent upon elderberry for egg-laying. It is active July through September. This species has also been observed in clearings created by old clearcuts and vegetated with grasses, forbs, and elderberry, and on the brushy edges of clearcuts (Foster 1974). It is known to occur in Jackson County, Oregon at elevations between 5,000 and 5,800 feet. The closely related species *C. conspersa* feeds primarily on grasses and to a lesser extent on forbs (Gangwere 1961); Siskiyou short-horned grasshoppers may exhibit similar feeding behavior.

Threats to this species include the loss of open meadows at higher elevations which can lead to the elimination of habitat for the host plant (Brenner 2006). Sources of meadow loss include fire prevention and restricted timber clearing (Brenner 2006). Other threats include birds, which may feed on the juveniles and adults, and the predator *Goniopsita oophaga* whose larvae infest egg pods (Brenner 2006).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes grassland and herbaceous habitat within 3,200 feet of the proposed action in the Rogue River and Umpqua national forests. Based on the habitat description above, we inferred that the Siskiyou short-horned grasshopper is associated with the Westside Grasslands, Eastside Grasslands, and Herbaceous Wetlands Johnson and O'Neil (2001) habitat types, as shown below. Table 36 lists the acreages of those habitats impacted by the Project, as well as the total acreage available within the analysis area for the Siskiyou short-horned grasshopper.

Table 36. Siskiyou Short-horned Grasshopper Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside Grasslands	Close	Feeds and Breeds	3.37	0.46	10.67[3/]	35.90%[3/]
Eastside Grasslands	Close	Feeds and Breeds	0.39	0	0.61[3/]	63.93%[3/]
Herbaceous Wetland	General	Feeds and Breeds	0.09	0.00	0.95	9.47%
Total			**3.85**	**0.46**	**12.23**	**35.24%**

1/ Totals taken from Table 5 for the Rogue River and Umpqua national forests in which the species has been documented or is susptected to occur.

Table 36. Siskiyou Short-horned Grasshopper Habitat Associations						
Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
2/ Totals taken from Table 3 for the Rogue River and Umpqua national forests in which the species has been documented or is suspected to occur; does not include habitat located in the Winema National Forest or on other federal or non-federal lands 3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.						

Based on these habitat association assumptions, approximately 35 percent of available potentially suitable habitat within the analysis area would be affected by the Project. Impacts would include loss of elderberry plants used for breeding, and loss of forage species. However, as discussed above, these calculations of potentially suitable habitat are likely overestimates as grassland habitat outside of the Project area was not fully delineated. Additionally, this species has been documented in clear-cuts, and timber clearing appears to provide open habitat for the host plant, blue elderberry, thereby increasing local populations of Siskiyou short-horned grasshoppers (Brenner 2006). As a result, removal of woody vegetation by the Project, and maintenance of the ROW in an early seral stage could create habitat for this species.

Direct mortality could occur during clearing and construction if individuals are not able to get out of the way, although grasshoppers are relatively mobile. Plants containing eggs could also be destroyed. Although elderberry trees containing eggs disturbed during construction would be negatively impacted, Project effects to breeding and foraging habitat would be temporary as the ROW would be restored following construction, and grassland habitats disturbed during construction would recover relatively quickly. Additionally, meadow restoration and elderberry plantings as described below under Conservation Measures and Mitigation would benefit the Siskiyou short-horned grasshopper.

Cumulative Effects

The short-horned grasshopper cumulative effects analysis area includes the fifth field watersheds crossed by the Project in the Umpqua and Rogue River national forests (Table 12). A major threat to this species is restricted timber clearing or fire prevention that lead to the loss of open habitat at high elevations (Brenner 2006). Other threats include removal of host plants by livestock and predation by other insects and birds. Under the NWFP, LSRs in the area are likely to improve habitat for this species with the maintenance of forest gaps and frequency of low-intensity fire. Meadows are further protected under the NWFP through measures that conserve great gray owl habitat by prohibiting tree-clearing within 300 feet of a meadow's edge. In addition, standards and guidelines within the NWFP limit livestock grazing around aquatic areas. These actions would likely lead to improved quantity and quality of suitable habitat on Forest Service lands within the analysis area.

Construction of the pipeline and associated facilities would affect 1,950 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). As described above, Project impacts would include loss of elderberry plants used for breeding, and

loss of forage species. However, removal of woody vegetation by the Project, and maintenance of the ROW in an early seral stage could create habitat for this species. Within the the Rogue River and Umpqua national forests, 83 acres (17 percent) of the ROW is currently forested, but would be maintanted in an early seral stage within the 30-foot permanent corridor.

Proposed mitigation actions in the cumulative effects analysis area that would affect the short-horned grasshopper include fuels reduction and meadow habitat planting projects. Mitigation actions on federal lands would affect 7,337 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Fuels reduction projects could negatively affect the short-horned grasshopper by contributing to fire prevention, which can result in loss of meadow habitat and is listed as a threat to this species. However, approximately 20 acres of elderberry, the species' host plant, would be planted within the ROW near a known population on the Dead Indian Plateau, within the Rogue River National Forest, resulting in habitat creation. These proposed mitigation projects are described in detail in Appendix F of the DEIS (FERC 2014).

Within the cumulative effects analysis area planned projects include livestock grazing allotments, timber thinning projects, and anticipated clearcutting on private land. Livestock grazing and timber thinning could negatively affect the Siskiyou short-horned grasshopper and its habitat in a similar fashion as the Project by preventing fire and disturbing individuals and habitat. Clearcutting could benefit the Siskiyou short-horned grasshopper by creating openings where elderberries may establish.

The proposed Project, including mitigation actions, would affect approximately 9,287 acres. Combined with 12,779 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 21,623 acres, or 4.4 percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions could result in meadow habitat loss through fire prevention which is listed as a threat to this species. However, clearing of the ROW as well as planned clearcutting would create habitat for the Siskiyou short-horned grasshopper. Therefore, cumulative impacts on the Siskiyou short-horned grasshopper are expected to be insignificant, because the combined impacts to the 4.4 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize project-related impacts and reestablish grassland vegetation are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), and the Erosion Control and Revegetation Plan (Appendix F of the BA).

Specific mitigation measures developed to benefit the Siskiyou short-horned grasshopper are described in the CMP (see Appendix O of the BA). Approximately 20 acres of elderberry, the species' host plant, would be planted within the ROW near a known population on the Dead Indian Plateau, within the Rogue River National Forest. Additionally, Pacific Connector has an agreement in principle with the Forest Service which includes 125.3 acres of meadow

restoration on the Umpqua National Forest within the Elk Creek and Days Creek South Umpqua River watershed that would benefit native species including the Siskiyou short-horned grasshopper (FERC 2014). For a full discussion of measures that would promote grassland and insect habitat see Appendix O of the BA.

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the Siskiyou short-horned grasshopper because only approximately 4 acres of suitable habitat would be impacted, and approximately 20 acres of the ROW would be planted with elderberry, creating suitable habitat near a known population. Additionally, the proposed Project could create additional suitable habitat for this species by clearing woody vegetation, replanting with native grass and forb species, and controlling potential invasion by noxious weeds post-construction throughout the ROW.

6.2.6.4 Gray-blue butterfly (Plebejus podarce klamathensis)

Species Status in the Project Area

The gray-blue butterfly is found in the southern Cascades and eastern Siskiyou Mountains located in Douglas, Jackson, and Klamath counties (Pyle 2002). As shown in Table 1, the species has been documented in all three national forests crossed by the Project. There has been one documented observation of the gray-blue butterfly within 1-5 miles of the Project on the Winema National Forest; there are no documented observations of the species within 5 miles of the Project on the Rogue River or the Umpqua national forests (Forest Service 2006, ORBIC 2012).

Appropriate habitat includes marshy slopes and meadows that contain deep grasses and dense stands of false hellebore (*Veratrum viride*; Dornfeld 1980). The species has been recorded at high elevation wet montane meadows from 5,100 ft. to over 6,500 feet. Adults typically begin to fly during June at lower elevations and continue through September at higher elevations. The larval food plant in Oregon has not been reported, but shooting stars (*Dodecatheon jeffreyi* and *D. alpinum*) are the larval food plant in the Trinity and Sierra Nevada Mountains, California (Pyle 2002, Warren 2005). Adults typically feed on yellow flowers in the composite family (NatureServe 2013). Adults are very local and do not appear to wander much beyond their meadow habitat (Opler and Wright 1999).

Threats to the limited high elevation habitat the species depends on include succession, impacts from grazing and recreation, or desiccation due to water diversions (Opler et al. 2006). Succession may include the encroachment of trees or woody shrubs that out compete native food plants. Grazing and recreation may trample or remove food plants while impacts to hydrology may influence moisture regimes and the abundance of native plants.

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable gray-blue butterfly habitat within 3,200 feet of the proposed action on the Rogue River and Winema national forests. Although this species has been documented on the Umpqua National Forest, the Project does not cross the Umpqua National Forest within the suspected distribution of the species (Jordan 2009); therefore no impacts are expected within the Umpqua National Forest and it is not included in this analysis.

Based on the habitat description above, we inferred that the the gray-blue butterfly is associated the Westside Grasslands, Eastside Grasslands, and Herbaceous Wetlands Johnson and O'Neil (2001) habitat types, as shown below. Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate. Nonetheless, Table 37 lists the acreages of those habitats impacted by the Project, as well as the total acreage available within the analysis area for the gray-blue butterfly.

Table 37. Gray-blue Butterfly Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside Grasslands	Close	Feeds and Breeds	3.37	0.46	10.67[3/]	35.90%[3/]
Eastside Grasslands	Close	Feeds and Breeds	1.3	0	2.57[3/]	50.58%[3/]
Herbaceous Wetland	Close	Feeds and Breeds	0.15	0	27.29	0.55%
Total			4.82	0.46	40.53	13.03%

1/ Totals taken from Table 5 for the Rogue River and Winema national forests in which the species has been documented to occur. Totals do not include the Umpqua National Forest because the proposed action does not cross the Umpqua National Forest within the range of the species.
2/ Totals taken from Table 3 for the Rogue River and Winema national forests in which the species has been documented to occur. Totals do not include the Umpqua National Forest because the proposed action does not cross the Umpqua National Forest within the range of the species.
3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

Based on these habitat association assumptions, approximately 5 acres, or 13 percent of available potentially suitable habitat within the analysis area would be affected by the Project; all three habitat types identified are assumed to be used by the gray-blue butterfly for feeding and breeding.

Direct mortality could occur to this species if individuals are located within the ROW during Project clearing or construction, including mortality of eggs, caterpillars, and nectaring adults, although adults would likely be able to fly out of the way of construction equipment. Another

potential direct effect is destruction or alteration of the high elevation wetland and meadow habitats used by this species. However, these habitats within the ROW would be revegetated following construction to approximate the original pre-disturbed condition. As described in Pacific Connector's Erosion Control and Revegetation Plan (Appendix F of the BA), all graded areas associated with pipeline construction would be regraded and recontoured as feasible to blend into the surrounding landscape and to reestablish natural drainage patterns. This would minimize changes in hydrology, which is listed as a threat to this species. Pacific Connector would also mitigate soil compaction during ROW restoration by regrading, recontouring, and scarifying compacted areas. These actions would promote infiltration, reduce surface water runoff, minimize erosion, and enhance revegetation efforts.

Indirect effects could result from the alteration of composition and structure of food plants resulting from changes in hydrology or soil compaction. However, as described above, changes in hydrology and soil compaction would be minimized following construction, and the ROW would be reseeded using an appropriate seed mix, which would minimize the loss of food plants in the long term. Therefore, although the Project could result in some impacts to individuals and habitat, considering site restoration measures designed to minimize compaction and changes in hydrology, and promote revegetation, the Project is not expected to result in a loss of viability for this species.

Cumulative Effects

The cumulative effects analysis area for the gray-blue butterfly includes the fifth field watersheds crossed by the Project on the Rogue River and Winema national forests (Table 12). Habitat types preferred by the gray-blue butterfly have been negatively impacted over the past 200 years. Development has concentrated around bodies of water, increasing disturbance and eliminating habitat. Wetlands and wet meadows have been drained and trampled by grazing livestock. However, the NWFP has special land use allocations around riparian areas, streams, lakes, ponds, and wetlands that protect these resources. Wetlands are often associated with meadows, another habitat component for blue-gray butterflies. Meadows are further protected under the NWFP through measures that conserve great gray owl habitat by prohibiting tree-clearing within 300 feet of a meadow's edge. In addition, standards and guidelines within the NWFP limit livestock grazing around aquatic areas. These actions would likely lead to improved quantity and quality of suitable blue-gray butterfly habitat on NFS land within the analysis area.

Construction of the pipeline and associated facilities would affect 962 acres within the cumulative effects analysis area, or 0.3 percent of the total watershed area (Table 12). The Project would result in habitat modification as well as potential direct mortality to individuals during construction. However, as described above, effects would be short term because meadow habitats within the ROW would be revegetated following construction to approximate the original pre-disturbed condition.

Mitigation actions on federal lands would affect 1,100 acres within the cumulative effects analysis area, or 0.3 percent of the total watershed area (Table 12). However, the only proposed mitigation actions in the cumulative effects analysis area with the potential to affect

the gray-blue butterfly is the meadow habitat planting project described above for the Siskiyou short-horned grasshopper. This meadow habitat planting designed to benefit other meadow species (Mardon skipper, short-hormed grasshopper) within the ROW on 20 acres in the Rogue River National Forest could also benefit the gray-blue butterfly.

Planned projects within watersheds where the proposed action crosses the Rogue River and Winema national forests include a variety of timber, grazing and biological projects (Table 11). On the Rogue River National Forest, there are 8 livestock grazing allotments planned within the Little Butte Watershed (Table 11). On the Winema National Forest, there are 7 planned projects within the Spencer Creek Watershed that consist of several livestock grazing allotments, road maintenance, noxious weed treatments and reclamation activities associated with this Project (Table 11). The large number of thinnings combined with the aquatic habitat restoration and noxious weed treatments would most likely contribute to the long term health of the ecosystem. However, the timber sales, grazing allotments, and clearcuts could contribute to habitat alteration and disturbance within the vicinity of the proposed Project, especially where the livestock grazing tramples food plants and alters hydrology by compacting soil at high elevation wet meadows.

The proposed Project, including mitigation actions, would affect approximately 2,062 acres. Combined with 2,875 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 4,631 acres, or 1.6 percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions could contribute to forest succession and impacts from grazing, which are listed as threats to the species (Opler et al. 2006). However, meadow habitat planting and ROW restoration would mitigate these effects. Therefore, cumulative impacts on the gray-blue butterfly are expected to be insignificant, because the combined impacts to the 1.6 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts and promote meadow habitat are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), and the Erosion Control and Revegetation Plan (Appendix F of the BA). Specific measures that would minimize impacts include site restoration and habitat enhancement measures as described above and discussed in the CMP (see Appendix O of the BA). A native grass mix would be used to benefit federally-listed plant species and may also provide suitable habitat for the butterfly.

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the gray-blue butterfly because

the proposed Project would affect only approximately 5 acres of potentially suitable habitat, and would restore the ROW to pre-disturbance conditions following construction.

6.2.6.1 Johnson's hairstreak (Callophrys johnsoni)

Species Status in the Project Area

The Johnson's hairstreak butterfly is found on Pacific-sloped mountains from British Columbia south to central California. In Oregon, populations have been found on the west side of the southern Cascade Mountains. In western Oregon, the species occupies a wide range of elevations, between 500 to over 5,000 feet (Warren 2005). There are 121 sites in Oregon and Washington and an undisclosed number of sites on NFS land (Andrews 2010b, Davis and Weaver 2011, Stone et al. 2011). As shown in Table 1, the species has been documented in all three national forests crossed by the Project. Neither the Forest Service nor ORBIC location database records contained observations of the Johnson's hairstreak butterfly within 5 miles of the Project on NFS lands (Forest Service 2006, ORBIC 2012).

Larsen et al. (1995) states that old-growth and late successional second growth forests provide the best habitat for this butterfly, although younger forests where mistletoe (*Arceuthobium* spp.) is present also supports populations. The most important habitat features to predict moderate to high abundance is the presence of its host larval plant, pine dwarf mistletoe (Davis 2009). The butterfly can occur in western hemlock (*Tsuga heterophyla*), ponderosa pine (*Pinus ponderosa*) or white fir (*Abies concolor*) forests that are infected with mistletoe (Davis 2009). Once hatched, caterpillars feed on the host plant (Opler et al. 2006). Adults fly from mid-May to early September with peaks occurring in May and August (Pyle 2002, Davis 2009). Adult food plants include nectar from genera *Actostophylos, Ceanothus, Cornus, Fragaria, Rorippa, Spraguea* and *Taraxacum* (Andrews 2010b).

Threats to the species are not fully understood but timber harvest and clearing, particularly involving stands that contain larval plants, is assumed to be the primary threat (Andrews 2010b). Additional threats may include the aerial broadcast of the bacteria *Bacillus thuringiensis kurstaki* to control spruce budworm outbreaks, although it is not know to what extent. Finally, herbicides may remove nectar plants which may affect individuals (Andrews 2010b).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes coniferous forests within 3,200 feet of the proposed action on the three national forests crossed by the Project. Based on the habitat description above, we inferred that Johnson's hairstreak is closely and generally associated with the Johnson and O'Neil habitat types shown below, especially where its host larval plant, pine dwarf mistletoe, is present. Table 38 lists the acreages of those habitats impacted by the Project, as well as the total acreage available within the analysis area for the Johnson's hairstreak.

Table 38. Johnson's Hairstreak Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside-Lowland Conifer-Hardwood-Forest	General	Feeds and breeds	0	0	0	0.00%
Montane Mixed Conifer Forest	General	Feeds and breeds	81.04	26.33	833.4	12.88%
Southwest Oregon Mixed Conifer-Hardwood Forest	General	Feeds and breeds	335.02	96.54	11,980.17	3.60%
Ponderosa Pine Forest and Woodlands	General	Feeds and breeds	0.01	0	957.7	0.00%
Westside Oak and Dry Douglas-fir Forest and Woodlands	General	Feeds and breeds	0	0	0	0.00%
Total			416.07	122.87	13771.27	3.91%

1/ Totals taken from Table 5 for the Rogue River, Winema, and Umpqua national forests in which the species has been documented to occur.
2/ Totals taken from Table 3 for the Rogue River, Winema, and Umpqua national forests in which the species has been documented to occur.

Based on these habitat association assumptions, approximately 4 percent of available potentially suitable habitat within the analysis area would be affected by the Project.

This species could be negatively impacted by the Project by the clearing of mistletoe host trees containing eggs or larvae and by alteration of habitat which could impact adult food plants and remove potential host trees, all of which are listed as current threats ot this species (Andrews 2010b). Indirect effects could result from the alteration of composition and structure of vegetation resulting in changes in microclimate. However, the Project would only affect approximately 4 percent of habitat available within the analysis area. Additionally, impacts to old-growth and late successional forests that provide the best habitat for this butterfly have been minimized where feasible, and compensatory mitigation proposed to offset impacts to NSO and marbled murrelet habitat may benefit the Johnson's hairstreak by creating and protecting old-growth and late successional forests, as described in the CMP (Appendix O of the BA).

Application of herbicides during noxious weed treatments may also have an indirect effect on the species by removing nectar sources. Vegetation at aboveground facilities would be periodically maintained using mowing, cutting, trimming and the selective use of herbicides[5]. Project herbicide application could reduce available floral sources for the Johnson's hairstreak,

[5] Pacific Connector would obtain applicable approvals or permits for use of herbicides on federal lands prior to use/treatment. Herbicides approved for use on NFS land include Chlorsulfuron, Glyphosate, Imazapyr, Metsulfuron methyl, Picloram, Sulfometuron methyl, Triclopyr, Sethoxydim, and Imazapic; see Pacific Connector's Integrated Pest Management Plan for details, Attachment 14 to the POD.

which Andrews (2010b) lists as a threat. However, herbicides would only be used where they are most appropriate treatment method, and would be applied using spot treatments to minimize impact to native or non-target species. The Project would not contribute to the third threat listed above, application of the bacterium *Bacillus thuringiensis kurstaki* to control spruce budworm outbreaks.

Cumulative Effects

The Johnson's hairstreak cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Rogue River, Umpqua, and Winema national forests (Table 12).The primary threat to Johnson's hairstreak is timber harvest and clearing. Over the past 200 years, timber clearing has dramatically decreased late successional and old-growth forest habitats in Oregon upon which the Johnson's hairstreak depends. Compared to historical times, only eight percent of this habitat type remains in the Coast Range of Oregon, 23 percent in the West Cascades, and 25 percent in the Klamath Mountains province (ODFW 2006). The NWFP designates late successional and old-growth forests on federal lands as protected areas and manage them for optimal habitat characteristics. Because the larval host plant is associated with late-seral and old growth habitat, management under the NWFP would maintain or potentially increase the quality and quantity of Johnson's hairstreak habitat in the future.

Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Project impacts would include habitat destruction, as well as potential effects from herbicide use. However, impacts to old-growth and late successional forests that provide the best habitat for this butterfly have been minimized where feasible, and compensatory mitigation proposed to offset impacts to NSO and marbled murrelet habitat may benefit the Johnson's hairstreak by creating and protecting old-growth and late successional forests, as described in the CMP (Appendix O of the BA).

Proposed mitigation actions in the cumulative effects analysis area include reallocation of Matrix to LSR, road decommissioning, and pre-commercial thinning. Mitigation actions on federal lands would affect 7,734 acres within the cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12). There could be some negative short-term impacts of these actions, including disturbance during implementation and potential removal of the host larval plant, pine dwarf mistletoe. However, overall, these projects would benefit the Johnson's hairstreak through habitat improvements and a reduction in disturbance over the long term. Reallocation of Matrix to LSR would offset the long-term loss of LSR acres, and thus ensure future availability of late-successional habitat. Decommissioning and planting of selected roads in conjunction with pre-commercial thinning treatments would block up forested habitat and reduce edge effects and fragmentation in a period of about 40 years. Density management of forested stands would assist in the recovery of late-seral habitat, reduce impacts from fragmentation, reduce edge effects, and enhance resilience of mature stands, all of which would benefit this late-successional associated species. These proposed mitigation projects are described in detail in Appendix F of the DEIS (FERC 2014).

Planned projects within the cumulative effects analysis area that could affect the Johnson's hairstreak include a variety of timber projects. Forest Service projects include several timber treatments; other projects include clearcutting on private lands, and a BLM timber sale (Table 11). These projects would contribute to the assumed primary threat to this species: timber harvest and clearing (Andrews 2010b).

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 22,321 acres, or 4.1 percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions would contribute to the threats to this species from timber harvest and clearing. However, Project mitigation would compensate for habitat loss. Therefore, cumulative impacts on the Johnson's hairstreak are expected to be insignificant, because the combined impacts to the 4.1 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), and the Erosion Control and Revegetation Plan (Appendix F of the BA).

The Forest Service proposed re-allocation of nearly 1,200 acres of forested lands from matrix to LSR allocation would benefit Johnson's hairstreak over time by providing additional habitat that is managed to create late successional–old growth stand conditions. Details on this compensatory mitigation can be found in the CMP (Appendix O of the BA).

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for Johnson's hairstreak butterfly since the proposed Project would affect only 4 percent of available potentially suitable habitat for this species within the analysis area, and compensatory mitigation proposed for impacts to the NSO and marbled murrelet would also benefit Johnson's hairstreak.

6.2.6.2 Mardon skipper (Polites mardon)

Species Status in the Project Area

This butterfly species' distribution is limited to sites located in the southern Puget Sound of Washington, the Mt. Adams area in southern Washington, the north coast of California, and the Cascade Range in southern Oregon. Many seemingly suitable habitats within the Cascade Range are currently unoccupied (NatureServe 2013). Within Oregon, the Mardon skipper can be found in Jackson and Klamath Counties. As shown in Table 1, the species is suspected to occur in the Umpqua National Forest and has been documented in the Rogue River and

Winema national forests. The Mardon skipper has been observed once within 1 mile and twice within 1-5 miles of the Project in the Rogue River National Forest; there are no documented observations of the species within 5 miles of the Project in the Winema or the Umpqua National Forest (Forest Service 2006, ORBIC 2012).

The Mardon skipper is a small butterfly that inhabits grassland and meadow habitats dominated by fescue grasses (*Festuca* spp.). They complete one life cycle annually, with adults emerging from their chrysalis in late spring or early summer. Following mating, females deposit their eggs onto the stalks of fescue. The eggs hatch after 6 to 7 days, after which the larva feeds on fescue grasses for about 3 months before hibernating through the winter and spring as a pupa (Black and Vaughan 2005). Adults feed on the nectar of a variety of plants including blue violet (*Viola adunca*), lupine (*Lupinus* spp.), Idaho blue-eyed grass (*Sisyrinchium idahoense*), penstemon (*Penstemon* spp.), western wallflower (*Erysimum capitatum*), and clover; Scotch broom (*Cytisus scoparius*) is strongly avoided. Very little movement between populations or suitable habitat is believed to occur due to the Mardon skipper's inability to traverse through unsuitable habitat such as closed woodlands and shrub thickets (Black and Vaughan 2005). Most sites support less than fifty butterflies, while none support more than a few hundred (Black and Vaughan 2005).

The Mardon skipper is a U.S. Fish and Wildlife Service candidate species considered for listing under the ESA (ORBIC 2013; 64 FR 57539). Threats to Mardon skipper include direct impacts to eggs, larvae and pupae by unregulated off-road vehicle use, livestock grazing, and application of *Bacillus thuringiensis kurstaki*, used to control spruce budworm outbreaks (Kerwin 2011). Habitat loss or modification through conifer encroachment, noxious weed invasion, roadside maintenance, and grassland/meadow management activities such as prescribed burning and mowing are also threats (Kerwin 2011). Stochastic events and climate change also threaten this species (Kerwin 2011).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable mardon skipper habitat within 3,200 feet of the proposed action in the three national forests crossed by the Project. Based on the habitat description above, we inferred that the mardon skipper is associated the Westside Grasslands and Eastside Grasslands Johnson and O'Neil (2001) habitat types, as shown below. Table 39 lists the acreages of those habitats impacted by the Project, as well as the total acreage available within the analysis area for the mardon skipper.

Table 39. Mardon Skipper Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Westside Grasslands	Close	Feeds and Breeds	3.37	0.46	10.67[3/]	35.90%[3/]

Table 39. Mardon Skipper Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Eastside Grasslands	Close	Feeds and Breeds	1.3	0	2.57[3/]	50.58%[3/]
Total			4.67	0.46	13.24	38.75%

1/ Totals taken from Table 5 for the Rogue River, Winema, and Umpqua national forests in which the species has been documented or is susptected to occur.
2/ Totals taken from Table 3 for the Rogue River, Winema and Umpqua national forests in which the species has been documented or is suspected to occur; does not include habitat located on other federal or non-federal lands.
3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

Based on these habitat association assumptions, approximately 5 acres, or 39 percent of available potentially suitable habitat within the analysis area would be affected by the Project. However, as discussed above, these calculations of potentially suitable habitat are likely overestimates as grassland habitat outside of the Project area was not fully delineated.

Pipeline construction could directly affect the Mardon skipper by increasing invasion by exotic plant species, impacting grassland habitat, or by direct mortality or disturbance during construction activities, all of which Kerwin (2011) lists as threats to this species. Eggs or pupae could also be destroyed during vegetation removal. Indirect effects could result from the alteration of composition and structure of vegetation resulting in changes in microclimate. However, these habitats within the ROW would be revegetated following construction to approximate the original pre-disturbed condition, and would be replanted with appropriate seed mixes to prevent noxious weed germination. Additionally, after construction, the ROW would be monitored and any noxious weed infestations would be controlled as described in Pacific Connector's Integrated Pest Management Plan (Attachment 14 to the POD).

The Forest Service has identified a specific on-site mitigation measure within the Rogue River National Forest that would benefit the Mardon skipper. Approximately 20 acres of the ROW near a known population on the Dead Indian Plateau would be restored with grasses (including *Festuca* sp.) preferred by the Mardon skipper in addition to the rehabilitation required under best management practices guidelines. Planting grass species preferred by the Mardon skipper would result in the creation of habitat along the permenant open corridor created by the Project, and would immediately benefit the known population at that location. Therefore, although the Project could result in some impacts to individuals and habitat, considering site restoration measures designed to promote revegetation with desirable species and prevent the spread of noxious weeds, the Project is not expected to result in a loss of viability for this species.

Cumulative Effects

The mardon skipper cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua and Rogue River national forests (Table 12). Native grasslands are one of the most imperiled habitats in the western U.S., including Oregon, due to conversion

to agriculture, development, invasion by non-native plant species, and fire suppression. In the Coast Range and West Cascades of Oregon, grassland loss since historical times is estimated at 99 percent (ODFW 2006). Sustainable grazing practices help maintain existing grasslands. Noxious weed treatments promote native vegetation and may benefit native grasslands and pastures.

Construction of the pipeline and associated facilities would affect 1,950 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). As described above, Project impacts would include habitat modification as well as potential mortality of individuals during construction. However, removal of woody vegetation by the Project and maintenance of the ROW in an early seral stage could create habitat for this species, and post-construction restoration would prevent noxious weeds from establishing. Within the the Rogue River and Umpqua national forests, 83 acres (17 percent) of the ROW is currently forested, but would be maintanted in an early seral stage within the 30-foot permanent corridor.

Proposed mitigation actions in the cumulative effects analysis area that would affect the mardon skipper include fuels reduction and meadow habitat planting projects. Mitigation actions on federal lands would affect 7,337 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Fuels reduction projects could negatively affect the mardon skipper by contributing to fire prevention, which could result in conifer encroachment which is listed as a threat to this species. However, within the Rogue River National Forest approximately 20 acres of the ROW near a known population on the Dead Indian Plateau would be planted with species preferred by the mardon skipper, resulting in habitat creation. These proposed mitigation projects are described in detail in Appendix F of the DEIS (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). Forest Service projects include a weed treatment project, several timber treatments, a grazing allotment, and a fuelbreak project; other projects include clearcutting on private lands, and a BLM timber sale (Table 11). The noxious weed treatments would benefit the mardon skipper by reducing the threat of noxious weed invasion. However, the timber sales, livestock grazing allotments, and clearcuts could contribute to habitat alteration and trampling of individuals within the vicinity of the proposed Project.

The proposed Project, including mitigation actions, would affect approximately 9,287 acres. Combined with 12,779 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 21,623 acres, or 4.4 percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions could result in meadow habitat loss through fire prevention and the associated conifer encroachment, and trampling of individuals during livestock grazing; both are listed as a threat to this species. However, clearing of the ROW and restoration following construction would create habitat for the mardon skipper. Therefore, cumulative impacts on the mardon skipper are expected to be insignificant, because the combined impacts to the 4.4 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would minimize Project-related impacts include revegetating and reseeding the ROW using native vegetation, avoiding soil compaction by performing construction during dry periods (May-October) and potentially using helicopters in rugged terrain, and controlling for invasive species after construction (see Appendix N of the BA).

As discussed above, approximately 20 acres of the ROW near a known population on the Dead Indian Plateau would be restored with grasses (including *Festuca* sp.) preferred by the Mardon skipper in addition to the rehabilitation required under best management practices guidelines. An additional 120 acres in the Umpqua National Forest would be treated for noxious weeds and encroaching conifer trees and planted with native vegetation. Additionally, Pacific Connector has an agreement in principle with the Forest Service which includes 125.3 acres of meadow restoration on the Umpqua National Forest within the Elk Creek and Days Creek South Umpqua River watershed that would benefit native species including Mardon skipper (FERC 2014). For a full discussion of mitigation activities that promote Mardon skipper habitat see Appendix O of the BA.

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species**" for the Mardon skipper butterfly since the proposed Project would affect approximately 5 acres of potentially suitable habitat for this species, but create approximately 20 acres of Mardon skipper habitat by planting grass species preferred by the Mardon skipper on 20 acres of the ROW, and controlling for noxious weeds throughout the ROW.

6.2.6.3 Coronis fritillary (Speyeria coronis coronis)

Species Status in the Project Area

This butterfly subspecies is found in low densities in the Siskiyou Mountains, Oregon. The majority of known records are from Josephine County, and there are a few records from Jackson County, including the lower Rogue River valley and the Illinois River valley (Scheuering 2006b; Jordan 2011). As shown in Table 1, the subspecies has been documented in the Rogue River National Forest, and was recently documented on the Umpqua National Forest (Reilly and Black 2011); it has not been documented and is not suspected to occur in the Winema National Forest. Neither the Forest Service nor ORBIC location database records contained observations of the Coronis fritillary within 5 miles of the Project on Forest Service lands (Forest Service 2006, ORBIC 2012).

This subspecies inhabits mountain slopes, foothills, dry gulches, lower elevation canyons, prairie valleys, meadows, chaparral, sage steppe, and forest glades, margins, and openings (Evergreen Aurelians 1996, Opler et al. 2011). Most known records are from lower slopes at elevations less than 2,000 feet, although elevations of 4,400 feet and 5,100 feet have also been

recorded (Scheuering 2006b). In Oregon, *Speyeria coronis* adults often congregate on hillsides and meadows overgrown with rabbitbrush (*Chrysothamnus* spp.) and sagebrush (*Artemisia* spp.; Dornfeld 1980). The common food plant is species in the *Viola* genus.

Recent surveys of *S. coronis coronis* in Josephine County found this species to be generally associated with serpentine influenced, rocky hill-slopes dominated by Jeffery pine (*Pinus jeffreyi*) and other serpentine associated forbes and grasses (Reilly and Black 2011). The serpentine region of the Siskiyou Mountains consists of a roughly 450 square mile area that extend from the California border beyond Medford and includes portions of the Rogue River National Forest (Brooks 1987). Jackson County (i.e., Umpqua and Rogue River national forests) contain little serpentine soils so habitat conditions are likely different to what is found in the Illinois Valley, approximately 60 miles southwest.

On NFS lands, conifer encroachment and wildfire are potential threats at historical, current, and suspected sites. Controlled burning could also be an issue if conducted on a large scale in areas where this subspecies is known or suspected to occur. Additionally, habitat for this butterfly is threatened by off-road vehicle use at some sites (Jordan 2011).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable coronis fritillary habitat within 3,200 feet of the proposed action on the Rogue River and Umpqua national forests. Based on the habitat description above, we inferred that coronis fritillary is closely and generally associated with the Johnson and O'Neil habitat types shown below, especially on rocky hillslopes and where its primary host plant (*Viola hallii*) occurs. Table 40 lists the acreages of those habitats impacted by the Project, as well as the total acreage available within the analysis area for the coronis fritillary.

Table 40. Johnson's Hairstreak Habitat Associations

Habitat Type	Association	Activities	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Southwest Oregon Mixed Conifer-Hardwood Forest	General		284.75	92.47	11,718.15	3.22%
Shrub-Steppe	Close	Feeds and breeds	6.49	0.51	9.26	75.59%
Westside Grasslands	Close	Feeds and breeds	3.37	0.46	10.67[3/]	35.90%[3/]
Eastside Grasslands	Close	Feeds and breeds	0.39	0	0.61[3/]	63.93%[3/]
Total			295	93.44	11738.69	3.31%

1/ Totals taken from Table 5 for the Rogue River, Winema, and Umpqua national forests in which the species has been documented to occur.
2/ Totals taken from Table 3 for the Rogue River, Winema, and Umpqua national forests in which the species has been documented to occur.
3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

Based on these habitat association assumptions, approximately 3 percent of available potentially suitable habitat within the analysis area would be affected by the Project, although over 50 percent of feeding and breeding habitat would be affected. However, not all the acreage listed here is likely suitable habitat as the specific habitat components associated with this species may not be present, including rocky slopes and the presence of host violet species (*Viola* sp.). Additionally, little to no serpentine soils are likely present within the analysis area so the species is not expected to occur in the densities found at locations to the southwest in Josephine County where serpentine soils and associated vegetation are prevalent.

Direct mortality could occur to this species if they are located within the ROW during Project clearing or construction of suitable habitat such as chaparral, sage, or meadows are destroyed or altered. Indirect effects could result from the alteration of composition and structure of vegetation resulting in changes in microclimate. Soil compaction may occur from construction machinery while new artificial clearings may promote invasive weeds and alter hydrology. However, non-forested habitats within the ROW would be revegetated following construction to approximate the original pre-disturbed condition, and would be replanted with appropriate seed mixes to prevent noxious weed germination. Additionally, after construction, the ROW would be monitored and any noxious weed infestations would be controlled as described in Pacific Connector's Integrated Pest Management Plan (Attachment 14 to the POD).

Herbicides used to treat invasive weeds may remove nectar plants which may affect individuals, although herbicides would only be used where they are most appropriate treatment method, and would be applied using spot treatments to minimize impact to native or non-target species. Additionally, Jordan (2011) lists conifer encroachment, wildfire, controlled burning, and off-road vehicle use as threats to this species on NFS lands; the Project would not contribute to these threats, and may reduce conifer encroachment by clearing woody vegetation from the ROW.

Cumulative Effects

The coronis fritillary cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Rogue River and Umpqua national forests (Table 12). Serpentine soil habitats preferred by the Coronis fritillary have been previously impacted by mining, recreation, and timber harvest. Mining development concentrated around serpentine deposits, fragmenting habitats with roads. Although mining claims on national forests are no longer at historical levels, habitat impacts from development remain. Through motorized vehicle use plans, national forests limit the type and extent of off-road vehicle use (Forest Service 2009). Even though serpentine areas are generally low in forest productivity these lands have been cut for timber resulting in accelerated soil erosion and vegetation changes. Natural recolonization of disturbed serpentine soils is generally slow often taking decades for vegetation to become established. Managing these actions would likely lead to improved quantity and quality of suitable Coronis fritillary habitat on Forest Service lands.

Construction of the pipeline and associated facilities would affect 1,950 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). As described above, Project impacts would include habitat modification as well as potential

mortality of individuals during construction. However, removal of woody vegetation by the Project and maintenance of the ROW in an early seral stage could create habitat for this species, and post-construction restoration would prevent noxious weeds from establishing. Within the the Rogue River and Umpqua national forests, 83 acres (17 percent) of the ROW is currently forested, but would be maintanted in an early seral stage within the 30-foot permanent corridor.

Proposed mitigation actions in the cumulative effects analysis area that would affect the coronis fritillary include fuels reduction and meadow habitat planting projects. Mitigation actions on federal lands would affect 7,337 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Fuels reduction projects could negatively affect the mardon skipper by contributing to fire prevention, which could result in conifer encroachment which is listed as a threat to this species. However, wildlife is also listed as a threat to this species so reducing fire risk could benefit this species. Additionally, meadow habitat planting designed to benefit other meadow species (Mardon skipper, short-hormed grasshopper) within the ROW on 20 acres in the Rogue River National Forest could also benefit the coronis fritillary.

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). Forest Service projects include a weed treatment project, several timber treatments, grazing allotments, and a fuelbreak project. Other projects include clearcutting on private lands, and a BLM timber sale (Table 11). The noxious weed treatments would benefit the coronis fritilary by reducing the threat of noxious weed invasion. However, the timber sales, grazing allotments, and clearcuts could contribute to habitat alteration and disturbance within the vicinity of the proposed Project.

The proposed Project, including mitigation actions, would affect approximately 9,287 acres. Combined with 12,779 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 21,623 acres, or 4.4 percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions could result in meadow habitat loss through fire prevention and the associated conifer encroachment, which is listed as a threat to this species. However, as wildfire is also listed as a threat to this species, the fire supporession projects would also benefit the coronis fritillary. Additionally, clearing of the ROW and restoration following construction would create habitat for the coronis fritillary. Therefore, cumulative impacts on the coronis fritillary are expected to be insignificant, because the combined impacts to the 4.4 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts include revegetation and reseeding efforts, and road decommissioning and riparian planting that reduce soil compaction. To further avoid soil compaction, construction would occur during dry periods (May-October) and potentially use helicopters in rugged terrain (see Appendix N of the BA).

The CMP discusses mitigation measures that would generally benefit butterflies including native grasses restoration within 20 acres of the Rogue River National Forest and treatment of 120

acres of noxious weed and encroaching conifer trees in the Umpqua National Forest. Results for improvement would be immediate in stabilizing habitat surrounding the pipeline corridor. Additionally, Pacific Connector has an agreement in principle with the Forest Service which includes 125.3 acres of meadow restoration on the Umpqua National Forest within the Elk Creek and Days Creek South Umpqua River watershed that would benefit butterfly species (FERC 2014). For a full discussion of mitigation activities that promote butterfly habitat see Appendix O of the BA.

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the Coronis fritillary butterfly because the proposed Project would affect a small amount of the suitable serpentine habitat for this species, if any, and the highest population densities are located approximately 60 miles southwest of the Project.

6.2.7 Aquatic Invertebrates

Surveys were not conducted specifically for all special status aquatic invertebrates. Three of the 10 sensitive aquatic invertebrate species that were documented or suspected to occur in the national forests recieved Project-specific surveys (Table 1). These species were not found during surveys so they are not discussed here. The information on sensitive species occurrence is based on several GIS data sources including ORBIC occurrence records (ORBIC 2012), Johnson and O'Neil (2001) habitat associations, and the Forest Service NRIS database (Forest Service 2006).

6.2.7.1 Western ridged mussel (Gonidea angulata)

Species Status in the Project Area

Western ridged mussels are broadly distributed in Washington, Oregon, California, Idaho, Nevada, possibly Montana (Gangloff and Gustafson 2000), and southern British Columbia. In Oregon this species historically occurred in rivers of the Coastal Range, and the main stem and tributaries of the Columbia River, including tributaries to the Snake and Malheur Rivers and John Day River mainstem (Brim Box et al. 2006). As shown in Table 1, the species has been documented in the Winema, and is suspected to occur in the Rogue River and Umpqua national forests. Neither the Forest Service nor ORBIC location database records contained observations of the Western ridged mussel within 5 miles of the Project on Forest Service lands (Forest Service 2006, ORBIC 2012).

This species inhabits creeks and rivers of all sizes and can be found on substrates varying from firm mud to coarse particles; it is rarely found in lakes or reservoirs (Taylor 1981, Frest and Johannes 1995). Freshwater mussels are filter feeders that consume phytoplankton and zooplankton suspended in the water. Western ridged mussel is a relatively slow growing and long lived species that may live 20 to 30 years (Vannote and Minshall 1982, COSEWIC 2003).

Fertilized juvenile mussels attach to host fish for a period of weeks to months. Gravid females have been found from late March through mid-July, and juvenile mussels have been observed on fish from late March to early August (COSEWIC 2003, Spring Rivers 2007).

Threats include loss of host fish, introduction of non-native fish, dams, channel modification from channelization and suction dredge mining, thermal pollution, chemical pollution, sedimentation and siltation from silvicultural and agricultural practices, water withdrawal and diversion, and livestock grazing in riparian areas (Bogan 1993, Williams et al. 1993, Hovingh 2004, Lydeard et al. 2004, Krueger et al. 2007). Because this species prefers stable habitats, it may be particularly threatened by dewatering and other activities that cause shifting substrates, water level fluctuations, and seasonal hypoxia or anoxia (COSEWIC 2003). They are also particularly vulnerable during activities such as channel modification from channelization and suction dredge mining.

Analysis of Effects

Direct and Indirect Effects

The analysis area includes river and stream habitat within 700 feet of the proposed action within all three forests (47.6 acres, Table 2). The Project would impact 0.6 acres (Table 5), representing 1.3 percent of available habitat. Waterbodies to be crossed by the Project are shown in Appendix C; we assume that western ridged mussel could be present in all of these waterbodies. Waterbodies crossed include 8 on the Umpqua National Forest, 2 on the Rogue River National Forest, and 4 on the Winema National Forest (Appendix C).

The dry open cut method used to cross waterbodies would either be flume or dam and pump, both of which maintain downstream flows and isolate the construction area from the streamflow. Construction across small or intermediate waterbodies generally takes seven days using these methods. Some mortality could occur to individuals with this process, especially because they are sensitive to dewatering. Turbidity increases are generally low using this crossing method but could increase temporarily. Indirect effects could occur through the harvest of riparian vegetation on either side of the stream for the width of the ROW, potentially increasing sedimentation and solar exposure. Discharge of contaminants into streams from construction equipment is not expected.

Cumulative Effects

The Western ridged mussel cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua, Rogue River, and Winema national forests (Table 12). Habitat types preferred by the western ridged mussel have been negatively impacted over the past 200 years. The concentration of human development around suitable habitat has increased disturbance and eliminated habitat. Riparian areas have been damaged and removed by timber clearing practices and conversion to other uses. Riparian areas have also been trampled and polluted by grazing livestock. However, the NWFP has special land use allocations around Riparian Reserves, streams, lakes, ponds, and wetlands that protect these resources. Standards and guidelines within the NWFP limit livestock grazing around aquatic areas and

provide measures to minimize impacts from timber harvest. These actions would likely lead to improved quantity and quality of suitable western ridged mussel habitat, and the fish that they depend upon, on NFS lands within the analysis area.

Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Project impacts on the western ridged mussel include mortality during construction, as well as negative effects associated with increased sedimentation during construction, and following construction as a result of riparian vegetation removal. However, proposed mitigation would reduce sedimentation in the long-term within the cumulative effects analysis area. Mitigation actions proposed for federal lands that could affect resources used by the Western ridged mussel include fish passage, fuels reduction, road storm proofing, road decomissioning, in stream LWD placement, riparian planting, and stream crossing repair projects.

Mitigation actions on federal lands would affect 7,734 acres within the cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12). Sediment could be mobilized into waterbodies during fish passage, road decommissioning, and stream crossing repair projects, especially where culverts are removed or replaced; however, long term beneficial effects include reconnection of aquatic habitats, sediment reduction, and shade restoration. Restoration of these crossings includes riparian planting as a mitigation which would help offset the impact of shade removal where the Project affects streams and riparian areas. Fuels reduction and in-stream LWD placement projects would benefit the Western ridged mussel. Placement of LWD in streams adds structural complexity to aquatic systems, traps fine sediments and can contribute to reductions in stream temperatures over time. Fuels reduction projects would lower the risk of loss of mature stands and other valuable habitats to high-intensity fire, which can contribute substantial sediment to streams and result in flooding and and erosion during post-fire precipitation events. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). Forest Service projects that could additionally impact the western ridged mussel include a grazing allotment that could cause short-term channel modification and increased sedimentation, and several timber treatments that could potentially increase sedimentation and disturb riparian vegetation. However, multiple aquatic restoration projects within the Umpqua River sub-basin would benefit water quality and fish habitat within the watershed. Restoration projects include culvert replacements, Riparian Reserve timber thinning and road decommissioning.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 22,321 acres, or 4.1 percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions would contribute to sedimentation, which is listed as a threat to this species. However, Project mitigation as well as other planned projects would reduce sedimentation overall within the cumulative effects analysis area long-term through riparian planting and

various culvert repair and road decommissioning projects. Therefore, cumulative impacts on the Western ridged mussel are expected to be insignificant, because the combined impacts to the 4.1 percent of the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), the Erosion Control and Revegetation Plan (Appendix F of the BA), and the Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings which would contribute to the stability of the streambank and reduce erosion (Appendix N of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the the NWFP Aquatic Conservation Strategy. Several projects within the Rogue River, Winema, and Umpqua national forests would benefit the mussel and include the repair of over 30 stream crossings, riparian plantings and in-stream placement of woody debris that would provide cover and improve stream integrity. For a full description of CMP activities that would benefit the western ridged mussel see Appendix O of the BA.

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the Western ridged mussel because the proposed Project would affect a small amount of the suitable habitat for this species (approximately 1.3 percent within analysis area) and waterbody and wetland crossing methods would be applied during construction.

6.2.7.2 A caddisfly (Namamyia plutonis)

Species Status in the Project Area

This species of caddisfly occurs in the Coastal and Cascade Mountain Ranges of Oregon and California (Xerces Society 2009). *Namamyia plutonis* is known from Benton, Curry, Jackson, Josephine, Lane and Marion counties. As shown in Table 1, the species has been documented in the Rogue River National Forest and is suspected to occur in the Winema and Umpqua national forests. Neither the Forest Service nor ORBIC location database records contained observations of the caddisfly within 5 miles of the Project on Forest Service lands (Forest Service 2006, ORBIC 2012).

This species is is associated with open-water lakes, rivers, and stream habitats. Populations tend to be extremely localized and are patchily distributed. Currently, fewer than 30 locations are known to contain this caddisfly, which occurs in low numbers. This caddisfly tends to be

found associated with small streams in densely forested old growth or mature forest watersheds (Scheuering 2006a). Larvae have been found among core samples collected from areas composed of coarse gravel mixed with silt and organic sediments (Anderson 1976). In a single year the species develops from egg through five larval instars, pupate and then emerge as adults (Wiggens 1996). Regardless of habitat, caddisfly adults tend to remain somewhat near the emergence site where oviposition occurs (Collier and Smith 1998).

Threats to the caddisfly include chemical pollution, sedimentation, and eutrophication from construction and timber harvesting.

Analysis of Effects

Direct and Indirect Effects

The analysis area includes river and stream habitat within 700 feet of the proposed action within all three forests (47.6 acres, Table 2). The Project would impact 0.6 acres (Table 5), representing 1.3 percent of available habitat. Waterbodies to be crossed by the Project are shown in Appendix C; we assume that *Namamyia plutonis* could be present in all of these waterbodies. Waterbodies crossed include 8 on the Umpqua National Forest, 2 on the Rogue River National Forest, and 4 on the Winema National Forest (Appendix C).

The dry open cut method used to cross waterbodies would either be flume or dam and pump, both of which maintain downstream flows and isolate the construction area from the streamflow. Construction across small or intermediate waterbodies generally takes seven days using these methods. Some mortality could occur to individuals with this process. Turbidity increases are generally low using this crossing method but could increase temporarily. Indirect effects could occur through the harvest of riparian vegetation on either side of the stream for the width of the ROW, potentially increasing sedimentation and solar exposure. Discharge of contaminants into streams from construction equipment is not expected.

Cumulative Effects

The *Namia plutonis* cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Umpqua, Rogue River, and Winema national forests (Table 12). Habitat types preferred by the caddisfly have been negatively impacted over the past 200 years. Development has concentrated around bodies of water, increasing disturbance, and eliminating habitat. Riparian areas have been damaged and removed by timber clearing practices and conversion to other uses. Protection and management of riparian habitat including maintenance of shading, water quality, and sediment control would likely benefit this species (Xerces Society 2009). The NWFP designates Riparian Reserves around streams, lakes, ponds, and wetlands to protect these resources. Standards and guidelines within the NWFP limit livestock grazing around aquatic areas and provide measures to minimize impacts from timber harvest. These actions would likely lead to improved quantity and quality of suitable caddisfly habitat on Forest Service lands within the analysis area.

Construction of the pipeline and associated facilities would affect 2,181 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Project

impacts on *Namia plutonis* include mortality during construction, as well as negative effects associated with increased sedimentation during construction, and following construction as a result of riparian vegetation removal. However, proposed mitigation would reduce sedimentation in the long-term within the cumulative effects analysis area. Mitigation actions proposed for federal lands that could affect resources used by *Namia plutonis* include fish passage, fuels reduction, road storm proofing, road decomissioning, in stream LWD placement, riparian planting, and stream crossing repair projects. Mitigation actions on federal lands would affect 7,734 acres within the cumulative effects analysis area, or 1.4 percent of the total watershed area (Table 12).

Sediment could be mobilized into waterbodies during fish passage, road decommissioning, and stream crossing repair projects, especially where culverts are removed or replaced; however, long term beneficial effects include reconnection of aquatic habitats, sediment reduction, and shade restoration. Restoration of these crossings includes riparian planting as a mitigation which would help offset the impact of shade removal where the Project affects streams and riparian areas. Fuels reduction and in-stream LWD placement projects would benefit *Namia plutonis* if present. Placement of LWD in streams adds structural complexity to aquatic systems, traps fine sediments and can contribute to reductions in stream temperatures over time. Fuels reduction projects would lower the risk of loss of mature stands and other valuable habitats to high-intensity fire, which can contribute substantial sediment to streams and result in flooding and and erosion during post-fire precipitation events. Therefore, fuels reduction Project would benefit *Namia plutonis* by protecting both the aquatic habitat used by the species, as well as the surrounding mature forests with which it is associated. These proposed mitigation projects are described in detail in Appendix F of the DEIS for the Project (FERC 2014).

Planned projects within the cumulative effects analysis area include a variety of timber, fuel, grazing and biological projects (Table 11). Forest Service projects that could additionally impact *Namamyia plutonis* include a grazing allotment that could cause short-term channel modification and increased sedimentation, and several timber treatments that could potentially increase sedimentation and disturb riparian vegetation. Multiple aquatic restoration projects within the Umpqua River sub-basin would benefit water quality and fish habitat within the watershed. Restoration projects include culvert replacements, Riparian Reserve timber thinning and road decommissioning.

The proposed Project, including mitigation actions, would affect approximately 9,915 acres. Combined with 12,849 acres of overlapping reasonably foreseeable activities described above, acreage impacted within the cumulative effects analysis area includes 22,321 acres, or 4.1 percent of the total watershed area (Table 12). The proposed action combined with reasonably foreseeable actions would contribute to sedimentation, as well as potential eutrophication from construction and timber harvest, all of which are listed as a threat to this species. However, Project mitigation as well as other planned projects would reduce sedimentation overall within the cumulative effects analysis area long-term through riparian planting and various culvert repair and road decommissioning projects. Therefore, cumulative impacts on *Namamyia plutonis* are expected to be insignificant, because the combined impacts to the 4.1 percent of

the cumulative effects analysis area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific mitigation measures that would minimize impacts include the containment and safe disposal of hazardous materials and pollutants as discussed in the Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings. As part of the CMP, Riparian Reserves would be restored or maintained through the NWFP Aquatic Conservation Strategy, and a 100-foot buffer beyond the ordinary high water mark would be maintained. These activities and a full description of aquatic mitigation measures are found in Appendix L, N, and O of the BA.

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the *Namamyia plutonis* caddisfly because the proposed action would affect a small amount of the suitable habitat (approximately 1.3 percent within the analysis area) for this species and waterbody and wetland crossing methods would be applied during construction.

6.2.7.3 Archimedes springsnail (Pyrgulopsis archimedis)

Species Status in the Project Area

The possible range of the Archimedes springsnail includes Lower Klamath Lake and Tule Lake, California where sites have been documented in the past but have not been relocated and may be extinct (Frest and Johannes 1996). It is known from a handful of spring-influenced sites in the vicinity of Upper Klamath Lake in Klamath County, Oregon. The range description for the Archimedes springsnail is based on very few documented locations. As shown in Table 1, the species has been documented to occur on the Winema National Forest; it has not been documented and is not suspected to occur in the Rogue River or the Umpqua National Forest. Neither the Forest Service nor ORBIC location database records contained observations of the Archimedes springsnail within 5 miles of the Project on NFS lands.

The species is found in large spring outflows and spring-influenced sites near shore in Upper Klamath Lake. It is associated with open water-lakes, rivers, and stream habitats (Frest and Johannes 1996). The species prefers sites with gravel-boulder basalt and pumice substrates and few macrophytes. It grazes on the sides and lower surfaces of larger stones (Frest and Johannes 1996). The Archimedes springsnail is a totally aquatic gastropod with a single-year lifespan. The biology of this species is not well understood and needs further investigation.

Threats to the species includes the alteration or degredation of perennial water quality. A variety of activites can impact water quality and include road construction and maintenance, livestock

grazing, recreation, and dewatering springs for irrigation or construction (Frest and Johannes 1996).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes river and stream habitat within 700 feet of the proposed action within the Winema National Forest (38.95 acres, Table 2). The Project would impact 0.05 acres of that habitat (Table 5), representing 0.13 percent of available habitat. Waterbodies to be crossed by the Project include Spencer Creek and three tributaries to Spencer Creek on the Winema National Forest (Appendix C). These waterbody crossings are far from known sites – with the closest known site occurring greater than 10 miles from the Project.

If the species were to occur in impacted area, habitat modification could occur. Because this snail is an annual species, the entire population may be extirpated if all individuals at an isolated spring site are lost in one incident. Any action which reduces the ground water discharge at springs or seeps may result in adverse changes to water chemistry and habitat quality in downstream habitats especially during Project related activities such as trenching and waterbody crossing. Lowering the water table or diverting the outflow of springs such that sites are dewatered, even temporarily, can eliminate an entire population (Frest and Johannes 1996).

Cumulative Effects

The Archimedes springsnail cumulative effects analysis area consists of the Spencer Creek fifth field watershed. Construction of the pipeline and associated facilities would affect 231 acres within the cumulative effects analysis area, or 0.4 percent of the total watershed area (Table 12). Potentail Project impacts include habitat modification at stream crossings and potential mortality of individuals, if present. However, this species is not known to occur within 10 miles of the Project, and Upper Klamath Lake, where this species is documented, is outside the Spencer Creek fifth field watershed.

This species is threatened by habitat destruction and water quality degradation. The major determining factor for the persistence of the Archimedes springsnail at spring sites is perennial water quality. Any action which reduces the ground water discharge at springs or seeps may result in adverse changes to water chemistry and habitat quality in downstream habitats. Lake and river sites may be adversely affected by fluctuating water levels caused by drought or by draw-downs for irrigation or power generation. Several spring flows around Upper Klamath Lake have been altered during road construction, altering habitat conditions at snail sites. Sites may also be degraded by grazing cattle, as a result of trampling, pollution from feces and urine and removal of vegetation (Frest and Johannes 1996). However, the NWFP designates Riparian Reserves around streams, lakes, ponds, and wetlands to protect these resources. Standards and guidelines within the NWFP limit livestock grazing around aquatic areas and provide measures to minimize impacts from timber harvest. These actions would likely lead to improved quantity and quality of suitable habitat on Forest Service lands within the analysis area.

Several mitigation projects have been identified in the Spencer Creek watershed that would benefit the Archimedes springnail, if present, by reducing sedimentation and improving riparian vegetation conditions in the long term. Riparian planting is proposed for Spencer Creek, downstream of the Project crossing. Shade provided by the plantings would contribute to moderating water temperatures in Spencer Creek, and root strength provided by new vegetation would increase bank stability and decrease erosion and sediment depositions to Spencer Creek. Fencing between the Project ROW and an adjacent grazing allotment has been proposed in order to keep cattle from grazing newly re-vegetated areas in the Project corridor, including areas where the corridor crosses Spencer Creek, thus helping to ensure that erosion control and re-vegetation objectives are met. Approximately 1.0 mile of LWD placement is proposed for Spencer Creek to mitigate Project effects by adding structural complexity to the aquatic system, trapping fine sediments, and potentially reducing the stream temperature over time. Road decommissioning and ford hardening within the cumulative effects analysis area would also improve habitat for the Archimedes springsnail, if present. Mitigation actions on federal lands would affect 397 acres within the cumulative effects analysis area, or 0.7 percent of the total watershed area (Table 12).

Planned projects on the Winema National Forest include several grazing allotments, road maintenance, and noxious weed treatments (Table 11). Livestock grazing could contribute to habitat modification and increased sedimentation, and harvest treatments could potentially disturb riparian vegetation. Both these actions could reduce water quality and thus negatively affect the Archimedes springsnail. Bank stabilization and reduction of sediment flow would likely have long-term benefits for the species.

The proposed Project, including mitigation actions, would affect approximately 628 acres. Combined with 70 acres overlapping reasonably foreseeable activities, approximately 698 acres within the cumulative effects analysis area would be affected, or 1.3 percent of the total watershed area (Table 12). The proposed action as well as planned projects could temporarily increase sediment and remove riparian vegetation, thus degrading water quality within the cumulative effects analysis area. However, Project impacts on water quality would be temporary, and minimized or mitigated with the measures discussed below. Therefore, cumulative impacts on the Archimedes springsnail are expected to be insignificant because the combined impacts to the 1.3 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

Specific conservation measures that would help minimize Project-related impacts are described in the Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures (Appendix C of the BA), the Erosion Control and Revegetation Plan (Appendix F of the BA), and the Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA). Impacts to streams and waters would be reduced with use of erosion control and bank stability techniques. LWD would be left or reestablished along stream crossings which would contribute to the stability of the streambank and reduce erosion (Appendix N of the BA).

As part of the CMP, Riparian Reserves would be restored or maintained through guidance provided in the the NWFP Aquatic Conservation Strategy. Within the Winema National Forest, there are several projects planned within the Spencer Creek watershed that includes a stream crossing repair and approximately 1 mile of riparian plantings and in-stream placement of woody debris that would provide cover and improve stream integrity. In addition, over 5 miles of road would be decommissioned in Riparian Reserves to improve water quality and reduce fragmentation. For a full description of CMP activities that would benefit the Archimedes springsnail see Appendix O of the BA.

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for the Archimedes springsnail because the species is unlikely to be encountered, the proposed Project would affect a small amount of the suitable habitat (0.13 acres within analysis area) for this species and waterbody and wetland crossing methods would be applied during construction.

6.2.8 Plants and Fungi

Surveys were conducted for all vascular, non-vascular and fungi species on Forest Service lands. Botany surveys were conducted between April 13 and August 20, 2007, and April 28 and August 6, 2008. Reroutes of alternatives and minor route adjustments garnered additional surveys in 2010 and were conducted June through September (Table 41).

Table 41. Survey Schedule for Vascular and Non-Vascular Plant Surveys on National Forest Lands

Project Eco-Regions	MP	Vascular Surveys[1/]	Non-Vascular Surveys
South Umpqua Moist Forest (Includes the Umpqua National Forest)	89-113	June 7-August 2, 2007	
		June 20 and August 6, 2008	
		August 24, 2010	
Rogue Foothills Dry Conifer Forest and Valley Edges (Includes portions of the Rogue River National Forest)	113-150	April 13-30, 2007	
		June 14-29, 2007	
		April 28-May 23, 2008	
Cascade Moist Forest (Includes portions of the Rogue River and Winema national forests)	150-179	July 7-July 28, 2007	
		July 14 and August 3, 2008	
		August 16, 2010	

1/ 2010 surveys focused on alternative re-routes and persistence surveys for special status species observed during previous surveys.

Botanists worked in pairs or singly and walked the survey area on foot. Full coverage complete surveys were conducted along the centerline and in the construction ROW. Along the corridor

margins, surveys were conducted in an intuitive-controlled meander, where botanists stratified their survey effort, focusing on habitat(s) with potential for special status species. Botanists recorded all common species encountered in field notebooks. Species that could not be easily identified in the field were collected and identified later in the lab. Botanists maintained field notes of habitat encountered, and recorded MPs (or acres) considered to be suitable habitat for federal or state listed species. When a special status vascular or non-vascular plant species was encountered, botanists recorded the GPS location, determined the area and population (i.e., number of plants) of the plant site location, recorded habitat data and associated species, and mapped the site on 1:200 scale maps. Plant sites located on Forest Service lands were flagged for future location and identification. Plant site locations were later digitized into GIS shape files and site maps were created (SBS 2008, 2011a).

Surveys were conducted for over 200 vascular and non-vascular species. Of these species, one Forest Service sensitive species addressed in this BE, Bellinger's meadowfoam, was documented in the Rogue River National Forest. An additional Forest Service sensitive species, bensonia (*Bensoniella oregano*), was documented on BLM lands but is not discussed here as no impacts are expected on Forest Service lands (see Appendix A).

6.2.8.1 Bellinger's meadowfoam (Limnanthes floccosa bellingeriana)

Species Status in the Project Area

Bellinger's meadowfoam has a range restricted to several counties within northern California and southern Oregon. The species is considered a narrow endemic but locally abundant with relatively more occurrences on BLM and private lands than on Forest Service lands (Rolle 2014). In Oregon, this subspecies is known from over 100 sites in Jackson County and an unknown number in Klamath County (NatureServe 2013, ORBIC 2013, Rolle 2014). As shown in Table 1, the species has been previously documented on the Rogue River National Forest; it has not been documented and is not suspected to occur in the Winema or the Umpqua national forest. Bellinger's meadowfoam has been observed within the impact area and within 1 mile of the Project in the Rogue River National Forest. Field surveys in 2008 located approximately 2,300 plants within 0.5 acres in clay soils in a seasonally saturated rocky meadow at MP 154.1 (SBS 2008). In 2010, surveys documented approximately 30,000 plants within 0.8 acres between MPs 154.8 and 154.7, in the vicinity of Heppsie Mountain (SBS 2011a).

The species is associated with cismontane woodlands and moist meadows with seeps and wetlands. Woodlands typically have an open canopy where oaks and conifer trees dominate and understories may be open and herbaceous or closed and shrubby (CalFlora 2014). It is associated with vernally wet meadows or vernal pools, and is generally found on nutrient-poor basalt scablands. The species typically occurs at elevations between 1,000 and 4,000 feet and blooms from April to June (Meinke 1982). This species is able to grow on disturbed sites and withstand grazing, although it is unable to complete with weedy species (Rolle 2014).

Bellinger's meadowfoam has a global status of vulnerable and current population trends appear stable but not increasing (NatureServe 2013). A major threat to Bellinger's meadowfoam is habitat degradation as non-native invasive plant species continue to move onto vernally moist

scablands. In addition, grazing of vernally moist areas and hydrologic manipulations of all kinds that alter or dry out vernally moist areas may contribute to the decline of this species (Rolle 2014).

Analysis of Effects

Direct and Indirect Effects

The analysis area includes all suitable Bellinger's meadowfoam habitat within 700 feet of the proposed action in the Rogue River National Forest. Table 42 shows the habitat types in the analysis area with which the species is generally or closely associated, and the acreages of those habitats impacted by the Project.

Table 42. Bellinger's Meadowfoam Habitat Associations

Habitat Type	Association	Total Acres Removed[1/]	Total Acres Modified[1/]	Total Acres in Analysis Area[2/]	Percentage Impacted
Herbaceous Wetlands	Closely Associated	0	0	0.06	0%
Westside Riparian Wetlands	Generally Associated	0	0	8.34	0%
Eastside Riparian Wetlands	Generally Associated	0	0	0	0%
Westside Grasslands	Generally Associated	3.37	0.46	10.67	35.9%
Eastside Grasslands	Generally Associated	0.39	0	0.61	63.9%
Total		**3.76**	**0.46**	**19.68**	**21.4%**

1/ Totals taken from Table 5 for the Rogue River National Forest in which the species has been documented to occur.
2/ Totals taken from Table 2 for the Rogue River National Forest in which the species has been documented to occur; does not include habitat located in the Umpua or Winema national forests or on other federal or non-federal lands.
3/ Delineation of grassland habitat outside of Project impacts was limited so the total acres within the analysis area is likely an underestimate, and the percentage impacted is likely an overestimate.

Direct impacts to the site observed in 2008 at MPs 154.1 would not be expected as the TEWA proposed for that location was eliminated from consideration, and the site is now approximately 95 to 255 feet south of a TEWA at its closest distance to the Project.

Potential impacts to the site observed in 2010 between MPs 154.8 and 154.7 include removal of individuals and permanent loss or alteration of habitat including changes in hydrology. The site is located in a vernally moist scabland meadow within the proposed Project ROW and a TEWA and therefore would be disturbed by the Project (SBS 2011a; Rolle 2014). Approximately 10 percent of the population was in the proposed ROW and an immediately-adjacent TEWA. Another 80 percent was in a large TEWA that included nearly all of the meadow to the south of the ROW. Approximately 10 percent was outside of the construction area. Direct effects of the proposed action would consist of temporary disturbance and permanent loss or alteration of habitat by directly removing or damaging plants, compacting soils, or disturbing the soil layers.

The Project could also potentially impact the hydrology of this site because construction activities would disturb soil composition and potentially influence erosion and water retention properties. A source seep is located at the head of the meadow, approximately 200 feet from the centerline.

Indirect effects could include removal of currently unoccupied but suitable habitat such as wet meadows, wet prairies, and wetland and riparian areas. Construction activities could create opportunities for invasive species that could outcompete and/or exclude Bellinger's meadowfoam from areas previously inhabited.

Although Project activities would affect the local population at MP 154.7, the species would not likely be eliminated from the site as it is able to grow on disturbed soil (Rolle 2014). Additionally, although the site that would be affected is one of only a few Bellinger's meadowfoam sites on Forest Service land, a large number of sites are known from BLM and private land in eastern Jackson County, Many more undocumented sites are likely to occur on unsurveyed private lands (Rolle 2014). Consequently, the expected loss of individuals and habitat at this site is not expected to affect the viability of Bellinger's meadowfoam over the broader geographic area of the low mountains and foothills of eastern Jackson County (Rolle 2014).

Cumulative Effects

The Bellinger's meadowfoam cumulative effects analysis area includes the fifth field watersheds crossed by the Project on the Rogue River National Forest: Big Butte Creek and Little Butte Creek. Construction of the pipeline and associated facilities would affect 731 acres within the cumulative effects analysis area, or 0.3 percent of the total watershed area (Table 12). Project impacts include removal of individuals, and habitat modification, although these effects would be minimized and mitigated as described below under Conservation Measures and Mitigation.

Noxious weeds and non-native invaders began to appear and spread with European settlement and continue to arrive today. The introduction of non-native invasive plants has increased dramatically in the past decade. Local spread of noxious weeds can be natural; but human activities such as, recreation, vehicle travel, and the movement of contaminated equipment, products, and livestock often greatly increase the distance and rate of dispersal. This spread of noxious weeds degrades native habitats, and has decreased suitable Bellinger's meadowfoam habitat.

Wetlands in the cumulative effects analysis area have been lost due to draining and conversion to other land uses. Continued canopy closure of wet meadows resulting from years of fire suppression may continue to shrink existing populations of Bellinger's meadowfoam. In addition, grazing of wet meadows and development of cattle troughs and irrigation ditches that dry down wetlands may also contribute to the decline of this species. Though one-third of Oregon wetlands are estimated to have been lost since the late 1700s, wetlands are now protected under federal law (Dahl 1990). The NWFP protects wetlands (Forest Service and BLM 1994). Riparian areas have also decreased dramatically, their acreage and connectivity lost to development, timber clearing, and grazing. The NWFP protects riparian areas by designating protected areas with specific management objectives around streams, ponds, and lakes.

Further, the NWFP has special land use allocations around riparian areas, streams, lakes, ponds, and wetlands that protect these resources. Wetlands are often associated with meadows, another habitat component for Bellinger's meadowfoam. Meadows are further protected under the NWFP through measures that conserve great gray owl habitat by prohibiting tree-clearing within 300 feet of a meadow's edge. These management activities may result in improved quantity and quality of Bellinger's meadowfoam habitat in the analysis area in the future.

On the Rogue River National Forest, planned projects include eight grazing allotments that could potentially impact suitable habitat for Bellinger's meadowfoam by introducing weeds or changing hydrology (Table 11). The planned projects would affect 2,805 acres, or 1.0 percent of the watersheds.

The proposed Project, including mitigation actions, would affect approximately 1,434 acres. Combined with 2,805 acres overlapping reasonably foreseeable activities, approximately 3,933 acres within the cumulative effects analysis area would be affected, or 1.4 percent of the total watershed area (Table 12). The proposed action as well as planned projects would remove individuals and degrade habitat; however, Project impacts would be mitigated through site restoration and noxious weed control as described below. Therefore, cumulative impacts on Bellinger's meadowfoam are expected to be insignificant because the combined impacts to the 1.4 percent of the watershed area are not expected to have a measureable effect on the species.

Conservation Measures and Mitigation

In order to avoid impacts to the Bellinger's meadowfoam site observed at MP 154.1 during surveys in 2008, Pacific Connector adopted a minor route adjustment and the site is now approximately 95 to 255 feet south of a TEWA at its closest distance to the Project; the Project is not expected to affect this site. Measures to avoid the site discovered in 2010 in the Rogue River National Forest, were considered but excluded in order to avoid a rare fungus, *Gymnomyces abietis*, which was also found at the same location on the north end of the meadow at MP 154.8.

The Forest Service recommends the following specific conservation measures for the Bellinger's meadowfoam site at MP 154.7:

- Collect seeds prior to pipeline construction.
- During and after pipeline construction in the meadow, clean machinery, people, and tools of soil and debris to avoid the spread or introduction of invasive plants.
- After construction, conduct ground scarring and recontouring to return the site to vernally moist conditions. This would include creating ground contours to prevent the meadow from draining excessively, and retaining some compacted areas and shallow swales.
- Re-seed the area with the collected seeds. Other native species could be included in seed mixes at this location, but not in proportions that would lessen the ability of Bellinger's meadowfoam to re-establish from the re-seeding effort.

- For 3 years following construction, use formulations of the herbicide glyphosate to spot spray invasive weeds, especially the locally abundant medusahead, while allowing native grass and meadowfoam to grow (Rolle 2014; glyphosate is recommended because imazapic tends to run from the site of application and will follow the slope to the Limnanthes population).

Additional mitigation measures that would minimize impacts include site restoration and habitat enhancement measures as discussed in the CMP (see Appendix O of the BA). Pacific Connector has an Agreement in Principle with the Forest Service that includes 125.3 acres of meadow restoration on the Umpqua National Forest within the Elk Creek and Days Creek South Umpqua River watershed that may benefit native plant species that rely on meadow habitats (FERC 2014). For a full discussion of conservation plans that promote grassland and meadow habitats see Appendix O of the BA. In addition, the containment and safe disposal of hazardous materials and pollutants would minimize soil contamination and are discussed in Pacific Connector's Spill Prevention, Containment, and Countermeasures Plan (Appendix L of the BA).

Determination of Impact

In considering the direct, indirect, and cumulative impacts of the Project, it is determined that the proposed action **"may impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species"** for Bellinger's meadowfoam because the large number of occurrences of the species outside of NFS lands, this species' tolerance of disturbance, and the proposed conservation and mitigation measures described above that would minimize impacts to the species on Forest Service land.

7.0 SIGNATURE

Must be signed by Journey-level botanist (> GS-11) or designated authority by Forest Supervisor. Must be completed prior to signing of Decision Memo.

_____	_____
Robert D. Cox, District Wildlife Biologist	Date
_____	_____
District Botanist	Date
_____	_____
District Fish Biologist	Date

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Appendix A: Sensitive Species that Are Not Expected to be Impacted by the Project

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Table A-1.: Forest Service Sensitive Terrestrial Wildlife Species Not Expected to be Impacted by the Project			
Common Name and *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Mammals			
Pygmy rabbit *Brachylagus idahoensis*	Tall dense clumps of sagebrush, also in greasewood. Deep, friable soils for burrows.	S – FWI	No currently known sites in Klamath County
North American wolverine *Gulo gulo luscus*	Rugged, subalpine to high alpine areas with with a mix of tree cover, alpine meadow boulders, avalanche chutes, and patches of spring snow.	S – FWI S – UMP S – RRS	Does not occur in Project vicinity
Birds			
Yellow rail *Coturnicops noveboracensis*	Freshwater and coastal estuary marshes. Requires areas with shallow water and vegetative cover.	D – FWI S – UMP	Does not occur in Project vicinity
Black swift *Cypseloides niger*	Associated with steep, tall waterfalls	D – UMP	No suitable habitat in survey area
Northern waterthrush *Seiurus noveboracensis*	Wooded swamps and riparian thickets in forests and scrub	D – RRS	Extremely limited breeding range in Oregon that occurs >50 miles from the Project area.
Amphibians			
Siskiyou Mountains salamander *Plethodon stormi*	Loose rock rubble or talus on north-facing slopes or in dense wooded areas.	D – RRS	Outside of known range.
Black salamander *Aneides flavipunctatus*	Near streams, in talus slopes or under rocks and logs. Inhabits open woodlands, and mixed coniferous and mixed-coniferous-deciduous forests.	D – RRS	Outside of known range

Table A-1.: Forest Service Sensitive Terrestrial Wildlife Species Not Expected to be Impacted by the Project			
Common Name and *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
California slender salamander *Batrachoseps attenuatus*	Lower-elevation forests along the southern coast, including hardwood, redwood, and other coniferous forests. Also in open areas with scattered trees. Under rocks, logs, or other objects on the ground.	D – RRS	Outside of known range
Northern leopard frog *Lithobates pipiens*	Marshes, wet meadows, vegetated irrigation canals, ponds, and reservoirs. Prefers quiet or slow flowing waters.	S – FWI	Outside of known range
Columbia spotted frog *Rana luteiventris*	Rarely far from permanent quiet water; usually at grassy/sedgy margins of streams, lakes, ponds, springs, and marshes; may disperse into forest, grassland, during wet weather.	S – FWI	Outside of known range
Terrestrial Invertebrates			
Seaside hoary elfin butterfly *Callophrys polios maritima* (formerly hoary elfin)	Maritime species found in close association with kinnikinnick (*Arctostaphylos uva-ursi*).	S – RRS	Does not occur in Project vicinity
Green sideband *Monadenia fidelis beryllica*	Generally inhabit deciduous stands (including alder) and brush in wet, relatively undisturbed forest; low elevation; low coastal scrub.	D – RRS	Not located during surveys
Modoc sideband *Monadenia fidelis ssp. Nov.*	Talus and wetted rocky areas on lakeshore; mixed pine-Douglas fir forest or open grasslands; associated with seeps and springs in talus deposits.	D – FWI	Not located during surveys
Crater Lake tightcoil *Pristiloma arcticum crateris*	Mature conifer forests; perennially wet areas among rushes, mosses, and other surface vegetation or under rocks and woody debris within 30 feet of open water in wetlands, springs, seeps, and riparian areas.	D – FWI D – RRS D – UMP	Not located during surveys
Leona's little blue butterfly *Philotiella leona*	Mazama ash and pumice fields east of Crater Lake with sub-surface moisture and spurry buckwheat (*Eriogonum spergulinum reddingianum*) caterpillar host plant.	D – FWI	Does not occur in Project vicinity

Table A-1.: Forest Service Sensitive Terrestrial Wildlife Species Not Expected to be Impacted by the Project			
Common Name and *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Insular blue butterfly (*Plebejus saepiolus littoralis*)	Generally associated with wet habitat such as stream edges, bogs, and wet meadows, but also occurs in drier sites containing blooming clover, such as road sides,	S – RRS	Does not occur in Project vicinity; coastal species.
California shield-backed bug *Vanduzeeina borealis californica*	A tall grass prairie specialist; inhabits high elevation natural balds and meadows	S – RRS S – UMP	No suitable habitat in survey area

1/ Expected Habitat: Adamus et al. 2001, Csuti et al. 2001, NatureServe 2013; ORBIC 2006; Gilligan et al. 1994; Kozloff 1976, ISSSSP 2014, Hoffman 2005.
2/ Occurrence Key:
National Forest: FWI = Winema National Forest, RRS = Rogue River National Forest, UMP = Umpqua National Forest
D = Documented within Forest Service Management Area
S = Suspected within Forest Service Management Area

Table A-2: Forest Service Sensitive Fish and Aquatic Invertebrates Not Expected to be Impacted by the Project				
Common Name and *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Waterbodies Crossed by Project or within Vicinity of Project Area[3/]**	**Reason for Determination**
Anadromous fish				
Chum salmon (Pacific Coast ESU) *Onocorhynchus keta*	Rears in the Pacific Ocean for most of its life and spawns in freshwater streams in the fall. Utilizes low gradient, gravel-rich, barrier-free habitats and productive estuaries. Juveniles migrate to estuarine environments after emergence.	I – UMP I – RRS	Unknown	Does not occur in vicinity of project
Chinook Salmon (Oncorhynchus tshawytscha), Southern Oregon /Northern California Coastal ESU, Fall-run and Spring-run	Anadromous species that rears in the Pacific Ocean for most of its life and spawns in freshwater streams. Most enter Oregon's coastal rivers April to December, but some start in February. Spawning generally occurs from October to early March. Preferred spawning and rearing areas have a low gradient (<3%); adults often ascend to higher gradient reaches to find spawning areas. Spawns and rears in a range of sizes of streams and rivers, and often uses estuaries for rearing. Adults require deep pools within proximity to spawning areas where they hold and mature between migration and spawning.	D-RRS	No	Natural barrier in the South Fork Little Butte Creek precludes presence upstream where waterbodies are crossed by Project.
Steelhead Oregon Coast ESU *(Oncorhynchus mykiss)*	Anadromous species; juveniles rear in freshwater streams 1-4 years. Adults live in marine environment prior to spawning mostly in winter or spring. May spawn more than once.	D-UMP D-RRS	No	Does not occur upstream of Galesville Reservoir, impacted streams well upstream of occurrence area.
Aquatic Invertebrates				
Turban pebblesnail *Fluminicola turbinformis*	Freshwater, very cold in semi arid sage scrub. Substrate is mud, basalt gravel, bedrock and gravel, with bedrock.	D – FWI	Unknown	Not located during surveys

Table A-2: Forest Service Sensitive Fish and Aquatic Invertebrates Not Expected to be Impacted by the Project				
Common Name and *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Waterbodies Crossed by Project or within Vicinity of Project Area[3/]**	**Reason for Determination**
Great Basin ramshorn *Helisoma newberryi newberryi*	Larger lakes, slow rivers, larger spring sources, spring-fed creeks; burrow in soft mud.	D – FWI		Not located during surveys
Highcap lanx *Lanx alta*	Freshwater in Middle Rogue, Upper Klamath Sub-basins, possibly extirpated Larger tributaries and outcrops, on upper surfaces of bedrock and bedrock outcrops. Cold, fast-flowing, highly oxygenated, clear water. Semelparous with a lifespan of 1 to 2 years. Eggs are laid from spring to fall. Lack a larval stage. Feed through scraping.	D – FWI D – RRS	Unknown	No suitable habitat in survey area
Scale lanx *Lanx klamathensis*	Spring-influenced portions of large lakes and streams or limnocrene springs; boulder/cobble substrates; well-oxygenated, cold water.	D – FWI S – RRS	Lost, Upper Klamath	Not located during surveys
Rotund lanx *Lanx subrotunda*	The rotund lanx is found in unpolluted rivers and large streams at low to moderate elevations, in highly oxygenated, swift-flowing, cold water on stable cobble, boulder or bedrock substrates.	D – FWI D – UMP	Upper Klamath	Not located during surveys
Montane peaclam (*Pisidium ultramontanum*)	The Montane peaclam is a local riparian endemic associated with lakes and springs. It is generally found on sand-gravel substrates in spring-influenced streams and lakes, and occasionally in large spring pools.	D-FWI	Upper Klamath	Closest known location greater than 10 miles from the Project at Upper Klamath Lake.
Robust walker *Pomatiopsis binneyi*	Freshwater, possibly extirpated Coos Subbasin, seeps, rivulets, shallow mud banks and marsh seepages leading into shallow streams. Semi-aquatic.	D – RRS	Unknown	Not located during surveys

Table A-2: Forest Service Sensitive Fish and Aquatic Invertebrates Not Expected to be Impacted by the Project				
Common Name and *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Waterbodies Crossed by Project or within Vicinity of Project Area[3/]**	**Reason for Determination**
Pacific walker Pomatiopsis californica	The Pacific Walker is a riparian associate semi-aquatic snail characteristically found among wet leaf litter and vegetation, beside flowing or standing water in shaded situations where humidity remains high	S – RRS	Unknown	Does not occur in vicinity of project; historical range included narrow coastal fog belt of Pacific Coast.
Haddock's Rhyacophilan caddisfly *Rhyacophila haddocki*	Streams are perennial, fed by cold-water springs with discharge relatively stable year-round. Microhabitats include runs and glides with deep, well-aerated gravel and coarse sand.	D – RRS	Unknown	Does not occur in vicinity of project; currently known only from Benton and Curry county.
Lined rams-horn (*Vorticifex effusa diagonalis*)	Found in spring-fed lakes and limnocrenes, as well as large streams with spring influence. Very cold, highly oxygenated water on stable (boulder-gravel) substrate, at fair depth (not in shallows).	D-FWI	Upper Klamath	Does not occur in vicinity of project; currently known from Crater Lake and NE Upper Klamath Lake.

1/ Life Histories and Expected Habitat References: Kostow 1995; NatureServe 2013; ODFW 2005; CDFG 1986; NMFS 2006b, ISSSP 2014.
2/ Occurrence Key:
National Forest: FWI = Winema National Forest, RRS = Rogue River National Forest, UMP = Umpqua National Forest
D = Documented within the BLM or Forest Service management area
S = Suspected within the BLM or Forest Service management area
I = Forest Service Actions Influence Downstream
3/ Waterbodies Crossed: ORNHIC 2006; Kostow 1995, ISSSSP 2014.

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Bryophytes			
Tiny Notchwort *Anastrophyllum minutum*	On peaty soil >5,500 feet. In the Tsuga mertensianazone, typically associated with ledges or at the base of cliffs.	S – FWI S – RRS S – UMP	Not documented in Project survey
Broad-leaved lantern moss *Andreaea schofieldiana*	Forms mats on dry and exposed to moist, shaded igneous rocks, montane to subalpine.	D – RRS S – UMP	No suitable habitat in survey area
Spidery threadwort *Blepharostoma arachnoideum*	Old growth forests, in mesic habitats, where it most often grows on rotten logs.	D – UMP	Not documented in Project survey
Giant fourpoint *Barbilophozia lycopodioides*	Forming mats on peaty soil on damp ledges of rock outcrops and cliffs at higher elevations (known sites in OR and WA: 3,400-7,500 feet).	S – FWI	Not documented in Project survey
Beautiful bryum *Bryum calobryoides*	Rock outcrops and shallow soil.	D – RRS S – UMP	Not documented in Project survey
Bog pouchwort *Calypogeia sphagnicola*	Sphagnum containing wetlands.	D – RRS D – UMP	No suitable habitat in survey area
Spiny threadwort *Cephaloziella spinigera*	Wetlands containing Sphagnum.	D – FWI D – RRS S – UMP	Not documented in Project survey
Racomitrium moss *Codriophorus depressus* (formerly *Racomitrium depressum*)	On rocks in montane streams.	S – FWI S – RRS S – UMP	Not documented in Project survey
Cryptomitrium tenerum[3/]	Forms small to locally extensive mats on bare, usually shaded and humid soil on hillsides, rock outcrops, and streambanks. In OR, between sea level and 1,000 feet. Root balls and cutbanks are favored habitat in forests.	D – RRS	Not documented in Project survey
White-mouthed Extinguisher-moss *Encalypta brevicollis*	Deep, rocky ravine.	D – RRS S – UMP	Not documented in Project survey
Candle snuffer moss *Encalypta brevipes*	Soil on ledges and in crevices on cliffs, reported from both igneous and siliceous substrates.	D – RRS S – UMP	No suitable habitat in survey area

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Banded cord-moss *Entosthodon fascicularis*	Seasonally wet, exposed soil in seeps or along intermittent streams. Usually hidden among grasses, other mosses, and litter. Known habitats: grassland, oak savanna, grassy balds, and rock outcrops. In OR, known at elevations below 3,000 feet.	S – RRS S – UMP	Not documented in Project survey
Braided frostwort *Gymnomitrion concinnatum*	On peaty soil of cliffs and rock outcrops, full exposure or shaded. In OR and WA, it has only been found in subalpine parkland areas.	S – UMP	Not documented in Project survey
Great mountain flapwort *Harpanthus flotovianus*	Wet places, often with Sphagnum.	D – FWI D – RRS S – UMP	Not documented in Project survey
Blandow's feather moss *Helodium blandowii*	Montane fens, usually with calcareous ground water.	D – FWI D – RRS D – UMP	Not documented in Project survey
Gillman's pawwort *Lophozia gillmanii*	Found on peaty soil, usually associated with cliffs or ledges. It is an obligate calciphile.	S – FWI S – UMP	Not documented in Project survey
Marsupella emarginata var. *aquatica*[3/]	Old growth forests. Grows in robust colonies attached to submerged rocks in partially shaded cold, flowing, cold perennial stream habitats. Known occurrence at Waldo Lake, Willamette National Forest in the Oregon Cascades.	S – UMP	Not documented in Project survey
Meesia moss *Meesia uliginosa*	Wet places, marshes and fens.	D – FWI D – RRS S – UMP	Not documented in Project survey
Orthodontium gracile	Occurs in old-growth or secondary growth redwood. May be found on the lower bark of trunks, below tree wounds, or downed redwood logs. Typically on redwood bark that has been burned or charred.	D – RSS	Not documented in Project survey
Translucent orthodontium *Orthodontium pellucens*	Forming dense cushions or mats on stumps, rotten logs and bark of living redwood trees, confined to redwood groves near the Pacific Ocean. Sometimes on charred wood, or below gaping wounds in trees. In OR, restricted to *Sequoia sempervirens* in extreme SW corner of the state.	D – RRS	No suitable habitat in survey area
Tuberous hornwort *Phymatoceros phymatodes*	On bare, mineral soil which remains moist until late spring or summer. From near sea level to 650 m elevation.	S – RRS	Not documented in Project survey
Dwarf rock haircap *Polytrichum sphaerothecium*	unknown	S – FWI S – UMP	Not documented in Project survey

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Bolander's scalemoss *Porella bolanderi*	On a variety of rock types (siliceous, calcareous, and metamorphic) and trunks of *Quercus, Umbellularia*, and *Acer macrophyllum*. In the Pacific Northwest, known elevations range from 500-3,000 feet.	D – RRS S – UMP	Not documented in Project survey
Blunt water moss *Pseudocalliergon trifarium* (formerly *Calliergon trifarium*)	Calcareous fens.	S – RRS D – FWI	No suitable habitat in survey area
Schistidium moss *Schistidium cinclidodonteum*	On wet or dry rocks or on soil in crevices of rocks and boulders, often along intermittent streams, at elevations of 5,000-11,000 feet.	S – FWI S – RRS	Not documented in Project survey
Schistostega pennata[3/]	Mineral soil in shaded pockets of overturned tree roots, often with shallow pools of standing water at the base of the root wad; attached to rock or mineral soil around the entrance to caves, old cellars, and animal burrows. Microhabitat requirements include dense shade, high humidity, and some source of reflection of light (i.e., a pool of water)	S – FWI S – RSS D – UMP	Not documented in Project survey
Alpine masterwort *Schofieldia monticola*	Terrestrial, on peaty soil under heather or beside small streams; strictly subalpine-alpine.	S – UMP	Not documented in Project survey
Purple-vased stink moss *Splachnum ampullaceum*	On old dung of herbivores.	D – FWI S – RRS S – UMP	Not documented in Project survey
Tetraphis geniculata[3/]	A moss that occurs in moist, coniferous forests with down logs; on the cut or broken ends or lower half of large (usually over 15" dbh), decay class 3, 4, and 5 rotted logs, or stumps, and occasionally on peaty banks in moist coniferous forests from sea level to subalpine elevations.	S – UMP	Not documented in Project survey
Tomentypnum moss *Tomentypnum nitens*	Medium to rich montane fens where it favors slightly elevated sites such as logs, stumps, or hummocks formed by *Vacccinium uliginosum* and *Betula glandulosa*. Elevations range from 5,000 to 6,000 feet.	D – FWI D – RRS D – UMP	Not documented in Project survey
Mucronleaf tortula moss *Tortula mucronifolia*	On soil or rock.	D – RRS	Not documented in Project survey
Asano's trematodon moss *Trematodon asanoi*	On moist bare soil along the edges of trails, streams and ponds in the subalpine zone. Soils usually have some organic content and are irrigated by meltwater from late-season snowbeds.	S – FWI S – UMP	Not documented in Project survey

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Tritomaria exsectiformis[3/]	Occurs in shady, cool, moist sites such as wet banks of riparian areas, spring heads, decaying logs and associated humus. Also on cliffs, ledges, and rock crevices covered with thin peaty acidic soils. In Oregon, it mostly occurs in peaty soils of mid-elevation coldwater streams.	D – FWI S – RSS D – UMP	Not documented in Project survey
Fungi			
Albatrellus avellaneus	Presumed mycorrhizal with pine trees, known from Shore Acres in Coos County, in T26S, R14W, Sec. 17 SWNE along Cape Arago area.	D – RSS	Not documented in Project survey
Arcangeliella camphorata	Forms sporocarps beneath soil surface associated with various Pinaceae spp., particularly Pseudotsuga menziesii and Tsuga heterophylla from 600 ft. to 2,800 ft. elevation.	D – RSS	Not documented in Project survey
Chamonixia caespitosa	Forms sporocarps beneath the soil surface associated with various Pinaceae spp., particularly Abies amabilis and Tsuga sp. at high elevation and Picea sitchensis, Pseudotsuga menziesii, and Tsuga heterophylla in coastal forests.	D – RSS	Not documented in Project survey
*Cortinarius barlowensis (*syn. *Cortinarius azureus)*	Coastal to montane conifer forests up to at least 1,200 m elevation; late successional old-growth association; fruits in autumn.	D – UMP	Not documented in Project survey
Dermocybe humboldtensis	Stabilized dunes on roots of pine and huckleberry species and conglomerate rock and gravelly loam soil with Douglas-fir and ponderosa pine.	S – RSS S – UMP	Not documented in Project survey
Gastroboletus vividus	Associated with Abies magnifica and Tsuga mertensiana.	S – FWI D – RSS S – UMP	Not documented in Project survey

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Gymnomyces fragrans	Unknown	D – RRS S – UMP	Not documented in Project survey
Pseudorhizina californica (formerly *Gyromitra californica)*	Forest edges, disturbed sites.	D – FWI D – RSS D – UMP	Not documented in Project survey
Ramaria amyloidea	In humus or soil under Abies ssp., Douglas-fir, and western hemlock from September to October.	S – RSS D – UMP	Not documented in Project survey
Ramaria spinulosa var. *diminutiva*	Terrestrial under Pinaceae ssp. in October and November.	S – RSS S – UMP	Not documented in Project survey
Rhizopogon chamaleontinus	Found in association with the roots of Pseudotsuga menziesii and scattered Pinus lambertiana at 1,100 m elevation.	D – RSS	Not documented in Project survey
Rhizopogon ellipsosporus	Associated with roots of Douglas-fir and sugarpine in October.	D – RSS	Not documented in Project survey
Rhizopogon exiguus	Associated with the roots of Pseudotsuga menziesii and Tsuga heterophylla at 950 m elevation.	D – RSS S – UMP	Not documented in Project survey

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Rhizopogon inquinatus	Found in association with the roots of Pinus jeffreyi, Pseudotsuga menziesii and Tsuga heterophylla from 500 to 1,400 m elevation.	S – UMP	Not documented in Project survey
Stagnicola perplexa	Unknown	D – RSS S – UMP	Not documented in Project survey
Lichen			
Bryoria subcana	Grows on conifer bark in forests of coastal bays, streams, dune forests, and high precipitation ridges within 30 mi (50 km) of the ocean. Inhabits areas of high humidity, mostly in late-seral to old-growth stands.	S – RSS	Not documented in Project survey
Shield lichen *Heterodermia leucomelos*	On mossy hardwoods or rock faces with some light.	S – RRS	Not documented in Project survey
Leptogium cyanescens	Occurs in mixed conifer and Douglas-fir stands, and in maple and willow thickets in both riparian and upland habitats.	S – FWI S – RSS S – UMP	Not documented in Project survey
Lobaria linita	On trees, shrubs, mossy rocks or alpine sod. Montane to alpine.	S – RSS D – UMP	Not documented in Project survey
Pseudocyphellaria mallota[3]	Old conifers or understory hardwoods and shrubs in late successional forests.	D – UMP	Not documented in Project survey
Ramalina pollinaria	Bark and wood, usually in low elevation swamps.	S – RSS S – UMP	Not documented in Project survey
Woven spore lichen *Texosporium sancti-jacobi*	Arid to semi-arid shrub-steppe, grassland or savannah communities up to 1,000 m in elevation. It requires natural openings or gaps in arid vegetation that are not maintained by fire.	S – FWI	Not documented in Project survey
Vascular plants			

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
California maiden-hair *Adiantum jordanii*	Rocky areas in moist woods.	S – FWI D – RRS S – UMP	Not documented in Project survey
Peninsular onion *Allium peninsulare*	Dry open or wooded slopes and flats to 3,000 ft; valley grassland, foothill woodlands; March through June.	S – RRS	Not documented in Project survey
Crater Lake rock-cress *Arabis suffrutescens horizontalis*	High elevation open sites with pumice. Known sites in Crater Lake NP.	D – FWI S – RRS S – UMP	Not documented in Project survey
Gasquet (hairy) manzanita *Arctostaphylos hispidula*	Rocky serpentine soils or sandstone, open forests.	D – RRS	Outside of known (or probable) range
Shasta arnica *Arnica viscosa*	High elevation, open rocky sites; known in Deschutes, Klamath, Douglas Co, found at a few sites in wilderness along the Cascade Crest and on Pelican Butte.	D – FWI S – RRS D – UMP	Not documented in Project survey
Grass-fern *Asplenium septentrionale*	Grows on shady, moist, north faces of large rocks; only known in North Umpqua.	D – FWI D – RRS D – UMP	Not documented in Project survey
Lemmon's milk-vetch *Astragalus lemmonii*	Great Basin scrub, meadows and seeps, marshes and swamps (lake shores). NOTE: According to 10/23/2012 plant meeting in Corvallis, *H. lemmonii* should be *H. cooperi* (*H. lemmonii* not in OR).	D – FWI	Not documented in Project survey
Bensonia *Bensoniella oregana*	Wet meadows and moist streamside sites in pre-Cretaceous metasedimentary rock at elevations above 4,000 feet.	D – RRS	The single site observed during surveys will be avoided.
Crenulate moonwort (Crenulate grape-fern) *Botrychium crenulatum*	Marshes, meadows above 4,000 feet	S – FWI	Not documented in Project survey

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Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Brewer's reedgrass *Calamagrostis breweri*	Restricted to subalpine habitats in a narrow elevation range in Oregon. Most populations in Oregon occur between 5,000-6,000 feet. Usually found in moist meadows with limited vegetative competition.	S – UMP	Not documented in Project survey
Greene's mariposa-lily *Calochortus greenei*	Grows on dry, bushy hillsides in southern Jackson County.	S – FWI	Not documented in Project survey
Howell's camassia *Camassia howellii*	Grassy wet meadows, swampy ground, and transitional areas between wet meadows and coniferous woodlands.	D – RRS	No suitable habitat in survey area
Slender-flowered evening primrose *Camissonia graciliflora*	Open rocky grassy and shrublands, usually clay soils.	D – RRS	Not documented in Project survey
Capitate sedge *Carex capitata*	Wet places.	D – FWI D – RRS	Not documented in Project survey
Bristly sedge *Carex comosa*	Wet places.	S – RRS	Not documented in Project survey
Cordilleran sedge *Carex cordillerana*	Naturally disturbed, rocky slopes with organic layer and leaf litter in mesic mixed forests, or disturbed, open, grassy slopes; 500-2,400 m.	D – FWI	Not documented in Project survey
Crawford's sedge *Carex crawfordii*	Moist or wet places.	S – RRS S – UMP	Not documented in Project survey
Lesser panicled sedge *Carex diandra*	Meadows.	D – FWI S – UMP	Not documented in Project survey
A sedge *Carex klamathensis*	Chaparral, cismontane woodland, meadows and seeps.	D – RRS	Not documented in Project survey
Slender sedge *Carex lasiocarpa americana*	Bogs, shallow water.	D – FWI S – UMP	Not documented in Project survey
Spikenard sedge *Carex nardina*	Exposed arctic and alpine tundra, usually calcareous cliffs, rocky slopes, ridges, and summits; 50-3,300 m.	D – UMP	Not documented in Project survey

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Sierra nerved sedge *Carex nervina*	Moist to wet places.	D – RRS	Not documented in Project survey
Russet sedge *Carex saxatilis*	Fens, bogs, wet tundra, roadside ditches, shores of lakes, ponds, and slow moving streams, often in shallow water, 1-3,700 m.	S – FWI	Not documented in Project survey
Native sedge *Carex vernacula*	Moist alpine tundra, moist forest openings just below treeline.	D – FWI S – UMP	Not documented in Project survey
Green-tinged paintbrush *Castilleja chlorotica*	Grows on dry gravelly or sandy slopes; Elevation 6,000 – 8,000 feet; late June through mid-August. Found in shrub openings on slopes and ridges; On FWI found at one site near northeast corner of the Forest.	D – FWI	No suitable habitat in survey area
Split-hair paintbrush *Castilleja schizotricha*	Decomposed granite or marble at high elevations.	D – RRS	No suitable habitat in survey area
Coville's lip-fern *Cheilanthes covillei*	Rock outcrops, cliffs.	D – RRS	Not documented in Project survey
Fee's lip-fern *Cheilanthes feei*	Calcareous cliffs and ledges, usually on limestone or sandstone; 100-3,800 m.	S – FWI	Not documented in Project survey
Coastal lip-fern *Cheilanthes intertexta*	Rock outcrops, cliffs.	S – FWI S – RRS	Not documented in Project survey
Narrow-leaved amole *Chlorogalum angustifolium*	Clay soils in dry grassland.	S – RRS	Not documented in Project survey
Oregon timwort *Cicendia quadrangularis*	Openings.	D – RRS	Not documented in Project survey
Mt. Mazama collomia *Collomia mazama*	Dry woods at high elevations; July and August; True fir/lodgepole pine forest, meadows, and meadow edges; On FWI, found in Lost Creek, Horse Creek, Rock Creek and Cherry Creek drainages, Klamath RD.	D – UMP D – RRS D – FWI	Not documented in Project survey

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Milo baker's cryptantha *Cryptantha milo-bakeri*	Rocky or gravelly soils in conifer openings, chaparral or oak woodlands.	D – RRS	Not documented in Project survey
Baker's cypress *Cupressus bakeri*	Scattered on dry wooded slopes, usually in serpentine soil.	D – RRS	Not documented in Project survey
Short-pointed cyperus *Cyperus acuminatus*	Wet, low places in valley and lowlands, edges of temporary pools, ponds, streams, ditches	S – RRS	Not documented in Project survey
Red larkspur *Delphinium nudicaule*	Rocky openings, often in talus on moist slopes.	D – RRS	Not documented in Project survey
Few-flowered bleedingheart *Dicentra pauciflora*	Openings in coniferous forests, in volcanic and granitic soils; 1,200-2,700 m.	D – RRS	Not documented in Project survey
Howell's whitlow-grass *Draba howellii*	Rocky summits, cracks in granite walls, rock crevices; 1,900-2,700 m.	D – RRS	Not documented in Project survey
Short seeded waterwort *Elatine brachysperma*	Occurs almost always under natural conditions in wetlands.	S – FWI S – UMP	Not documented in Project survey
Bolander's spikerush *Eleocharis bolanderi*	Fresh, often summer-dry meadows, springs, seeps, stream margins; 1,000–3,400 m.	D – FWI	Not documented in Project survey
Oregon willow herb *Epilobium oreganum*	Grows in bogs at low elevations. Known only from Josephine County.	D – RRS	No suitable habitat in survey area
Siskiyou willow herb *Epilobium siskiyouense*	Scree and talus on Serpentine ridges.	D – RRS	No suitable habitat in survey area
Golden fleece *Ericameria arborescens*	Dry foothill slopes, in chaparral; 90–2,000 m.	D – RRS	Not documented in Project survey
Siskiyou daisy *Erigeron cervinus*	Rocky streamsides.	D – RRS	Not documented in Project survey
Cliff (rock) daisy *Erigeron petrophilus*	Rocky foothills to montane forest.	D – RRS	Not documented in Project survey

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Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Lobb's buckwheat *Eriogonum lobbii*	Gravelly to rocky or talus slopes, mixed grassland, buckbrush, manzanita, and sagebrush communities, montane, subalpine, or alpine conifer woodlands.	D – RRS	Not documented in Project survey
Prostrate buckwheat *Eriogonum prociduum*	Areas of barren rocky or gravelly volcanic soils within juniper or sagebrush habitat.	D – FWI	Not documented in Project survey
Green buckwheat *Eriogonum umbellatum* var. *glaberrimum*	Sandy to gravelly slopes, sagebrush communities, aspen and montane conifer woodlands; 1,600-2,300 m.	D – FWI	Not documented in Project survey
Howell's adder's tongue *Erythronium howellii*	Found in open woods primarily in the upper Illinois River basin, mostly in serpentine soil; April and May.	D – RRS	Outside of known (or probable) range
Gold poppy *Eschscholzia caespitosa*	Grows on dry, brushy slopes and flat areas, mostly along roadsides; known in southern Douglas County; March through early June.	S – RRS	No suitable habitat in survey area
Umpqua swertia *Frasera umpquaensis*	Elevations 4500 – 6500 feet in conifer forests, in damp, shaded or sometimes open environments; June through August.	D – RRS D – UMP	Not documented in Project survey
Warner Mt. bedstraw *Galium serpenticum warnerense*	Meadows in subalpine forest.	D – FWI	Not documented in Project survey
Newberry's gentian *Gentiana newberryi newberryi*	High alpine meadows of the Cascade Mountains; wet meadows and meadow edges, generally 5,000 ft and above; August and September.	S – RRS S – UMP D – FWI	Not documented in Project survey
Elegant gentian *Gentiana plurisetosa*	Meadows in lodgepole forest, red fir forest, or yellow pine forest.	D – RRS	Not documented in Project survey
Waldo gentian *Gentiana setigera*	Meadows in yellow pine forest, red fir forest, wetland-riparian. Almost always under natural conditions in wetlands.	D – RRS	Not documented in Project survey
Beautiful stickseed *Hackelia bella*	Forest openings, roadsides.	S – RRS	Not documented in Project survey
Salt heliotrope *Heliotropium curassavicum*	Moist to dry saline soils.	S – FWI	No suitable habitat in survey area
Shaggy hawkweed *Hieracium horridum*	Rocky places.	S – RRS	Not documented in Project survey

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Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Henderson's horkelia *Horkelia hendersonii*	Endemic to summits of a few granite peaks in southern Jackson County.	D – RRS	No suitable habitat in survey area
Three-toothed horkelia *Horkelia tridentata tridentata*	Montane forests, associated with conifer trees.	D – RRS	Not documented in Project survey
California globe-mallow *Iliamna latibracteata*	Coastal ranges in Coos and Douglas counties; June and July.	D – RRS D – UMP	Not documented in Project survey
Shockley's ivesia *Ivesia shockleyi*	Subalpine forest, bristle-cone pine forest, alpine fell-fields.	D – FWI	Not documented in Project survey
Fragrant kalmiopsis *Kalmiopsis fragrans*	Cliffs and rock outcrops, known only from North Umpqua River.	D – UMP	Not documented in Project survey
Bush beardtongue *Keckiella lemmonii*	Conifer forests and chaparral of coastal and inland mountain ranges.	D – RRS	Not documented in Project survey
Columbia lewisia *Lewisia columbiana* var. *columbiana*	Reported on three mountains in the southeastern portion of Douglas County; May through July.	D – UMP	Not documented in Project survey
Lee's lewisia *Lewisia leana*	Grows on high elevation serpentine ridges; late May through August.	D – RRS S – UMP	Not documented in Project survey
Slender meadow-foam *Limnanthes gracilis gracilis*	Found in Douglas, Jackson, and Josephine counties in very wet areas (early spring) and often in serpentine soil; March through May. Vernal pools.	S – RRS	Not documented in Project survey
Aristulate lipocarpha *Lipocarpha aristulata*	Wet soil at an elevation of 100 to 400 m. In Washington, has been found along shorelines and islands below high water on silty substrates.	S – FWI	Not documented in Project survey
Englemann's desert-parsley *Lomatium engelmannii*	Chaparral, red fir forest, yellow pine forest.	D – RRS	No suitable habitat in survey area

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Stipuled trefoil *Lotus stipularis*	Open forests, chaparral, disturbed sites.	D – RRS	Not documented in Project survey
Mt. Ashland lupine *Lupinus lepidus ashlandensis*	Sandy or gravelly soils at low to alpine elevations.	D – RRS	No suitable habitat in survey area
Tracy's lupine *Lupinus tracyi*	Dry open montane forest.	D – RRS	Not documented in Project survey
Bog club-moss *Lycopodiella inundata*	Bogs, muddy depressions, and pond margins. On FWI one site in Yoss Creek drainage on Chiloquin RD.	D – FWI	Not documented in Project survey
White meconella (fairy poppy) *Meconella oregana*	Grows in open areas that are wet in the spring at low elevations. Known from sites in the Willamette Valley and the Columbia Gorge.	S – RRS	Not documented in Project survey
Bolander's monkeyflower *Mimulus bolanderi*	Openings in chaparral, burns and disturbed areas. Applegate Valley.	D – RRS	Not documented in Project survey
Congdon's monkeyflower *Mimulus congdonii*	Openings in oak woodland and chaparral. Applegate Valley.	S – RRS	Not documented in Project survey

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Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Disappearing monkeyflower *Mimulus evanescens*	Vernally moist sites along perennial and intermittent streams; receding margins of lakes, ponds, and reservoirs within juniper/sagebrush habitats.	D – FWI	No suitable habitat in survey area
Tri-colored monkeyflower *Mimulus tricolor*	Grows at low elevations in clay soil, preferring vernal pools; scattered in Klamath County; late May through June.	D – FWI	Not documented in Project survey
Annual dropseed *Muhlenbergia minutissima*	Pinyon-juniper woodland, sagebrush scrub, yellow pine forest, wetland-riparia; between 4,000 and 7,500 feet.	S – FWI	Not documented in Project survey
Slender nemacladus *Nemacladus capillaris*	Dry slopes, burned areas.	S – RRS	Not documented in Project survey
Adder's-tongue *Ophioglossum pusilum*	Open fens, wet meadows, grassy slopes, roadside ditches.	D – RRS D – UMP	Not documented in Project survey
Coffee fern *Pellaea andromedifolia*	Rock outcrops, cliffs.	S – RRS D – UMP	Not documented in Project survey
Bird's-foot fern *Pellaea mucronata* m*ucronata*	Rocky dry openings.	S – RRS	Not documented in Project survey

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Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Blue-leaved penstemon *Penstemon glaucinus*	Openings in mid to high elevation pine, fir, and mountain hemlock communities. Well-drained volcanic soils along rocky points and ridges.	D – FWI	Not documented in Project survey
Red-rooted yampah *Perideridia erythrorhiza*	Moist meadows, forest edges below 4,500 ft.	D – FWI D – RRS S – UMP	Not documented in Project survey
Siskiyou phacelia *Phacelia leonis*	Serpentine forests.	D – RRS	Not documented in Project survey
American pillwort *Pilularia americana*	Aquatic fern in shallow ponds or temporary pools.	S – FWI S – RRS	Not documented in Project survey
Whitebark pine *Pinus albicaulis*	Subalpine forests.	D – FWI D – RRS D – UMP	Not documented in Project survey
Coral seeded allocarya *Plagiobothrys figuratus corallicarpus*	Low elevation meadows and moist clearings and fields.	S – RRS	Not documented in Project survey
Greene's popcorn flower *Plagiobothrys greenei*	Vernal pools.	S – RRS	Not documented in Project survey

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Desert allocarya *Plagiobothrys salsus*	Playas in alkali sink, wetland-riparian.	S – FWI	Not documented in Project survey
Timber bluegrass *Poa rhizomata*	Dry Douglas-fir/ponderosa pine forests.	S – RRS S – UMP	Not documented in Project survey
Profuse-flowered mesa mint *Pogogyne floribunda*	Vernal pools, seasonal lakes.	S – FWI	Not documented in Project survey
California sword-fern *Polystichum californicum*	Creek banks and canyons in redwoods and mixed evergreen forests.	S – RRS D – UMP	Not documented in Project survey
Rafinesque's pondweed *Potamogeton diversifolius*	Shallow water, ditches, ponds, lakes.	S – FWI	Not documented in Project survey
California chicory *Rafinesquia californica*	Chaparral, recent burns, in the Applegate Valley.	S – RRS	Not documented in Project survey
Redberry *Rhamnus ilicifolia*	Chaparral in Applegate Valley.	D – RRS	Not documented in Project survey
Straggly gooseberry *Ribes divaricatum pubiflorum*	Coastal bluffs, forest edges; 0-1,500 m.	S – RRS	Not documented in Project survey

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Thompson's mistmaiden *Romanzoffia thompsonii*	Sunny, vernally wet mossy rocks.	D – RRS D – UMP	Not documented in Project survey
Columbia cress *Rorippa columbiae*	Along intermittent and perennial streams and lakeshores: banks, sandbars, vernal pools, lakebeds, and ditches.	D – FWI S – RRS	Not documented in Project survey
Lowland toothcup *Rotala ramosior*	Open, wet gravelly soil around ponds (1.5-133 m in western Oregon).	S – FWI S – UMP	Not documented in Project survey
Joint-leaved saxifrage *Saxifragopsis fragarioides*	Grows on dry cliffs in the high Siskiyou Mountains.	D – RRS	Not documented in Project survey
Scheuchzeria *Scheuchzeria palustris americana*	Grows in ponds and along streams in Oregon Cascades.	D – FWI D – RRS D – UMP	Not documented in Project survey
Water clubrush *Schoenoplectus subterminalis* (formerly *Scirpus subterminalis*)	Wetlands and bogs.	D – FWI D – RRS D – UMP	Not documented in Project survey
Drooping bulrush *Scirpus pendulus*	Marshes, wet meadows, ditches.	D – RRS	Not documented in Project survey
California fetid adderstongue *Scoliopus bigelovii*	Redwood and coastal coniferous forests, mossy mountain stream banks, shaded slopes; 0-500 m.	D – RRS	Not documented in Project survey
Rogue river stonecrop *Sedum moranii*	Steep south to west facing slopes and rock outcrops; 200-275 m.	D – RRS	Not documented in Project survey
Verrucose sea-purslane *Sesuvium verrucosum*	Valley grassland, coastal sage scrub, alkali sink, wetland riparian.	S – FWI	Not documented in Project survey
Coast checkermallow *Sidalcea malviflora patula*	Open Coastal Forest.	D – RRS	Not documented in Project survey
Bolander's catchfly *Silene hookeri bolanderi*	Oak and douglas fir woodlands (100-1,000 m).	D – RRS	Not documented in Project survey
Parish's horse-nettle *Solanum parishii*	Chaparral, dry conifer openings, recent burns.	D – RRS	Not documented in Project survey

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Western sophora *Sophora leachiana*	Dry, open areas, open mixed woodlands, roadcuts and clearcuts; 140-460 m.	D – RRS	Not documented in Project survey
Common jewel flower *Streptanthus glandulosus*	Serpentine areas. (Note: this source lists the subspecies *S. g. josephinensis* as occurring in Oregon.)	S – RRS	Not documented in Project survey
Howell's streptanthus *Streptanthus howellii*	Dry, serpentine slopes, mixed evergreen forests, open pine woods or brushy areas; 485-1,220 m.	D – RRS	Not documented in Project survey
Howell's tauschia *Tauschia howellii*	Granitic gravel ridgetops above 1,830 m	D – RRS	No suitable habitat in survey area
Short-podded thelypody *Thelypodium brachycarpum*	Alkaline flats, lake margins in shrub steppe and near edges of pine forests.	D – FWI	No suitable habitat in survey area
Siskiyou trillium *Trillium kurabayashii*	Rich, moist conifer-hardwood forest, slopes, especially lower slopes, predominantly deciduous flat woods along streams, edges of Sequoia groves, and alder, vine maple, and fern thickets along streams, especially older, higher flood terraces, not the lowest and wettest; at higher elevations, both in forests and in open grassy meadows with scattered oak trees.	D – RRS	Not documented in Project survey
Lesser bladderwort *Utricularia minor*	Shallow water.	D – FWI D – RRS D – UMP	Not documented in Project survey
Northern bladderwort *Utricularia ochroleuca*	Shallow water on Shagnum mats.	S – FWI S – UMP	Not documented in Project survey
Western bog violet *Viola primulifolia occidentalis*	Serpentine bogs.	D – RRS	No suitable habitat in survey area
Dotted water-meal *Wolffia borealis*	Freshwater ponds and slow flowing ditches in which water has somewhat high levels of organic material. Occurs in natural ponds as well as in log and sewage treatment ponds; 107-460 m.	S – UMP	Not documented in Project survey
Columbia water-meal *Wolffia columbiana*	Free floating in quiet water.	S – RRS S – UMP	Not documented in Project survey

Table A-3: Forest Service Sensitive Plant (Vascular and Non-Vascular) Species Not Expected to be Impacted by the Project			
Common Name and/or *Scientific Name*	**Expected Habitat[1/]**	**Documented or Suspected Occurrence[2/]**	**Reason for Determination**
Small-flowered death camas *Zigadenus fontanus*	Meadows	S – RRS	Not documented in Project survey

1/ ORNHIC 2006; Eastman 1990; Pojar and MacKinnon 1994; BLM 2004; Hickman 1993; Hitchcock et al. 1969; Castellano et al. 1999; Arora 1986; Christy and Wagner 1996; Lawton 1971; Norris and Shevok 2004a and b; McCune and Geiser 1997; Brodo et al. 2001, ORBIC 2013.
2/ Occurrence Key:
National Forest: FWI = Winema National Forest, RRS = Rogue River National Forest, UMP = Umpqua National Forest
D = Documented within Forest Service Management Area
S = Suspected within Forest Service Management Area
3/ No common name found for this species.

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Appendix B: Summary of Construction and Operation-Related Disturbance to Each National Forest

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Table B-1. Summary of Construction-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Umpqua National Forest.

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities							Aboveground Facilities – Klamath Compressor Station	Subtotals					Percent of Total
			Construction ROW	Hydrostatic Discharge Sites [4]	Temporary Extra Work Areas	Uncleared Storage Areas	Rock Source/ Disposal	Access Roads (TARs/PARs/ Improvements) [5]	Pipe Yards		Subtotal Late Successional – Old Growth	Subtotal Mid-Seral	Subtotal Clearcut or Regenerating	Subtotal by Habitat Type	*Percent of* Habitat *Type*	
Forest-Woodland	Westside Lowland Conifer-Hardwood Forest	LO [1/]														
		MS [2/]														
		CR [3/]														
	Montane Mixed Conifer Forest	LO [1/]														
		MS [2/]														
		CR [3/]														
	Southwest Oregon Mixed Conifer-Hardwood Forest	LO [1/]	74.03		13.16	36.44		0.03								
		MS [2/]	19.73		10.74	7.14					123.66	37.61	29.87	191.14	*100.00*	*88.40*
		CR [3/]	23.23		5.29	1.35										
	Ponderosa Pine Forest and Woodland	LO [1/]														
		MS [2/]														
		CR [3/]														
	Westside Oak and Dry Douglas-fir Forest and Woodlands	LO [1/]														
		MS [2/]														
		CR [3/]														
	Western Juniper and Mountain Mahogany Woodlands	LO [1/]														
		MS [2/]														
		CR [3/]														
	Subtotal Forest-Woodland by Age Class	LO [1/]	74.03		13.16	36.44		0.03							*64.40*	
		MS [2/]	19.73		10.74	7.14					123.66	37.61	29.87	191.14	*19.80*	88.40
		CR [3/]	23.23		5.29	1.35									*15.80*	
Subtotal Forest-Woodland			**116.99**		**29.19**	**44.93**		**0.03**			**123.66**	**37.61**	**29.87**	**191.14**	***100.00***	***88.40***
Percent of All Forest-Woodland			***61.60***		***15.4***	***23.00***		***0.02***			***64.40***	***19.80***	***15.80***	***100.00***		
Grasslands-Shrubland	Shrub-Steppe															
	Westside Grasslands															
	Eastside Grasslands															
Subtotal Grasslands-Shrubland																
Wetland/Riparian	Westside Riparian-Wetlands/Eastside Riparian-Wetlands		0.04		0.05									0.09	*100.00*	*0.04*
	Herbaceous Wetlands															
Subtotal Wetland / Riparian			**0.04**		**0.05**									**0.09**	***100.00***	***0.04***
Agriculture	Agriculture, Pastures, and Mixed Environs															
Subtotal Agriculture																

Table B-1. Summary of Construction-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Umpqua National Forest.

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities							Aboveground Facilities – Klamath Compressor Station	Subtotals					Percent of Total
			Construction ROW	Hydrostatic Discharge Sites [4]	Temporary Extra Work Areas	Uncleared Storage Areas	Rock Source/ Disposal	Access Roads (TARs/PARs/ Improvements) [5]	Pipe Yards		Subtotal Late Successional – Old Growth	Subtotal Mid-Seral	Subtotal Clearcut or Regenerating	Subtotal by Habitat Type	*Percent of Habitat Type*	
Developed/Barren	Urban and Mixed Environs				7.74		2.32							10.06	*41.10*	*4.70*
	Beaches															
	Roads		7.59		6.21	0.60	0.01	0.03						14.44	*58.90*	*6.70*
Subtotal Developed / Barren			**7.59**		**13.95**	**0.60**	**2.33**	**0.03**						**24.50**	***100.00***	***4.70***
Open Water	Open Water – Lakes, Rivers, and Streams		0.21		0.11									0.32	*100.00*	*0.14*
	Bays and Estuaries															
Subtotal Open Water			**0.21**		**0.11**									**0.32**	***100.00***	***0.20***
Subtotal Non-Forest			**7.84**		**14.11**	**0.60**	**2.33**	**0.03**						**24.91**		***11.60***
Percent of All Non-Forest			**31.40**		**56.60**	**2.40**	**9.40**	**0.10**						***100.00***		
Project Total			***124.83***		***43.30***	***45.53***	***2.33***	***0.06***			**122.06**	**37.6**	**29.9**	**215.05**		
Percent of Pipeline Facilities			***58.10***		***20.20***	***20.60***	***1.10***	***0.02***			***56.90***	***17.5***	***13.9***	***100.00***		

1/ The "Late Successional and Old-Growth" category (LO) describes those forest areas with a majority of trees over 80 years of age. Forests with stands greater than 175 years are considered to have old-growth characteristics.
2/ The "Mid-Seral" category (MS) describes those forest areas with a majority of trees over 40 years of age but less than 80 years of age.
3/ The "Clearcut or Regenerating Forest" category (CR) describes those forest areas that are either clear-cut (tree age 0-5 years) or regenerating (tree age 5 to 40 years). Forest areas in this category are divided into forest vegetation types based on their potential to become those types of forests.
4/ Small brush or trees may be cleared by a rubber-tired rotary or flail motor (brush hog) or by hand with machetes/chainsaws. Minimal soil disturbance would occur. A rubber-tired hoe would be utilized to lay the discharge line and to remove the saturated hay bales or filter bags upon completion of hydrostatic discharge.
5/ Portions of some of the PARs are located within the construction ROW and there is some duplication in the acreage calculations.

Table B-2. Summary of Operation-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Umpqua National Forest.

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities						Permanent Easement (50-foot)	Aboveground Facilities																				Total Operation Impacts by Habitat Type[4/]
			30-foot Maintenance Corridor	Permanent Access Roads	Subtotal Late Successional Old-Growth Forest	Subtotal Mid-Seral Forest	Subtotal Clearcut / Regenerating Forest	Subtotal Pipeline Facilities By Vegetation Type		Jordan Cove MS & BVA #1	BVA #2	BVA #3	BVA #4	BVA #5	BVA #6, Clarks Branch Meter Station	BVA #7	BVA #8	BVA #9	BVA #10	BVA #11	BVA #12	BVA #13	BVA #14	BVA #15	BVA #16	Klamath CS, BVA #17, MS	Subtotal Aboveground Facilities	
Forest-Woodland	Westside Lowland Conifer-Hardwood Forest	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Montane Mixed Conifer Forest	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Southwest Oregon Mixed Conifer-Hardwood Forest	LO [1/]	22.35	0.03					*37.56*									0.06												
		MS [2/]	6.51		22.38	6.51	7.65	36.54	*10.79*																			0.06	**36.61**	
		CR [3/]	7.65						*12.62*																					
	Ponderosa Pine Forest and Woodland	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Westside Oak and Dry Douglas-fir Forest and Woodlands	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Western Juniper and Mountain Mahogany	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
		LO [1/]	***22.35***	***0.03***					***37.56***									***0.06***												***22.45***
	Subtotal Forest-Woodland by Age Class	***MS [2/]***	***6.51***		***22.38***	***6.51***	***7.65***	***36.54***	***10.79***																					***6.51***
		CR [3/]	***7.65***						***12.62***																					***7.65***
Subtotal Forest-Woodland			**36.51**	**0.03**	**22.38**	**6.51**	**7.65**	**36.54**	***60.97***									**0.06**												**36.61**
Grasslands-Shrubland	Shrub-steppe																													
	Westside Grasslands																													
	Eastside Grasslands																													
Subtotal Grasslands-Shrubland																														
Wetland-Riparian	Westside Riparian-Wetlands/Eastside Riparian-Wetlands		0.01					0.01	*0.01*																					**0.01**
	Herbaceous Wetland																													
Subtotal Wetland/Riparian			**0.01**					**0.01**	***0.01***																					**0.01**
Agriculture	Agriculture, Pastures, and Mixed Environs																													

Table B-2. Summary of Operation-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Umpqua National Forest.

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities						Permanent Easement (50-foot)	Aboveground Facilities																			Total Operation Impacts by Habitat Type[4/]
			30-foot Maintenance Corridor	Permanent Access Roads	Subtotal Late Successional Old-Growth Forest	Subtotal Mid-Seral Forest	Subtotal Clearcut / Regenerating Forest	Subtotal Pipeline Facilities By Vegetation Type		Jordan Cove MS & BVA #1	BVA #2	BVA #3	BVA #4	BVA #5	BVA #6, Clarks Branch Meter Station	BVA #7	BVA #8	BVA #9	BVA #10	BVA #11	BVA #12	BVA #13	BVA #14	BVA #15	BVA #16	Klamath CS, BVA #17, MS	Subtotal Aboveground Facilities	
Subtotal Agriculture																													
Developed / Barren	Urban and Mixed Environs																												
	Beaches																												
	Roads		2.94	0.03				2.94	*4.73*																				**2.96**
Subtotal Developed / Barren			**2.94**	**0.03**				**2.94**	***4.73***																				**2.96**
Open Water	Open Water – Lakes, Rivers, and Streams		0.07					0.07	*0.13*																				**0.07**
	Bays and Estuaries																												
Subtotal Open Water			**0.08**					**0.08**	***0.13***																				**0.07**
Subtotal Non-Forest			**3.03**	**0.03**				**3.06**	***4.87***																				**3.04**
Project Total			**39.54**	**0.06**	**22.39**	**6.51**	**7.65**	**39.58**	***65.85***								**0.06**												**39.64**

1/ The "Late Successional and Old-Growth" category (LO) describes those forest areas with a majority of trees over 80 years of age. Forests with stands greater than 175 years are considered to have old-growth characteristics.
2/ The "Mid-Seral" category (MS) describes those forest areas with a majority of trees over 40 years of age but less than 80 years of age.
3/ The "Clearcut or Regenerating Forest" category (CR) describes those forest areas that are either clear-cut (tree age 0-5 years) or regenerating (tree age 5 to 40 years).
4/ Total Operation Impacts by Habitat Type includes the 30-foot maintenance corridor, permanent access roads, and only aboveground facilities with a meter station or compressor station (mainline block valves located within the 30-foot maintenance corridor).
General: If percentages were less than 1/100ths, they were not included in the table.
Columns and rows do not necessarily sum correctly due to rounding.

Table B-3. Summary of Construction-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Rogue River National Forest.

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities							Aboveground Facilities – Klamath Compressor Station	Subtotals					
			Construction ROW	Hydrostatic Discharge Sites [4]	Temporary Extra Work Areas	Uncleared Storage Areas	Rock Source/ Disposal	Access Roads (TARs/PARs/ Improvements) [5]	Pipe Yards		Subtotal Late Successional – Old Growth	Subtotal Mid-Seral	Subtotal Clearcut or Regenerating	Subtotal by Habitat Type	*Percent of Habitat Type*	*Percent of Total*
Forest-Woodland	Westside Lowland Conifer-Hardwood Forest	LO [1/]														
		MS [2/]														
		CR [3/]														
	Montane Mixed Conifer Forest	LO [1/]	11.95		0.69	4.07										
		MS [2/]	6.71		0.17	3.57					16.71	10.45	46.12	73.28	*30.40*	*26.20*
		CR [3/]	22.73		11.72	11.67										
	Southwest Oregon Mixed Conifer-Hardwood Forest	LO [1/]	59.38		5.34	32.26										
		MS [2/]	5.22		0.21	1.30					96.98	6.73	63.88	167.59	*69.60*	*60.00*
		CR [3/]	37.71		12.19	13.98										
	Ponderosa Pine Forest and Woodland	LO [1/]														
		MS [2/]														
		CR [3/]														
	Westside Oak and Dry Douglas-fir Forest and Woodlands	LO [1/]														
		MS [2/]														
		CR [3/]														
	Western Juniper and Mountain Mahogany Woodlands	LO [1/]														
		MS [2/]														
		CR [3/]														
Subtotal Forest-Woodland by Age Class		LO [1/]	71.33		6.03	36.33									*47.20*	
		MS [2/]	11.93		0.38	4.87					113.69	17.18	110	240.87	*7.40*	86.30
		CR [3/]	60.44		23.91	25.65									*45.70*	
Subtotal Forest-Woodland			**143.70**		**30.32**	**66.85**					**113.69**	**17.18**	**110**	**240.87**	***100.00***	***86.30***
Percent of All Forest-Woodland											***47.20***	***7.40***	***45.70***	***100***		
Grassland-scrubland	shrub-steppe		1.87		4.62	0.51								7.00	*62.40*	*2.50*
	Grasslands (West of Cascades)		1.77		1.60	0.46								3.83	*34.20*	*1.40*
	Grasslands (East of Cascades)		0.29		0.10									0.39	*3.40*	*0.10*
Subtotal Grasslands-Shrubland			**3.93**		**6.32**	**0.97**								**11.22**	***100.00***	***4.00***
Wetland / Riparian	Westside Riparian-Wetlands/Eastside Riparian-Wetlands	LO [1/]														
		MS [2/]														
		CR [3/]														
	Herbaceous Wetlands															
Subtotal Wetland / Riparian																

Table B-3. Summary of Construction-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Rogue River National Forest.

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities							Aboveground Facilities – Klamath Compressor Station	Subtotals					
			Construction ROW	Hydrostatic Discharge Sites[4]	Temporary Extra Work Areas	Uncleared Storage Areas	Rock Source/ Disposal	Access Roads (TARs/PARs/ Improvements)[5]	Pipe Yards		Subtotal Late Successional – Old Growth	Subtotal Mid-Seral	Subtotal Clearcut or Regenerating	Subtotal by Habitat Type	*Percent of Habitat Type*	*Percent of Total*
Agriculture	Agriculture, Pastures, and Mixed Environs															
Subtotal Agriculture																
Developed Barren	Urban and Mixed Environs				10.76									10.76	*40.00*	*0.38*
	Beaches				1.54???									1.54	*3.60*	*0.30*
	Roads		9.42		3.25	2.51								15.18	*56.40*	*5.40*
Subtotal Developed / Barren			**9.42**		**15.50**	**2.51**								**27.43**	***100.00***	***9.60***
Open Water	Open Water – Lakes, Rivers, and Streams		0.14			0.09								0.23	*100.00*	*0.08*
	Bays and Estuaries															
Subtotal Open Water			**0.14**			**0.09**								**0.23**	***100.00***	***0.08***
Subtotal Non-Forest			**3.51**		**21.82**	**3.57**								**28.37**		***13.7***
Percent of All Non-Forest			***12.40***		***75.00***	***12.60***								***100.00***		
Project Total			***157.20***		***52.14***	***70.41***					**133.68**	**17.18**	**109.97**	**279.75**		
Percent of Pipeline Facilities			***56.30***		***17.50***	***25.30***					***47.90***	***6.10***	***39.30***	***100.00***		

1/ The "Late Successional and Old-Growth" category (LO) describes those forest areas with a majority of trees over 80 years of age. Forests with stands greater than 175 years are considered to have old-growth characteristics.
2/ The "Mid-Seral" category (MS) describes those forest areas with a majority of trees over 40 years of age but less than 80 years of age.
3/ The "Clearcut or Regenerating Forest" category (CR) describes those forest areas that are either clear-cut (tree age 0-5 years) or regenerating (tree age 5 to 40 years). Forest areas in this category are divided into forest vegetation types based on their potential to become those types of forests.
4/ Small brush or trees may be cleared by a rubber-tired rotary or flail motor (brush hog) or by hand with machetes/chainsaws. Minimal soil disturbance would occur. A rubber-tired hoe would be utilized to lay the discharge line and to remove the saturated hay bales or filter bags upon completion of hydrostatic discharge.
5/ Portions of some of the PARs are located within the construction ROW and there is some duplication in the acreage calculations.

Table B-4. Summary of Operation-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Rogue River National Forest

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities						Permanent Easement (50-foot)	Aboveground Facilities																				Total Operation Impacts by Habitat Type[4/]
			30-foot Maintenance Corridor	Permanent Access Roads	Subtotal Late Successional Old-Growth Forest	Subtotal Mid-Seral Forest	Subtotal Clearcut / Regenerating Forest	Subtotal Pipeline Facilities By Vegetation Type		Jordan Cove MS & BVA #1	BVA #2	BVA #3	BVA #4	BVA #5	BVA #6, Clarks Branch Meter Station	BVA #7	BVA #8	BVA #9	BVA #10	BVA #11	BVA #12	BVA #13	BVA #14	BVA #15	BVA #16	Klamath CS, BVA #17, MS	Subtotal Aboveground Facilities	
Forest-Woodland	Westside Lowland Conifer-Hardwood Forest	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Montane Mixed Conifer Forest	LO [1/]	3.96		3.96	2.39	7.22	13.57	*6.52*																				**13.58**
		MS [2/]	2.39						*3.90*																				
		CR [3/]	7.22						*12.04*																				
	Southwest Oregon Mixed Conifer-Hardwood Forest	LO [1/]	19.04		19.04	1.56	12.04	32.64	*31.43*																				**32.64**
		MS [2/]	1.56						*2.62*																				
		CR [3/]	12.04						*19.97*																				
	Ponderosa Pine Forest and Woodland	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Westside Oak and Dry Douglas-fir Forest and Woodlands	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Western Juniper and Mountain Mahogany Woodlands	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
		LO [1/]	***23.00***						***37.95***																				***23.01***
	Subtotal Forest-Woodland by Age Class	***MS [2/]***	***3.95***		***23.00***	***3.95***	***19.26***	***46.21***	***6.52***																				***2.95***
		CR [3/]	***19.26***						***32.01***																				***19.26***
Subtotal Forest-Woodland			**46.21**		**23.00**	**3.95**	**19.26**	**46.21**	***76.48***																				**46.22**
Grasslands-shrubland	Shrub-steppe		0.58					0.58	*0.95*																				**0.58**
	Westside Grasslands		0.54					0.54	*0.90*																				**0.54**
	Eastside Grasslands		0.09					0.09	*0.15*																				**0.09**
Subtotal Grasslands-Shrubland			**1.21**					**1.21**	***2.00***																				**1.21**
Wetland/ Riparian	Westside Riparian-Wetlands/Eastside Riparian-Wetlands	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Herbaceous Wetlands																													

Table B-4. Summary of Operation-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Rogue River National Forest

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities						Permanent Easement (50-foot)	Aboveground Facilities																				Total Operation Impacts by Habitat Type[4/]
			30-foot Maintenance Corridor	Permanent Access Roads	Subtotal Late Successional Old-Growth Forest	Subtotal Mid-Seral Forest	Subtotal Clearcut / Regenerating Forest	Subtotal Pipeline Facilities By Vegetation Type		Jordan Cove MS & BVA #1	BVA #2	BVA #3	BVA #4	BVA #5	BVA #6, Clarks Branch Meter Station	BVA #7	BVA #8	BVA #9	BVA #10	BVA #11	BVA #12	BVA #13	BVA #14	BVA #15	BVA #16	Klamath CS, BVA #17, MS	Subtotal Aboveground Facilities	
Subtotal Wetland/Riparian																														
Agriculture	Agriculture, Pastures, and Mixed Environs																													
Subtotal Agriculture																														
Developed / Barren	Urban and Mixed Envions																													
	Beaches																													
	Roads		2.31					2.31	*4.34*																					**2.30**
Subtotal Developed / Barren			**2.31**					**2.31**	***4.34***																					**2.30**
Open Water	Open Water – Lakes, Rivers, and Streams		0.04					0.04	*0.06*																					**0.04**
	Bays and Estuaries																													
Subtotal Open Water			**0.04**					**0.04**	***0.06***																					**0.04**
Subtotal Non-Forest			**3.56**					**3.56**	***6.40***																					**3.55**
Project Total			**49.77**		**23.01**	**3.95**	**19.26**	**49.78**	***82.88***																					**49.78**

1/ The "Late Successional and Old-Growth" category (LO) describes those forest areas with a majority of trees over 80 years of age. Forests with stands greater than 175 years are considered to have old-growth characteristics.
2/ The "Mid-Seral" category (MS) describes those forest areas with a majority of trees over 40 years of age but less than 80 years of age.
3/ The "Clearcut or Regenerating Forest" category (CR) describes those forest areas that are either clear-cut (tree age 0-5 years) or regenerating (tree age 5 to 40 years).
4/ Total Operation Impacts by Habitat Type includes the 30-foot maintenance corridor, permanent access roads, and only aboveground facilities with a meter station or compressor station (mainline block valves located within the 30-foot maintenance corridor).
General: If percentages were less than 1/100ths, they were not included in the table.
-Columns and rows do not necessarily sum correctly due to rounding.

Table B-5. Summary of Construction-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Winema National Forest

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities							Aboveground Facilities – Klamath Compressor Station	Subtotals					
			Construction ROW	Hydrostatic Discharge Sites [4]	Temporary Extra Work Areas	Uncleared Storage Areas	Rock Source/ Disposal	Access Roads (TARs/PARs/ Improvements) [5]	Pipe Yards		Subtotal Late Successional – Old Growth	Subtotal Mid-Seral	Subtotal Clearcut or Regenerating	Subtotal by Habitat Type	*Percent of Habitat Type*	*Percent of Total*
Forest-Woodland	Westside Lowland Conifer-Hardwood Forest	LO [1/]														
		MS [2/]														
		CR [3/]														
	Montane Mixed Conifer Forest	LO [1/]	5.77		0.56	2.96										
		MS [2/]	2.43		0.30	0.92					9.29	3.65	21.15	34.09	*38.50*	*36.60*
		CR [3/]	14.47		3.54	3.14										
	Southwest Oregon Mixed Conifer-Hardwood Forest	LO [1/]	29.86		4.27	2.28										
		MS [2/]	5.62		1.08	0.70					36.41	7.40	10.53	54.34	*61.50*	*58.40*
		CR [3/]	8.83		0.61	1.09										
	Ponderosa Pine Forest and Woodland	LO [1/]														
		MS [2/]											0.01	0.01	*0.01*	*0.01*
		CR [3/]			0.01											
	Westside Oak and Dry Douglas-fir Forest and Woodlands	LO [1/]														
		MS [2/]														
		CR [3/]														
	Western Juniper and Mountain Mahogany Woodlands	LO [1/]														
		MS [2/]														
		CR [3/]														
Subtotal Forest-Woodland by Age Class		LO [1/]	35.63		4.83	5.24									*51.70*	
		MS [2/]	8.05		1.38	1.62					45.70	11.05	31.68	88.43	*12.50*	95.00
		CR [3/]	23.30		4.15	4.23									*35.80*	
Subtotal Forest-Woodland			**66.98**		**10.37**	**11.09**					**45.70**	**11.05**	**31.68**	**88.43**	***100.00***	***95.00***
Percent of All Forest-Woodland											***51.70***	***12.50***	***35.80***	***100.00***		
Grasslands-Shrubland	Shrub-steppe															
	Westside Grasslands															
	Eastside Grasslands		0.69		0.22									0.91	*100.00*	*0.90*
Subtotal Grasslands-Shrubland			**0.69**		**0.22**									**0.91**	*100.00*	***0.90***
Wetland / Riparian	Westside Riparian-Wetlands/Eastside Riparian-Wetlands	LO [1/]														
		MS [2/]	0.26									0.26		0.26	*63.40*	*0.30*
		CR [3/]														
	Herbaceous Wetlands		0.15											0.15	*36.60*	*0.20*
Subtotal Wetland / Riparian			**0.41**									**0.26**		**0.41**	***100.00***	***0.40***
Agriculture	Agriculture, Pastures, and Mixed Environs															

Table B-5. Summary of Construction-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Winema National Forest

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities							Aboveground Facilities – Klamath Compressor Station	Subtotals					
			Construction ROW	Hydrostatic Discharge Sites [4]	Temporary Extra Work Areas	Uncleared Storage Areas	Rock Source/ Disposal	Access Roads (TARs/PARs/ Improvements)[5]	Pipe Yards		Subtotal Late Successional – Old Growth	Subtotal Mid-Seral	Subtotal Clearcut or Regenerating	Subtotal by Habitat Type	*Percent of Habitat Type*	*Percent of Total*
Subtotal Agriculture																
Developed / Barren	Urban and Mixed Environs															
	Beaches															
	Roads		1.52		1.15	0.05								2.72	*100.00*	*3.50*
Subtotal Developed / Barren			**1.52**		**1.15**	**0.05**								**2.72**	***100.00***	***3.50***
Open Water	Open Water – Lakes, Rivers, and Streams		0.05											0.05	*100.00*	*0.05*
	Bays and Estuaries															
Subtotal Open Water			**0.05**											**0.05**	***100.00***	***0.05***
Subtotal Non-Forest			**2.67**		**1.37**	**0.05**						**0.26**		**4.67**		***5.30***
Percent of All Non-Forest			**53.70**		**38.90**	**1.00**						***5.20***		***100.00***		
Project Total			***69.65***		***11.74***	***11.14***					**45.69**	**11.30**	**31.69**	**92.53**		
Percent of Pipeline Facilities			***74.90***		***13.20***	***11.9***					***49.10***	***12.10***	***34.00***	***100.00***		

1/ The "Late Successional and Old-Growth" category (LO) describes those forest areas with a majority of trees over 80 years of age. Forests with stands greater than 175 years are considered to have old-growth characteristics.
2/ The "Mid-Seral" category (MS) describes those forest areas with a majority of trees over 40 years of age but less than 80 years of age.
3/ The "Clearcut or Regenerating Forest" category (CR) describes those forest areas that are either clear-cut (tree age 0-5 years) or regenerating (tree age 5 to 40 years). Forest areas in this category are divided into forest vegetation types based on their potential to become those types of forests.
4/ Small brush or trees may be cleared by a rubber-tired rotary or flail motor (brush hog) or by hand with machetes/chainsaws. Minimal soil disturbance would occur. A rubber-tired hoe would be utilized to lay the discharge line and to remove the saturated hay bales or filter bags upon completion of hydrostatic discharge.
5/ Portions of some of the PARs are located within the construction ROW and there is some duplication in the acreage calculations.

Table B-6. Summary of Operation-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Winema National Forest

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities						Permanent Easement (50-foot)	Aboveground Facilities																				Total Operation Impacts by Habitat Type[4/]
			30-foot Maintenance Corridor	Permanent Access Roads	Subtotal Late Successional Old-Growth Forest	Subtotal Mid-Seral Forest	Subtotal Clearcut / Regenerating Forest	Subtotal Pipeline Facilities By Vegetation Type		Jordan Cove MS & BVA #1	BVA #2	BVA #3	BVA #4	BVA #5	BVA #6, Clarks Branch Meter Station	BVA #7	BVA #8	BVA #9	BVA #10	BVA #11	BVA #12	BVA #13	BVA #14	BVA #15	BVA #16	Klamath CS, BVA #17, MS	Subtotal Aboveground Facilities	
Forest-Woodland	Westside Lowland Conifer-Hardwood Forest	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Montane Mixed Conifer Forest	LO [1/]	1.84		1.84	0.84	4.68	7.36	*3.06*																				**7.36**
		MS [2/]	0.84						*1.40*																				
		CR [3/]	4.68						*7.79*																				
	Southwest Oregon Mixed Conifer-Hardwood Forest	LO [1/]	9.43		9.43	1.77	2.77	13.97	*15.73*																				**13.97**
		MS [2/]	1.77						*2.95*																				
		CR [3/]	2.77						*4.61*																				
	Ponderosa Pine Forest and Woodland	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Westside Oak and Dry Douglas-fir Forest and Woodlands	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Western Juniper and Mountain Mahogany Woodlands	LO [1/]																												
		MS [2/]																												
		CR [3/]																												
	Subtotal Forest-Woodland by Age Class	***LO [1/]***	***11.27***		***11.27***	***2.61***	***7.45***	***21.33***	***18.79***																				***11.27***
		MS [2/]	***2.61***						***4.35***																				***2.61***
		CR [3/]	***7.45***						***12.40***																				***7.45***
Subtotal Forest-Woodland			**21.33**		**11.27**	**2.61**	**7.45**	**21.33**	***35.54***																				**21.33**
Grasslands-Shrubland	Shrub-steppe																												
	Westside Grasslands																												
	Eastside Grasslands		0.26					0.26	*0.42*																				**0.26**
Subtotal Grasslands-Shrubland			**0.26**					**0.26**	***0.42***																				**0.26**
Wetland/ Riparian	Westside Riparian-Wetlands/Eastside Riparian-Wetlands	LO [1/]																												
		MS [2/]	0.10			0.01		0.01	*0.17*																				**0.01**
		CR [3/]																												
	Herbaceous Wetlands		0.05					0.05	*0.08*																				**0.05**

Table B-6. Summary of Operation-Related Disturbance (acres) to Corresponding Habitat Category (Johnson and O'Neil, 2001) in Winema National Forest

General Habitat Type	Mapped Habitat Category Type	Forest Stand by Age	Pipeline Facilities						Permanent Easement (50-foot)	Aboveground Facilities																				Total Operation Impacts by Habitat Type[4/]
			30-foot Maintenance Corridor	Permanent Access Roads	Subtotal Late Successional Old-Growth Forest	Subtotal Mid-Seral Forest	Subtotal Clearcut / Regenerating Forest	Subtotal Pipeline Facilities By Vegetation Type		Jordan Cove MS & BVA #1	BVA #2	BVA #3	BVA #4	BVA #5	BVA #6, Clarks Branch Meter Station	BVA #7	BVA #8	BVA #9	BVA #10	BVA #11	BVA #12	BVA #13	BVA #14	BVA #15	BVA #16	Klamath CS, BVA #17, MS	Subtotal Aboveground Facilities	
Subtotal Wetland/Riparian			**0.06**					**0.06**	***0.25***																				**0.06**
Agriculture	Agriculture, Pastures, and Mixed Environs																												
Subtotal Agriculture																													
Developed / Barren	Urban and Mixed Environs																												
	Beaches																												
	Roads		0.28					0.28	*0.46*																				**0.28**
Subtotal Developed / Barren			**0.28**					**0.28**	***0.46***																				**0.28**
Open Water	Open Water – Lakes, Rivers, and Streams		0.10					0.10	*0.02*																				**0.10**
	Bays and Estuaries																												
Subtotal Open Water			**0.10**					**0.10**	***0.02***																				**0.10**
Subtotal Non-Forest			**0.71**			**0.01**		**0.72**	***1.15***																				**0.72**
Project Total			**22.03**		**11.27**	**2.62**	**7.45**	**22.03**	***36.69***																				**22.03**

1/ The "Late Successional and Old-Growth" category (LO) describes those forest areas with a majority of trees over 80 years of age. Forests with stands greater than 175 years are considered to have old-growth characteristics.
2/ The "Mid-Seral" category (MS) describes those forest areas with a majority of trees over 40 years of age but less than 80 years of age.
3/ The "Clearcut or Regenerating Forest" category (CR) describes those forest areas that are either clear-cut (tree age 0-5 years) or regenerating (tree age 5 to 40 years).
4/ Total by Habitat Type includes the 30-foot maintenance corridor, permanent access roads, and only aboveground facilities with a meter station or compressor station (mainline block valves located within the 30-foot maintenance corridor).
General: If percentages were less than 1/100ths, they were not included in the table.
-Columns and rows do not necessarily sum correctly due to rounding.

Appendix C: Waterbodies Crossed by the Project on National Forest Lands

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Table C- 1: Waterbodies Crossed by the Project on National Forest Lands													
Waterbodies Crossed and Waterbody ID	**Identification Number (LLID) and Jurisdiction**	**Approximate Pipeline MP**	**Waterbody Type Size [1/]**	**Proposed Crossing Method Scour Level [2/]**	**Waterbody Crossing Rationale[3/]**	**ESA Species Present/Habitat[4/]**	**Anadromous Species Present [5/]**	**Resident Species Present**	**EFH Species Present [6/]**	**EFH Component Present [6/]**	**Fishery Construction Window [5/, 7/]**	**Water Quality Status [8/]**	**Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, if = set inside fish window, N=None**
Cascades Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Upper Cow Creek (HUC 1710030206) Fifth field Watershed, Douglas County, Oregon													
Trib. to East Fork Cow Creek (GW014/FS-HF-C)	1229383427835 Forest Service – Umpqua NF	109.17	Perennial (FS – Interpretation) Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small headwater wetland/tributary-if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Unknown	Y*
Trib. to East Fork Cow Creek (GSI016/FS-HF-F)	1229369427819 Forest Service – Umpqua NF	109.33	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide headwater intermittent tributary if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Unknown	Y*
East Fork Cow Creek (GSP019/FS-HF-G)	1229918428021 Forest Service – Umpqua NF	109.47	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [10/]	Dry open-cut methods feasible/practical on small headwater stream during low flow periods within ODFW in-water work period. No additional work areas proposed.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	3	Y
East Fork Cow Creek (GSP022/FS-HF-G ASP297)	1229918428021 Forest Service – Umpqua NF	109.69	Perennial Intermediate	Adjacent to centerline within TEWA	Not crossed by centerline. Waterbody flows through culvert on road which is encompassed by TEWA 109.68-N. This TEWA was selected for parking/staging as well as for potential mitigation to remove the culvert if the road is not required.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	3	N

Table C- 1: Waterbodies Crossed by the Project on National Forest Lands													
Waterbodies Crossed and Waterbody ID	**Identification Number (LLID) and Jurisdiction**	**Approximate Pipeline MP**	**Waterbody Type Size [1/]**	**Proposed Crossing Method Scour Level [2/]**	**Waterbody Crossing Rationale[3/]**	**ESA Species Present/Habitat[4/]**	**Anadromous Species Present [5/]**	**Resident Species Present**	**EFH Species Present [6/]**	**EFH Component Present [6/]**	**Fishery Construction Window [5/, 7/]**	**Water Quality Status [8/]**	**Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, if = set inside fish window, N=None**
Trib. to East Fork Cow Creek (FS-HF-J/AW298)	1229332427779 Forest Service – Umpqua NF	109.69	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' headwater tributary. ROW necked down to 75' and TEWAs only utilized on north side of creek to minimize riparian impacts. Steep topographic conditions prevent a conventional bore because of extensive grading/excavation requirements.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Unknown	Y
Trib. to East Fork Cow Creek (FS-HF-K/AW299)	1229332427781 Forest Service – Umpqua NF	109.78	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2-4' headwater tributary. ROW necked down to 75' and no TEWAs utilized to minimize riparian impacts.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Unknown	Y
Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), Upper Cow Creek (HUC 1710030206) Fifth field Watershed, Jackson County, Oregon													
Trib. to East Fork Cow Creek (ESI068/FS-HF-N)	Forest Service – Umpqua NF	110.98	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2-4' headwater tributary which is expected to be dry at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Unknown	Y*
Cascades Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Trail Creek (HUC 1710030706) Fifth field Watershed, Jackson County, Oregon													
Trib. to W. Fork Trail Creek (ESI068)	Forest Service – Umpqua NF	110.76	Intermittent Minor	Adjacent to centerline within TEWA 110.73	Small 1-2' wide ephemeral drainage located Peavine Quarry within TEWA; drainage to be avoided by construction; drainage expected to be dry during construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Unknown	N –to be avoided
Eastern Slopes Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Little Butte Creek (HUC 1710030708) Fifth field Watershed[9/], Jackson County, Oregon													

Table C- 1: Waterbodies Crossed by the Project on National Forest Lands													
Waterbodies Crossed and Waterbody ID	**Identification Number (LLID) and Jurisdiction**	**Approximate Pipeline MP**	**Waterbody Type Size [1/]**	**Proposed Crossing Method Scour Level [2/]**	**Waterbody Crossing Rationale[3/]**	**ESA Species Present/Habitat[4/]**	**Anadromous Species Present [5/]**	**Resident Species Present**	**EFH Species Present [6/]**	**EFH Component Present [6/]**	**Fishery Construction Window [5/, 7/]**	**Water Quality Status [8/]**	**Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, if = set inside fish window, N=None**
South Fork Little Butte Creek (ASP165)	1226154424195 Forest Service-Rogue River NF	162.45	Perennial Intermediate	Dry Open-Cut Level 1	Dry-open cut feasible and practical on creek. ODFW fish passage barrier data (RecordID 51163) indicates that downstream irrigation diversion dam/barrier (~ 0.5 miles): is unladdered and impassible. USGS Gage Station 14339500 – located below diversion reports monthly mean flow of 14, 12 and 11 cfs, respectively for Jul, Aug & Sep. ROW necked down to 75 feet and TEWAs set back to minimize riparian impacts.	None	None	Trout, unspecified	None	None	Jun 15 to Sep 15	2 and 4A	Y-1i with mid-stream support
Daley Creek (ESI076)	1223666423096 Forest Service-Rogue River NF	166.21	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small headwater intermittent trib. if flowing at the time of construction.	None	None	Trout, Unspecified	None	None	Jun 15 to Sep 15	Unknown	Y*
Eastern Slopes Ecoregion, Upper Klamath River (HUC 18010206) Sub-basin, Spencer Creek (HUC 1801020601) Fifth field Watershed [9/], Klamath County, Oregon													
Spencer Creek (EW085)	1220277421487 Forest Service-Winema NF	171.07	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 10' wide stream with associated wetland. ROW necked down 75 feet and TEWAs set back or located to the edge of existing road disturbance to minimize riparian and wetland impacts. Conventional bore not practical because of topographic conditions and grading/excavation requirements on the south side of creek.	None	None	Redband Trout Possible Brook Trout	None	None	Jul 1 to Sep 30	5: 303(d)	Y

Table C- 1: Waterbodies Crossed by the Project on National Forest Lands													
Waterbodies Crossed and Waterbody ID	**Identification Number (LLID) and Jurisdiction**	**Approximate Pipeline MP**	**Waterbody Type Size [1/]**	**Proposed Crossing Method Scour Level [2/]**	**Waterbody Crossing Rationale[3/]**	**ESA Species Present/Habitat[4/]**	**Anadromous Species Present [5/]**	**Resident Species Present**	**EFH Species Present [6/]**	**EFH Component Present [6/]**	**Fishery Construction Window [5/, 7/]**	**Water Quality Status [8/]**	**Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, if = set inside fish window, N=None**
Trib. to Spencer Creek (GSP007)	1221988422850 Forest Service-Winema NF	171.57	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 2' wide intermittent trib/wetland. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Sep 30	Unknown	Y*
Trib. to Spencer Creek (EW107)	1221837422760 Forest Service-Winema NF	172.48	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 10' wide intermittent trib. if flowing at the time of construction. ROW necked down 75 feet and TEWAs set back to minimize riparian and wetland impacts.	None	None	Unknown	None	None	Jul 1 to Sep 30	Unknown	Y*
Trib. to Spencer Creek (ESI106)	Forest Service-Winema NF	173.74	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 5' wide ephemeral trib. if flowing at the time of construction.	None	None	Assumed	None	None	Jul 1 to Sep 30	Unknown	Y

Table C- 1: Waterbodies Crossed by the Project on National Forest Lands

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline MP	Waterbody Type Size [1/]	Proposed Crossing Method Scour Level [2/]	Waterbody Crossing Rationale[3/]	ESA Species Present/Habitat[4/]	Anadromous Species Present [5/]	Resident Species Present	EFH Species Present [6/]	EFH Component Present [6/]	Fishery Construction Window [5/, 7/]	Water Quality Status [8/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, if = set inside fish window, N=None

1/ FERC waterbody definitions:
Minor = less than or equal to 10 feet wide
Intermediate = greater than 10 feet wide but less than or equal to 100 feet wide
Major = greater than 100 feet wide

2/ Level 1 and 2 waterbodies have been identified; all others are Level 0. According to GeoEngineers 2013 Channel Migration and Scour Analysis for the Project, channel migration is defined as the lateral movement, over time, of an entire channel segment perpendicular to the direction of stream flow; channel avulsion is the sudden abandonment of an active channel for a newly created or previously abandoned channel located on the floodplain; channel widening is defined as erosion and subsequent recession of one or both stream banks that widens the channel without changing the channel location; streambed scour is erosion of the streambed resulting in the development of deep pools and/or the systematic lowering of the channel floor elevation.
Level 0 = streams not likely subject to migration, avulsion and/or scour
Level 1 = streams with a moderate potential for migration, avulsion and/or scour
Level 2 = streams with a high potential for migration, avulsion and/or scour

3/ Dry open-cut crossing methods include Flume or Dam and Pump procedures. Dam and Pump methods would be utilized where streambed blasting is anticipated to eliminate blasting around the flume. The Dam and Pump crossing method is the preferred crossing procedure in steep incised drainage valleys where worker safety may be compromised when placing ("threading") the pipe string under the flume pipe and where there is a risk of upsetting the flume during this operation. The Dam and Pump crossing method is also the preferred crossing method on small streams under low flow conditions during the recommended ODFW-recommended in-water work period. Pacific Connector requests permission for temporary/short-term fish passage restriction when completing Dam and Pump crossings within the ODFW-recommended in-water work period.

4/ FWS, NMFS, and StreamNet. T = Threatened, E = Endangered, CH = Critical Habitat

5/ ODFW 2012. 2012. Fish Distribution Data, 1:24,000 Scale. Oregon Department of Fish and Wildlife Natural Resources Information Management Program. Online: https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=fishdistdata.

6/ PFMC 1999; ODFW 2012.

7/ Pacific Connector understands that fisheries' construction windows only apply to those waterbodies flowing at the time of construction.

8/ ODEQ Water Quality Status:
Unknown = waterbody is not registered with Oregon Department of Environmental Quality (ODEQ 2012)
2 = Available data and information indicate that somedesignated uses are supported and the water quality standard is attained.
3 = Insufficient data to determine whether a designated use is supported.
4A = Total maximum daily loads that will result in attainment of water quality standards have been approved
5: 303(d) = Data indicate a designated use is not supported or a water quality standard is not attained and a TMDL is needed. This category constitutes the Section 303(d) list that EPA will approve or disapprove under the Clean Water Act.

9/ Key Watershed.

10/ Streambed bedrock based on Pacific Connector's Wetland and Waterbody delineation surveys (see the Wetland Delineation Report, submitted as a stand-alone document). Streambed bedrock may require special construction techniques to ensure pipeline design depth. Special construction techniques may include rock hammering, drilling and hammering, or blasting. The need for blasting would be determined by the contractor and would only be initiated after ODFW blasting permits are obtained.

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Appendix D: Estimates of Snags on National Forest Lands

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Table D-1 Estimate of Snags on National Forest Lands within Areas Impacted by the Proposed Action													
Umpqua							**Rogue River**						
Age class	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**	**Age class**	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**
LO	Hard	87	436	52	70	0	LO	Hard	77	116	15	8	1
	Soft		9	35	17	35		Soft		0	39	15	0
MS	Hard	38	188	23	30	0	MS	Hard	12	18	2	1	0
	Soft		4	15	8	15		Soft		0	6	2	0
CR	Hard	30	149	18	24	0	CR	Hard	84	127	17	8	1
	Soft		3	12	6	12		Soft		0	42	17	0
Total	Hard	155	774	93	124	0	Total	Hard	174	261	35	17	2
	Soft		15	62	31	62		Soft		0	87	35	0
Winema							**National Forest Total**						
Age class	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**	**Age class**	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**
LO	Hard	40	121	4	4	0	LO	Hard	205	674	72	82	1
	Soft		0	16	4	0		Soft		9	90	37	35
MS	Hard	9	28	1	1	0	MS	Hard	59	235	26	32	0
	Soft		0	4	1	0		Soft		4	25	11	15
CR	Hard	27	82	3	3	0	CR	Hard	142	358	38	35	1
	Soft		0	11	3	0		Soft		3	65	26	12
Total	Hard	77	232	8	8	0	Total	Hard	406	1,267	135	149	2
	Soft		0	31	8	0		Soft		15	180	73	62

Table D-2 Estimate of Snags on National Forest Lands within 700 feet of the Proposed Action													
Umpqua							**Rogue River**						
Age class	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**	**Age class**	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**
LO	Hard	921	4,604	552	737	0	LO	Hard	964	1,447	193	96	10
	Soft		92	368	184	368		Soft		0	482	193	0
MS	Hard	790	3,948	474	632	0	MS	Hard	289	433	58	29	3
	Soft		79	316	158	316		Soft		0	144	58	0
CR	Hard	396	1,982	238	317	0	CR	Hard	1,097	1,645	219	110	11
	Soft		40	159	79	159		Soft		0	548	219	0
Total	Hard	2,107	10,533	1,264	1,685	0	Total	Hard	2,350	3,525	470	235	23
	Soft		211	843	421	843		Soft		0	1,175	470	0
Winema							**National Forest Total**						
Age class	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**	**Age class**	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**
LO	Hard	287	861	29	29	0	LO	Hard	0	6,912	774	862	10
	Soft		0	115	29	0		Soft		92	965	406	368
MS	Hard	161	483	16	16	0	MS	Hard	0	4,864	548	677	3
	Soft		0	64	16	0		Soft		79	525	232	316
CR	Hard	866	2,597	87	87	0	CR	Hard	0	6,223	544	513	11
	Soft		0	346	87	0		Soft		40	1,053	385	159
Total	Hard	1,314	3,941	131	131	0	Total	Hard	5,770	17,999	1,865	2,052	23
	Soft		0	525	131	0		Soft		211	2,543	1,023	843

Table D-3 Estimate of Snags on National Forest Lands within 3,200 feet of the Proposed Action													
Umpqua							**Rogue River**						
Age class	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**	**Age class**	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**
LO	Hard	4,861	24,306	2,917	3,889	0	LO	Hard	4,400	6,600	880	440	44
	Soft		486	1,944	972	1,944		Soft		0	2,200	880	0
MS	Hard	1,970	9,848	1,182	1,576	0	MS	Hard	584	876	117	58	6
	Soft		197	788	394	788		Soft		0	292	117	0
CR	Hard	2,262	11,308	1,357	1,809	0	CR	Hard	5,787	8,681	1,157	579	58
	Soft		226	905	452	905		Soft		0	2,894	1,157	0
Total	Hard	9,092	45,462	5,455	7,274	0	Total	Hard	10,771	16,157	2,154	1,077	108
	Soft		909	3,637	1,818	3,637		Soft		0	5,386	2,154	0
Winema							**National Forest Total**						
Age class	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**	**Age class**	**Decay class**	**Forested acres**	**<13**	**13-24**	**25-36**	**>36**
LO	Hard	1,092	3,276	109	109	0	LO	Hard	10,353	34,182	3,906	4,438	44
	Soft		0	437	109	0		Soft		486	4,581	1,961	1,944
MS	Hard	242	725	24	24	0	MS	Hard	2,795	11,448	1,323	1,658	6
	Soft		0	97	24	0		Soft		197	1,176	535	788
CR	Hard	3,716	11,147	372	372	0	CR	Hard	11,765	31,136	2,886	2,760	58
	Soft		0	1,486	372	0		Soft		226	5,285	1,981	905
Total	Hard	5,049	15,148	505	505	0	Total	Hard	24,913	76,767	8,115	8,856	108
	Soft		0	2,020	505	0		Soft		909	11,042	4,478	3,637

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APPENDIX M

Management Indicator Species Report



Pacific Connector Gas Pipeline, LP

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Management Indicator Species

Pacific Connector Gas Pipeline Project

April 2014

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1.0 INTRODUCTION

The National Forest Management Act of 1976 (NFMA) requires each National Forest to identify Management Indicator Species (MIS) in the planning process and for fish and wildlife habitats to be managed to maintain and improve habitat of selected MIS. MIS are "*plant and animal species, communities, or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent*" (Forest Service Manual 2620.5). The role of MIS and the criteria to select MIS are described in 36 CFR 219.19 (a)(1) and Forest Service Manual 2600 (1982 Rule):

> *"In order to estimate the effects of each [Forest Plan] alternative on fish and wildlife populations, certain vertebrate and/or invertebrate species present in the area shall be identified and selected as management indicator species and the reasons for their selection will be stated. These species shall be selected because their population changes are believed to indicate the effects of management activities. In the selection of management indicator species, the following categories shall be represented where appropriate: Endangered and threatened plant and animal species identified on State and Federal lists for the planning area; species with special habitat needs that may be influenced significantly by planned management programs; species commonly hunted, fished or trapped; non-game species of special interest; and additional plant or animal species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality."*

Important characteristics of MIS include their capability of being effectively monitored and that relationships between species and their habitats and response to the effects of management activities of interest are well understood. MIS and their habitats have been used as part of a strategy to monitor implementation of Forest Plans and the effects to wildlife and plants. By monitoring the habitat changes of these particular indicator species, the effects of management activities on the associated animal communities can theoretically be determined. Since the habitats of MIS cover the majority of the vegetative seral stages on a specific National Forest, it is assumed that meeting the requirements of those species will assure that the needs of associated species will be met (Forest Service, 1990a).

This assessment examines potential effects to MIS and to concomitant wildlife resources which may result from implementation of activities associated with the Jordan Cove Energy and Pacific Connector Gas Pipeline (PCGP) Project. The many components of this Proposed Action have been described by Federal Energy Regulatory Commission (FERC) in their Draft Environmental Impact Statement (DEIS). Portions of the Proposed Action will cross the Umpqua, Rogue River-Siskiyou, and Fremont-Winema National Forests.

This analysis identifies MIS on each National Forest that will be potentially affected by the Proposed Action, the management indicators that each MIS represents, including management goals, standards, guidelines, and prescriptions for the management indicators, the status of MIS habitats and populations on National Forests or vicinities if known, the habitats that will be affected by the Proposed Action, and the effects of the Proposed Action in relation to achieving Forest Plan standards. Wherever possible, the analysis in this document includes available information on recent population trends, though in most instances population indices in one form or another have been developed from limited data or used directly if available from other sources. With the exception of northern spotted owls, no species-specific surveys for MIS species have been conducted for the PCGP Project. Table 1-1 provides a list of MIS considered for each National Forest affected by the Proposed Action.

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Table 1-1
Summary of Management Indicator Species Analyzed for Each National Forest Affected by the Pacific Connector Gas Pipeline Project

Common Species Name / *Scientific Name*	Umpqua NF	Rogue River - Siskiyou NF	Fremont - Winema NF	General Habitat Targeted	Status[1]		
					Federal	State/ODFW	Conservation Status
Northern Spotted Owl *Strix occidentalis caurina*	MIS	MIS	MIS	Mature and old-growth coniferous forest	FT	ST	G3T3, S3
Pileated Woodpecker *Dryocopus pileatus*	MIS	MIS	MIS	Mature and old-growth coniferous forest	MBTA	SV	G5, S4
Black-backed Woodpecker *Picoides arcticus* [Three-toed Woodpecker *Picoides tridactylus]*			MIS	Mature and old-growth coniferous forest	MBTA	SV	G5, S3
American (Pine) Marten *Martes americana*	MIS	MIS	MIS	Mature and old-growth coniferous forest		SV	G5
Bald Eagle *Haliaeetus leucocephalus*	MIS		MIS	previously listed as T&E	MBTA, BCC-5, BMC FS - Sensitive		G5, S4BS4N
Peregrine Falcon Falco peregrinus	MIS			previously listed as T&E	MBTA, BCC-5, BMC		G4, S1
Northern Goshawk *Accipiter gentilis*			MIS	Mature and old-growth coniferous forest	SOC MBTA, BCC-5	SV	G5, S3
Roosevelt Elk *Cervus elaphus roosevelti*	MIS	MIS		Big game winter range			G4T4
Columbian Black-tail deer *Odocoileus hemionus columbianus*	MIS	MIS		Big game winter range			G5, S5
Mule Deer *Odocoileus hemionus*			MIS	Big game winter range			G5, S5
Acorn Woodpecker *Melanerpes formicivorus*	MIS			Dead and defective tree habitats	SOC MBTA	SV	G5, S3
Lewis Woodpecker *Melanerpes lewis*	MIS			Dead and defective tree habitats	SOC MBTA, BCC-R9 FS - Sensitive	SC	G4, S2S3B
Yellow-bellied Sapsucker *Sphyrapicus varius*	MIS			Dead and defective tree habitats	MBTA		G5

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Common Species Name / *Scientific Name*	Umpqua NF	Rogue River - Siskiyou NF	Fremont - Winema NF	General Habitat Targeted	Status[1]		
					Federal	State/ODFW	Conservation Status
Williamson Sapsucker *Sphyrapicus thyroideus*	MIS			Dead and defective tree habitats	MBTA, BCC-R9		G5, S4BS3N
Hairy Woodpecker *Picoides villosus*	MIS	MIS		Dead and defective tree habitats	MBTA		G5, S4
Downy Woodpecker *Picoides pubescens*	MIS	MIS		Dead and defective tree habitats	MBTA		G5, S4
Northern (Common) Flicker *Colaptes auratus*		MIS		Dead and defective tree habitats	MBTA		G5, S5
Winter Steelhead *Oncorhynchus mykiss*	MIS			Water quality		SC	G5T3Q , S2S3
Summer Steelhead *Oncorhynchus mykiss*	MIS			Water quality		SC	G5T2T3Q,S2S3
Inland Redband Trout *Oncorhynchus mykiss spp.*			MIS	Water quality	FS - Sensitive		G5T4, S3

[1] Status:

- Federal: MBTA = Migratory Bird Treaty Act, SOC = Federal Species of Concern, BCC = Bird of Conservation Concern (R9 = Region 9, R5 = Region 5), BMC = Bird of Management Concern, FS – Sensitive = Forest Service Region 6 sensitive species, FT = Federal Threatened
- State: SC = ODFW critical, SV = ODFW vulnerable, ST = State Threatened
- Conservation Status (NatureServe, 2014): G = Global, S = Oregon State, T = intraspecific taxon, B = Breeding, N = Nesting, Q = Questionable taxonomy; 1 = critical imperiled, 2 = imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure.

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Proposed Action. The Proposed Action crosses Coos, Douglas, Jackson, and Klamath Counties in Southwest Oregon. The Umpqua, Rogue River-Siskiyou, and Fremont-Winema National Forests will be crossed by the Proposed Action which includes a liquefied natural gas facility in Coos Bay, Oregon (Jordan Cove Liquid Natural Gas (LNG) facility) and a 232-mile natural gas pipeline (PCGP) from the LNG facility in Coos Bay to east of Malin, Oregon near the California border. Only the PCGP Project will affect lands managed on National Forests.

To construct the pipeline, Pacific Connector must remove vegetation, including trees, from within the construction right-of-way, temporary extra work areas, and other limited locations (rock disposal sites, hydrostatic test sites, and temporary access roads). In addition, Pacific Connector will also utilize uncleared storage areas (UCSAs) at various locations along the route to store forest slash, stumps, and dead and downed log materials that will eventually be scattered across the right-of-way after construction. UCSAs will mostly be located in dense, mature forested areas, in areas of steep slopes, and in areas where the route follows steep, narrow ridgelines. However, to minimize overall project disturbance, UCSAs will not be cleared of trees during construction.

Pacific Connector will be restoring some portions of impacted habitats by revegetating them with native species of grasses and shrubs, and replanting conifers within affected forested areas. Restoration of grasslands, shrublands, and early successional forest stages will occur within shorter time spans than restoration of mid-seral forests. In some cases, Pacific Connector will enhance or create habitat features through, for example, girdling trees to create snags, and will be supporting agencies' treatments of forested stands through pre-commercial thinning projects that may enhance forest understories and accelerate development of late successional growth characteristics in treated conifer stands.

Pacific Connector must retain a maintenance corridor that is 30 feet wide centered on the pipeline. That corridor will be maintained in an herbaceous and/or shrub state during the life of the project. Direct restoration of late successional-old growth forests >80 years old cannot occur during the life of the project, assumed to be 50 years. To mitigate for losses of late successional-old growth forests, Pacific Connector has developed a Compensatory Mitigation Plan (CMP). The CMP includes funding for implementation of projects proposed by the Forest Service on each National Forest crossed. Pacific Connector is confident that funding such projects will offset impacts within Northwest Forest Plan (NWFP) Late Successional Reserves (LSRs) – mapped and unmapped, Riparian Reserves, and to species dependent on affected habitats within those land allocations on each forest to at least a neutral level. That is, implementation of agency projects will mitigate effects by the PCGP Project so that levels of ecological services provided after the impact are the same as those provided before the impact.

A more detailed description of the project, including Purpose and Need, can be found in the Draft Environmental Impact Statement.

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2.0 UMPQUA NATIONAL FOREST

Species. The Umpqua National Forest Plan (1990b) includes the following species as MIS: northern spotted owl, pileated woodpecker, pine marten, bald eagle, peregrine falcon, Roosevelt elk, Columbian black-tail deer, and primary cavity nesters (acorn woodpecker, Lewis's woodpecker, yellow-bellied sapsucker, Williamson's sapsucker, hairy woodpecker, and downy woodpecker; Table 1-1). Indicator species for water quality on the Forest include summer and winter steelhead runs. The northern spotted owl, pine marten, and pileated woodpecker represent various mature and old growth conifer habitats. Primary cavity excavators represent dead and defective tree habitats. Big game winter range is represented by Roosevelt elk and black-tail deer.

The bald eagle and peregrine falcon were listed as threatened or endangered species requiring special management at the time of the Forest Plan's release, but have since been delisted. However, they are included in this discussion because they still remain indicator species under the current Forest Plan (1990b). The northern spotted owl is now listed under the Endangered Species Act and its status is covered extensively under separate cover in the Biological Assessment.

Habitats. MIS on the Umpqua National Forest are associated with a variety of habitats found throughout the forest. However, the PCGP Project will affect only those habitats included in Table 2-1, below. Table 2-1 summarizes the areas (acres) of habitat affected on Umpqua National Forest, including forested habitats (Southwest Oregon Mixed Conifer-Hardwood Forest), non-forested habitats, and other affected habitat categories; forested habitat is differentiated by seral stages including clearcut-regenerating forest, mid-seral forest, late successional-old growth forest. Effects by the project have been summarized by project component (facility) during construction and during operation of the pipeline. Generally, most long-term disturbance by the project is due to a 30-foot wide maintenance corridor, centered on the pipeline that is maintained in an herbaceous and/or shrub state for the life of the project. Table 2-1 is referenced in discussions for each MIS in the sections, below.

The forest habitat affected – Southwest Oregon Mixed Conifer-Hardwood Forest (Johnson and O'Neil, 2001) – corresponds to two vegetation categories described by the Oregon Gap Analysis Project (Oregon Gap; Kagan et al., 1999) and mapped in the project area. Those vegetation categories include 1) Douglas-fir-White Fir/Tanoak-Madrone Mixed Forest, and 2) Douglas-fir Dominant-Mixed Conifer Forest (Kagan et al., 1999).

Douglas-fir-White Fir/Tanoak-Madrone Mixed Forest: Multi-layered forest of mixed conifer and mixed deciduous forest makes up this vegetation type. It always contains Douglas-fir, with other co-dominants (i.e., white fir, incense cedar, sugar pine and rarely western white pine). The subcanopy layers contain shade-tolerant trees, including tanoak, madrone, chinquapin, Pacific dogwood, and California laurel. Shrub and herb layers are generally well represented, and this forest type is found in low to mid elevations (Kagan et al., 1999).

Douglas-fir Dominant-Mixed Conifer Forest**:** Single-layer forest canopy is typical, although stand structure can be diverse in undisturbed late seral stands. There is a wide range of canopy closure based on management practice, disturbance history, and microsite. Douglas-fir is dominant, with a variety of coniferous trees including white fir, incense cedar, western white pine, ponderosa pine, and sugar pine. Understory vegetation is usually diverse and rich in species, and this forest type is found at mid elevations (Kagan et al., 1999).

Other habitat types affected by the Proposed Action within the Umpqua National Forest (Table 2-1) include:

Table 2-1
Summary of Construction and Operation-Related Disturbance (acres [1]) to Corresponding Wildlife Habitat Categories (Johnson and O'Neil, 2001) in the Umpqua National Forest

Facility	Forest –Woodland Seral Stage [2]	Southwest Oregon Mixed Conifer-Hardwood Forest	Riparian		Developed		Open Water	Total
			Forested Wetland	Non-Forested Wetland	Developed-Urban and Mixed Environs	Roads		
CONSTRUCTION DISTURBANCE								
Pipeline Facilities								
Construction Right-of-Way	**L-O** **M-S** **C-R** **Tot**	74.03 19.73 23.23 116.99	0.04			7.59	0.21	124.83
Hydrostatic Discharge Sites [3]	**L-O** **M-S** **C-R** **Tot**							0.0
Rock Source/Disposal	**L-O** **M-S** **C-R** **Tot**				2.32	0.01		2.33
Temporary Extra Work Areas	**L-O** **M-S** **C-R** **Tot**	13.16 10.74 5.29 29.19	0.05		7.74	6.21	0.11	43.30
Uncleared Storage Areas [4]	**L-O** **M-S** **C-R** **Tot**	36.44 7.14 1.35 44.93				0.60		45.53
Total Construction Disturbance	**L-O** **M-S** **C-R** **Tot**	123.66 37.61 29.87 191.14	0.09	0	9.62	12.86	0.21	218.66
OPERATION DISTURBANCE								
Pipeline Facilities								
30-foot Maintenance Corridor	**L-O** **M-S** **C-R** **Tot**	22.35 6.51 7.65 36.51	0.01			2.94	0.07	39.54
Total Operation Disturbance	**L-O** **M-S** **C-R** **Tot**	22.45 6.51 7.65 36.61	0.01	0	0	2.96	0.07	39.64

[1] Acres disturbed were evaluated using GIS; footprints for each component (temporary construction right-of-way, temporary extra work areas, temporary access roads, uncleared storage areas, pipe storage yards, aboveground facilities, permanent easement, and 30-foot maintenance corridor) were overlaid on the digitized vegetation coverage.

[2] Forest-Woodland Seral Stages are L-O, Late Succession/Old Growth assumed to be ≥80 years old; M-S, Mid-Seral assumed to be ≥40 but ≤80 years old; C-R, Clearcut-Regenerating Forest assumed to be ≤40 years old.

[3] Small brush or trees may be cleared by a rubber-tired rotary or flail motor (brush hog) or by hand with machetes/chainsaws. No soil disturbance will occur. A rubber-tired or track hoe will be utilized to lay the discharge line and to remove the saturated haybales or filter bags upon completion of hydrostatic discharge.

[4] PCGP uncleared storage areas (UCSAs) will not be cleared of trees during construction. These areas will be used to store forest slash, stumps and dead and downed log materials that will be removed and scattered across the right-of-way after construction during restoration and are considered as temporary insignificant habitat modifications.

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Forested Wetlands or Palustrine Forest: This type is typically multi-storied canopy (trees >18 feet tall). Deciduous trees generally dominate in eastern Oregon, including black cottonwood, white alder, quaking aspen, and peachleaf willow. In western Oregon, conifer trees such as western redcedar, western hemlock, Douglas-fir, and grand fir tend to dominate the canopy. This forest type is located in narrow riparian zones along flowing waterbodies (Kagan et al., 1999).

Developed-Urban and Mixed Environs: This type can include urban areas located in cities and municipalities (Kagan et al., 1999), areas associated with the sale of products and commercial services (Anderson et al., 1976) and industrial sites, typified by light to heavy manufacturing and buildings associated with mining, including rock quarries (Anderson et al., 1976).

Roads: This type is made up of non-vegetated, manmade highways and roads, either paved or un-paved. It is often included in the urban category (Johnson and O'Neil, 2001; Kagan et al., 1999; Anderson et al., 1976).

Open Water includes rivers, creeks, and other linear waterbodies. It may also include non-vegetated, smooth and sloping accumulations of sand and gravel along shorelines (Anderson et al., 1976) as well as ditches and canals since they contain excavated drainages or conveyance features that drain agricultural or upland areas.

2.1 Northern Spotted Owl

The northern spotted owl (NSO) was selected as a MIS for mature and old growth habitat, and in the 1990 Umpqua National Forest Plan there was 392,000 acres of modeled suitable NSO nesting, roosting, and foraging (NRF) habitat and 154 inventoried NSO pairs (Forest Service, 1990b). The NSO was proposed for listing under the Endangered Species Act (ESA) when the Umpqua National Forest's Plan was signed in 1990, and was officially listed as Threatened in 1992. The Northwest Forest Plan (1994) amended the Umpqua's Forest Plan (Forest Service, 1990b), and was designed to ensure the population viability of the NSO. Since the NSO is now listed under the Endangered Species Act, it is covered extensively under separate cover in the Biological Assessment prepared for the Proposed Action. A summary of the status of NSOs and its habitat on Umpqua National Forest is included here, including affects to NSO habitat by the PCGP Project. Additional information can be reviewed in the Biological Assessment.

Umpqua National Forest occurs within two physiographic provinces within the range of the northern spotted owl: Klamath Mountains and West Cascades. As part of the Northwest Forest Plan Monitoring, Ray Davis developed a habitat model for NSO habitat to track changes in NSO habitat from the inception of the Northwest Forest Plan (BLM and Forest Service, 1994) through 2006 for the 15 year monitoring report for the NSO. This model was peer reviewed and published in a GTR in 2011 (Davis et al., 2011). This model applied to the Umpqua National Forest predicts that there is approximately 535,963 acres of suitable NSO NRF habitat available, which is an increase of 143,963 acres of suitable NSO habitat from what was predicted in the 1990 Forest Plan. Through surveys for spotted owls that have occurred from the early 1990's through 2008 on the Umpqua, there are 294 pairs of NSO documented to have occurred or are occurring on the Umpqua National Forest, with an additional 51 resident singles (Umpqua National Forest, 2013 GIS data layer). This is an increase of approximately 140 pairs of NSO documented on Umpqua National Forest since the 1990 Forest Plan.

The proposed PCGP Project affects NSO habitat (high NRF, NRF, dispersal only, and capable habitat as defined by FWS in the Conservation Framework developed for the Proposed Action;

see PC Trask & Associates, 2013) on Umpqua National Forest within the Klamath Mountains physiographic province. All NSO habitat affected from the Proposed Action on Umpqua National Forest occurs within NSO home ranges. Fifteen known NSO home ranges with a radius of 1.3 miles occur within the PCGP Project area and will have NSO habitat affected, including habitat from five NSO core areas and one nest patch. Table 2-2, below identifies the amount of NSO habitat removed by the PCGP Project in Umpqua National Forest. Overall, the PCGP Project would remove approximately 87.23 acres of NRF habitat (high NRF and NRF, combined), which is approximately 0.02 percent of the 535,963 acres of NRF habitat available within Umpqua National Forest. Because the PCGP Project affects less than 0.1 percent of suitable NRF across the Umpqua National Forest, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the northern spotted owl is expected on Umpqua National Forest.

Table 2-2
Summary of NSO Habitat Removed (acres) within Umpqua National Forest

NSO Habitat	Construction Right-of-Way	Temporary Extra Work Space	Access Roads (PAR)	Total Habitat Removed
High NRF	48.61	8.70	0	57.32
NRF	25.42	4.46	0.03	29.91
Dispersal Only	19.73	10.74	0	30.46
Capable	23.23	5.29	0	28.52
Total NSO Habitat	**116.99**	**29.20**	**0.03**	**146.21**

2.2 Pileated Woodpecker

This large woodpecker was identified as a management indicator species because of the number and size of snags it requires and its need for mature stands of timber for nesting habitat, especially the hemlock / white fir, silver fir / Shasta red fir, and Douglas-fir / ponderosa pine eco-classes. The species may provide information for other cavity excavating species and animal communities associated with late successional forest. The pileated woodpecker requires the largest snags of any of the primary cavity nesters on the Umpqua National Forest (Forest Service, 1990b). The pileated woodpecker is protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712).

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for pileated woodpeckers and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines.

- Provide one habitat area for every 12,000 to 13,000 acres of suitable habitat. Habitats will be distributed in such a way that any given habitat unit will be connected to two or more other suitable habitats.
- When possible, wildlife trees (snags and green culls) will be left standing in areas of timber harvest. This habitat will be in addition to that provided by implementing the snag habitat prescriptions.

Management Prescriptions.
Prescription C5-VII, Wildlife – Pileated Woodpecker, Dedicated applies to 600-acre areas with the purpose of providing suitable reproduction habitat for pileated woodpeckers.

- Wildlife and Fish: Vegetation manipulation or structural improvement designed to enhance wildlife permitted. Activities designed to produce the desired number of snags and dead and down material per acre on a continuing basis will be featured and receive high priority. Areas for nonstructural improvement are the priority for this prescription.
- Timber: No timber harvest or salvage in the 300-acre reproduction area. An adjacent 300 acres will be managed to provide snags at the minimum rate of two snags per acre >12 inches dbh. Six green trees per acre will be left to provide for future snags. A minimum of one snag >20 inches dbh per 6 acres will be provided. Commercial and personal-use firewood cutting shall be an incidental secondary product of timber harvest. Firewood cutting and gathering shall be limited to that needed for onsite recreational use.
- Facilities: Generally no construction of new roads or corridors in a 300-acre reproduction area, except where vital to serve adjacent areas. Exceptions will be on a case-by-case basis. Acreage lost to roads or corridors will be compensated by additions to the reproduction areas. Normal maintenance of existing roads is permitted. Corridors may be allowed within the 300-acre area adjacent to the reproduction area, as determined by the NEPA process. Full road activities to meet timber objectives will occur in the 300-acre area adjacent to the reproduction area.
- Protection: No snag removal for pre-suppression purposes. No insect or disease control unless it is catastrophic in nature (threatening 50 percent or more of the stand).

Prescription C5-VIII, Wildlife – Pileated Woodpecker, Managed directs that an area of 2,011 acres be managed with a 130-year rotation. The prescription will be applied to timber stands to proved suitable habitat characteristics for the pileated woodpecker on at least 600 acres properly located at any point in time.

- Wildlife and Fish: Vegetation manipulation or structural improvement designed to enhance wildlife permitted. Activities designed to produce the desired number of snags and dead and down material per acre on a continuing basis will be featured and receive high priority. Areas for nonstructural improvement are priority for this prescription.
- Timber: Timber stands will be managed to maintain at least 300 acres >20 inches dbh at all times. Salvage is not permitted around the 600-acre designated core area. Firewood cutting shall be an incidental secondary product of timber harvest. Firewood cutting and gathering shall be limited to that needed for onsite recreational use.
- Facilities: Replacement areas have no special restrictions for the first 90 years of the rotation period. During the last 40 years of the rotation, only arterial roads will be maintained. All other roads will be obliterated or maintained only to protect soil and water values. For the periphery portion of replacement area, full road management is permitted even during last 40 years of rotation period. Utility/transportation corridors may be allowed pending determination by the NEPA (EA) process.
- Protection: No snag removal for pre-suppression purposes. No insect or disease control unless it is catastrophic in nature (threatening 50 percent or more of the stand).

Also see *Prescription C5-VI, Wildlife – Snag Management Areas* below for Primary Cavity Excavators.

<u>Management Areas.</u>

Two Management Areas, MA 10 and MA 11, in which the above prescriptions are directed toward managing habitats utilized by pileated woodpeckers, will be affected by the Proposed Action:

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Management Area 10 Direction. Pileated woodpecker prescriptions (C5-Vll and VIII, discussed above) are assigned to locations that meet the distribution requirements set out in the Forestwide wildlife standards and guidelines. Where these locations overlap other prescription assignments that harvest timber, the managed prescription (C5-VIII) is assigned. Where these locations overlap other prescription assignments that do not harvest timber, the dedicated prescription (C5-VII) is assigned (Forest Service, 1990b).

Management Area 11 Direction. Same as for MA 10.

Habitat. Pileated woodpeckers are found primarily in dense mixed conifer forests in late seral stages, or in bottom land deciduous stands (Marshall et al., 2006). The birds require snags 50 feet or greater in height and 20 inches in diameter at a 50-foot height, down logs, diseased trees, and a fairly high density of snags of all sizes (Forest Service, 1990b). This late seral association indicates the need to utilize large trees for nesting, foraging, roost sites, and cover from predators (Marshall et al., 2006). On the Umpqua National Forest, mature to old growth stands that have not been salvage-logged are generally considered prime habitat for pileated woodpeckers. The hemlock/white fir, silver fir/Shasta red fir, Douglas-fir/ponderosa pine ecoclasses are considered capable habitats for the species (Forest Service, 1990b). The Umpqua Forest Plan (Forest Service, 1990b) estimated there was 714,499 acres of capable habitat in those ecoclasses, and 485,859 acres of suitable pileated woodpecker habitat in 1990.

To determine current habitat available for pileated woodpeckers in Umpqua National Forest, the NSO habitat created by Davis et al. (2011) was used as a surrogate for pileated woodpecker habitat since both species are an indicator for the same mature/old-growth habitat. In addition to the NSO habitat, snag habitat has also been identified as an indicator for pileated woodpeckers. To quantify current snag habitat, fire perimeters and documented tree mortality from the Region 6 Aerial Insect and Disease surveys (from 2000-2011) were counted as suitable snag habitat for pileated woodpeckers to forage in (Table 2-3). Using both the NSO habitat model and snag habitat created by wildfire and insects, there are 624,689 acres of current habitat, an increase of 138,830 acres from the 1990 Forest Plan habitat estimate. Habitat is distributed sufficiently to ensure dispersal of breeding Pileated Woodpecker across the Forests suitable habitat.

Table 2-3
Acres of Snag Patches Measured by the Region 6 Aerial Detection Surveys (2000-2011) and Wildlife Perimeters (2000-2011) to Measure Current Functional Snag Habitat on the Umpqua National Forest

Insect & Disease Agent	Acres
Douglas-fir Beetle	15,874
Mountain Pine Beetle-Lodgepole	24,143
Mountain Pine Beetle-Ponderosa	139
Mountain Pine Beetle-Sugar Pine	1,331
Mountain Pine Beetle-Western White Pine	589
Western Pine Beetle	67
Total Acres of Snag Patches Created by Insect & Disease	*42,143*
Fire Year	**Acres**
2002	87,379
2003	1,208
2008	34,783
2009	7,880

2011	1,708
Total Acres of Fire Perimeters	*132,958*
Total Acres of Snag Habitat 2000-2011	***175,102***

Pileated woodpeckers are generally associated with Southwest Oregon Mixed Conifer-Hardwood Forests and Westside Riparian Wetlands – both are habitat type associations described by Johnson and O'Neil (2001) – that coincide with the PCGP Project (Table 2-1) within Umpqua National Forest. Since they are dependent on downed wood and snags, pileated woodpeckers would be most likely to inhabit the old growth or late successional stands (≥80 years old) of Southwest Oregon Mixed Conifer-Hardwood Forest that are included in Table 2-1. They are, however, closely associated with small, medium, large, and giant tree forested stands that provide structural conditions with decadent wood and snags (Johnson and O'Neil, 2001). A general association of a species with a given habitat applies to an adaptable species that is supported by a number of habitats that provide for its maintenance and viability, while a close association is indication of a species' dependency on a specific habitat for part or all of its life history requirements (feeding and reproduction) implying that the species has an essential need for a particular habitat for its maintenance and viability (Johnson and O'Neil, 2001).

Forest Management Activities. Logging, fire control, and road building activities that reduce the number of snags or potential snags, or convert mature stands to early successional timber stages have the greatest detriment on pileated woodpeckers. Past fire management practices have had a significant impact on their habitat. In the past, all snags within a 200-foot distance around the outside perimeter of harvest units were felled for fire protection purposes. This practice is no longer in use, although snags continue to be felled on a case-by-case basis where fire and safety concerns are high (Forest Service, 1990b).

Current management for the pileated woodpecker is incorporated in Forest and Regional snag management policies. This management is designed to maintain a well-distributed population of all cavity nesting species by providing habitat for 40 percent of potential population capability. The results of applying snag management practices to timber sale operations have been variable (Forest Service, 1990b)

Species' Status in the Project Area. Based on the reductions in suitable habitat on the Umpqua National Forest due to logging and associated activities during the last several decades, it could be expected that populations have been reduced by approximately 25 to 30 percent (Forest Service, 1990b). Even with the current snag management policy, future logging will continue to reduce this species' population. Also, the use of timber rotations of less than 100 years may not produce trees of suitable size to meet the nesting requirements of this species (Forest Service, 1990b).

Data have been collected on 15 National Biological Survey Breeding Bird Survey (BBS) routes (Sauer et al., 2013) in Bird Conservation Region (BCR) 5 that are within the vicinity of the Umpqua National Forest and the PCGP Project, of which three BBS routes occur on the Umpqua National Forest. Numbers of each species that were reported on each route were compiled and averaged (numbers per route) for each year, 1993 through 2012, to develop indices of populations in the vicinity of the Proposed Project and Umpqua National Forest. During the 20-year period, an average of 1.93 pileated woodpeckers were observed per BBS route (average of 10.75 routes reporting per year) each year. Over the past 20 years, pileated woodpeckers appear to be significantly increasing ($P<0.05$) on BBS routes within the PCGP Project vicinity (Figure 2-1); however, on a shorter trend (i.e., past 10 years) there has been a

slight decline in population within BCR 5 in the vicinity of the Proposed Project, but not significant. The three BBS routes that occur on the Umpqua National Forest have observed pileated woodpeckers from 1991 through 2012.

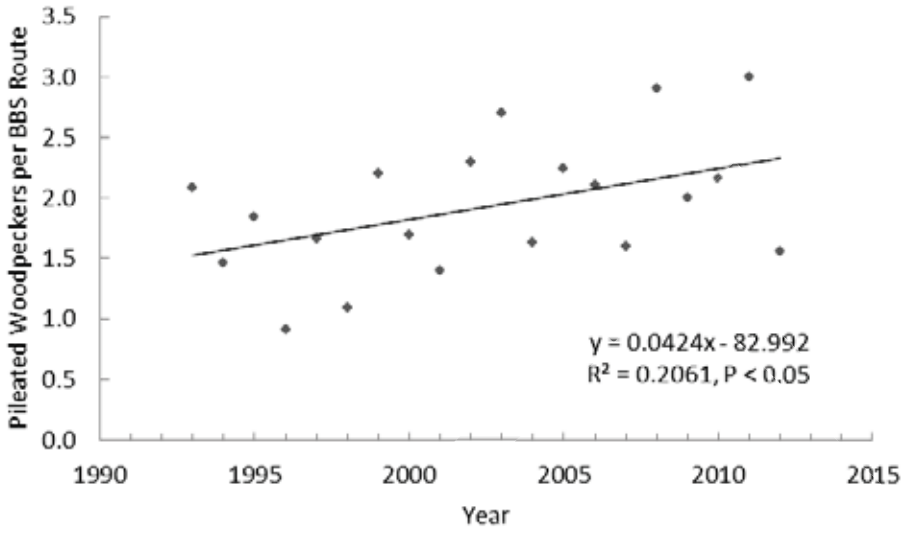


Figure 2-1
20-year Trend in Pileated Woodpeckers Counted per BBS Route in BCR 5 in the Vicinity of the PCGP Project

Effects of the Proposed Action. Pileated woodpeckers could be negatively impacted during construction of the PCGP Project. Direct mortality of young could occur if nest trees are cleared prior to young fledging. Since nest excavation lasts from late March through early May, eggs are present in May and early June, and nestlings are present from late May through early July (Marshall et al., 2006), tree felling during those periods could directly impact young birds. While adults would be able to escape temporary disturbances, adult birds could abandon nests, leaving eggs and chicks vulnerable to predation and the elements. However, tree felling within 0.25 mile of one known NSO activity center and within 1.5 mile of a known peregrine falcon eyerie on the Umpqua National Forest will occur after the breeding period for northern spotted owls, from October 1 to the end of February and outside the breeding period for peregrine falcons (from August 1 through the end of December); this will likely avoid impacting nesting pileated woodpeckers in those areas.

Clearing the right-of-way will modify habitat, changing the seral stage and tree species makeup of occupied forests. Construction will remove 123.66 acres of late successional-old growth Southwest Oregon Mixed Conifer-Hardwood Forest and 0.09 acres of Westside Riparian Forest in Umpqua National Forest (Table 2-1). Additional potential long-term effects to pileated woodpeckers will be removal of 37.61 acres of mid-seral conifer-hardwood forest (≥40 years but ≤80 years old), thereby setting back seral development that would be expected to eventually provide suitable habitat elements for pileated woodpeckers, including downed wood and snags.

The amount of late successional-old growth habitat that would be removed by the project is not expected to have an impact on the local or regional population of pileated woodpeckers which have mean home ranges of 478 hectares or 1,180 acres in western Oregon (Mellen, 1987; Mellen et al., 1992). If all of the impacted late successional-old growth Southwest Oregon Mixed Conifer-Hardwood Forest (123.66 acres) occurred within a bird's or pair's one home

range, less than 10 percent of one home range would be affected. More likely, the Proposed Action would span several home ranges and the overall effect to any single one would be less than 10 percent removal. Removal of 123.66 acres of potentially suitable pileated woodpecker habitat represents approximately 0.02 percent of the 624,689 acres of currently available habitat on Umpqua National Forest; the continued viability of the species would be expected.

If pileated woodpecker home ranges are assumed to be circular, the diameter of a 1,180-acre home range would be 8,090 feet. Blasting at one edge of that home range would attenuate to 30 dBA at the far edge of the home range and would attenuate to ambient noise (assumed to be 40 dBA) 4,630 feet away or a distance equal to 57 percent the diameter of a home range. Noise due to construction would be a short term effect (restricted to the period of constriction) to pileated woodpeckers and expected to affect them within only a portion of their home ranges.

Mitigation. Prior to clearing operations and before or concurrently with timber cruising, Pacific Connector will identify and flag existing snags on the edges of the construction right-of-way and temporary extra work areas where it is feasible to save/conserve them from project clearing operations. These snags will be saved as mitigation to benefit primary and secondary cavity nesting birds, mammals, reptiles, and amphibians. Also during this process, Pacific Connector will flag other large-diameter trees on the edges of the construction right-of-way and temporary extra work areas that can be saved/protected as green recruitment or as habitat/shade trees. Some of these trees would be girdled to create snags to augment the number of snags along the right-of-way to provide habitat structures. See the Leave Tree Protection Plan (Appendix P of the POD).

Other mitigation measures that would minimize impacts to pileated woodpeckers include planting trees within the right-of-way after construction, outside of the 30-foot maintenance corridor (within 15 feet of each side of the pipeline centerline). After tree planting, there will be 36.52 acres of former forest (22.35 acres of late successional-old growth, 6.52 acres of mid-seral forest, and 7.65 acres of clear cut-regenerating forest that will remain in an herbaceous and/or shrub state within the 30-foot maintenance corridor during the life of the project (Table 2-1).

Noise from blasting, if it is required during construction, will be minimized through application of various measures. Mitigation measures commonly applied to blasting of this type include drilling small (2.5-inch) charge holes, stemming the blast holes with sand and placing inert material on top of the blast area (Michael Minor & Associates, 2008).

In Umpqua National Forest, trees will be felled along at least 0.4 mile of the proposed construction right-of-way in Year 1 beginning October 1 and continuing through February 28 of the following year where one known spotted owl activity center is within 0.25 mile of the proposed project. Additionally, approximately 3.3 miles of the proposed construction right-of-way on Umpqua National Forest will be cleared from August 1 through the end of December within 1.5 miles of a peregrine falcon eyerie outside of the breeding season. Felling trees during these time periods will avoid directly impacting young birds during the nesting season.

To mitigate for loss of cavities and snags within the construction right-of-way, Pacific Connector will create snags in large trees strategically left on the edge of the construction right-of-way by topping and or girdling trees. In addition, the Forest Service has proposed creating snags and placing large wood in habitats adjacent to the proposed pipeline to meet the management objectives of snag densities and enhance areas deficient in coarse woody material. The proposal would treat approximately 570 acres and would accelerate the development of late

successional habitat characteristics of structure and diversity (snags/large wood) including suitable nesting structures for pileated woodpeckers (see the CMP). The project would also reduce localized fuel loads while improving habitat in deficient stands (large wood) and provide long-term structure in the event of fire since larger logs maintain moisture longer and are less likely to be fully consumed by fire.

In addition, Pacific Connector will fund other projects proposed by the Forest Service on the Umpqua National Forest that include decommissioning or closing 13 miles of roads, commercial and/or pre-commercial thinning of up to 5,650 acres to accelerate development of late successional and old growth habitat characteristic among other objectives, and reallocate 585 acres from matrix to LSR designation so that forested habitat within former Matrix lands will be managed to obtain late successional forest characteristics. Those additional projects would provide benefits to pileated woodpeckers within the Umpqua National Forest.

During construction, potential impact to nesting pileated woodpeckers and other species by predatory corvids will be addressed by assuring that all contractors practice appropriate and responsible trash disposal.

Pacific Connector has also prepared a Migratory Bird Special Purpose Permit Application that identifies additional measures that would be implemented to offset potential effects to pileated woodpeckers.

Forest Plan Consistency. The Proposed Action will affect forested habitat in Management Area 10 and Management Area 11. The location of the Proposed Action relative to designated 300-acre reproduction areas and 300-acre adjacent areas – managed to provide snags – within each Management Area will determine whether or not the Proposed Action is consistent with Management Prescriptions.

If the Proposed Action crosses a dedicated 300-acre reproduction area, the project would be inconsistent with Prescription C5-VII since no timber harvest or salvage in the 300-acre reproduction area is allowed. However, new corridors within the reproduction area may be allowed on a case-by–case basis, since Prescription C5-VII indicates that new corridors may be allowed within the 300-acre area adjacent to a reproductive area. Acreage lost to corridors will be compensated by additions to the affected reproductive area and would be analyzed through the NEPA process. Removal of snags within either Management Area by the Proposed Action is possible but inconsistent with Prescriptions C5-VII and C5-VIII, above.

Because the PCGP Project affects less than 0.1 percent of suitable pileated woodpecker across the Umpqua National Forest, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the pileated woodpecker is expected on Umpqua National Forest.

2.3 Primary Cavity Excavators (nesters)

Primary cavity excavators have been identified as indicator species to represent the dead and defective tree (snag) component of conifer forest habitat, as they excavate cavities for nesting that are in turn used by a whole host of avian and mammalian secondary cavity nesters. Primary cavity excavators that are identified in the Forest Plan as MIS are the pileated woodpecker (discussed above), acorn woodpecker, Lewis's woodpecker, yellow-bellied sapsucker, Williamson's sapsucker, hairy woodpecker, and downy woodpecker (Forest Service, 1990b). The yellow-bellied sapsucker is rare to Oregon, with only 19 site records in the state

(Marshall et al., 2006). This sapsucker is common east of the Rocky Mountains, but is closely related to the red-breasted sapsucker (*Sphyrapicus ruber*), which is the only sapsucker commonly found in western Oregon (Marshall et al., 2006).

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for primary cavity excavators and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines:

- When possible, wildlife trees (snags and green culls) will be left standing in areas of timber harvest. This habitat will be in addition to that provided by implementing the snag habitat prescriptions.

Management Prescription.
Prescription C5-VI, Wildlife – Snag Management Areas – applies to any area scheduled for timber harvest where there is a need to provide snags for cavity-nesting birds. This prescription use at a rate of one acre per 100 acres of standard forest management prescription provides 10 percent potential population capability for the 100 acres.

- Wildlife and Fish: Snag densities needed to meet management requirement direction for cavity excavating birds must be provided within land areas that are generally no larger than normal harvest unit size (maximum 60 acres). These densities will be maintained through the full harvest rotation period. Snags provided above the management requirement (MR) level but that are needed to meet plan objectives will be distributed in order to:
  a. reduce likelihood of inter-specific crowding,
  b. increase likelihood of use by pairs,
  c. provide adequate numbers and types of snags throughout the rotation, and
  d. vegetation manipulation or structural improvement designed to enhance wildlife permitted. Activities designed to produce the desired number of snags and dead and down material per acre on a continuing basis will be featured and receive high priority. Areas for nonstructural improvement are priority for this prescription.
- Timber: All snags and dead and down material will be left. Thirty-three percent of the existing volume in green trees will be left standing. Green trees left standing shall represent mix of size classes in the unharvested stand. No salvage permitted. No commercial or personal-use firewood cutting. Gathering of firewood is allowed only for on-site recreational use, but cutting for this use is not allowed.
- Facilities: Utility/Transportation corridors may be allowed pending determination by the NEPA (EA) process.
- Protection: No special restrictions on insect and disease control.

Management Area 10 Direction. Adequate snag habitat must be provided in this management area to meet the 60 percent potential population capability (PPC) for cavity nesters. Other prescription assignments within the management area and immediately adjacent to the MA may contribute to meeting this objective. Once all contributions to snag habitat have been identified, prescription C5-VI (see below) is assigned and distributed on land suitable for timber production to meet the 60 percent PPC objective.

Management Area 11 Direction. Same as in MA 10.
Species Status in the Project Area. Based on reductions in suitable habitat due to logging and associated activities during the last several decades, it could be expected that populations have

been reduced by 20 to 30 percent (Forest Service, 1990b). Minimum viable population levels for this group of species are met by providing dead and defective trees at the 20 percent potential population capability as described in *Wildlife Habitats in Managed Forests of the Blue Mountains of Oregon and Washington* and *Management of Wildlife and Fish Habitats in Forests in Western Oregon and Washington* (Thomas, 1979).

Data have been collected on 16 BBS routes (Sauer et al., 2013) in BCR 5 that are within the region of the Umpqua National Forest and PCGP Project, of which three BBS routes occur on Umpqua National Forest. Numbers of acorn woodpecker, Lewis's woodpecker, hairy woodpecker, and downy woodpecker that were reported on each route were compiled and averaged (numbers per route) for each year, 1993 through 2012 (Table 2-4) to develop a population index. Only red-breasted sapsuckers were reported; no yellow-bellied sapsuckers or Williamson's sapsuckers were included in any of the BBS observations on the compiled routes.

During the 20-year period, an average of 3.64 acorn woodpeckers and 1.16 hairy woodpeckers each year were observed per BBS route (average of 5.55 routes and 10.75 routes reporting per year, respectively) in BCR 5. Over the past 20 years, acorn woodpeckers appear to be significantly increasing (P<0.01), whereas hairy woodpeckers appear to be significantly decreasing (< 0.05) on BBS routes within BCR 5 in the vicinity of Umpqua National Forest and the PCGP Project (Table 2-4). In addition to pileated woodpeckers discussed above, acorn woodpeckers and hairy woodpeckers are the only other species of cavity nesters included as a MIS with sufficient data to estimate 20-year population trends, indexed as annual counts per route. Regional populations (BCR 5) of pileated woodpeckers and acorn woodpeckers appear to be increasing. The three BBS routes that occur on the Umpqua National Forest have observed acorn woodpeckers, hairy woodpeckers, and/or downy woodpeckers at some point during the 20-year trend.

Table 2-4
Data Compiled for 20-years and Trends of Population Indices
(Numbers Counted per BBS Route per Year in BCR 5) of Primary
Cavity Excavator MIS in the Vicinity of the Umpqua National Forest and PCGP Project

Cavity Nesting Species	Data Compiled for 20 Years, 1988-2007			
	Average Number of Routes per Year with Species	Average Annual Count of Species per Route	Population Index Trend	Comments
Acorn Woodpecker	5.55	3.64	Significantly Increasing (P< 0.01)	none
Lewis's Woodpecker	0.05	0.0	Insufficient data	Too few BBS routes
Hairy Woodpecker	10.75	1.16	Significantly Decreasing (P< 0.05)	none
Downy Woodpecker	9.05	0.597	Insufficient data	Too few observations per year

Habitat. Primary cavity excavators' habitat requirements are dead and defective trees of the appropriate diameter, height, and decay stage to meet the specific requirements of the various species. Found in both conifer and mixed conifer-deciduous, tree diameters required vary from 6 inches to 20 inches or greater DBH. Dead tree heights vary from 6 feet to 50 feet or more (Forest Service, 1990b and Marshall et al., 2006).

In the 1990 Umpqua Forest Plan EIS, there was estimated to be 803,917 acres of capable cavity nester habitat, with 244,473 acres being altered by timber harvest, for a total of 559,444 acres of suitable cavity nester habitat. The Forest Plan used potential population capacity (PPC), which "provides an indicator of the number of cavity-nesting species likely to be present

on the Forest in comparison to the Forest's total potential." Minimum PPC identified for cavity excavators was 60 percent in most management areas (Table 2-5).

To monitor current cavity excavator habitat on the Umpqua, snag habitat was assessed using the data derived from 2006 imagery (Ohmann et al., 2010) for snags per acre greater than or equal to 10-inch diameter-at-breast-height (dbh). This results in 857,196 acres of habitat with one or more snags per acre (to meet the 60 percent PPC for hairy woodpecker of 1.15 snags per acre, which is the highest snag per acre requirement for any of the selected cavity excavators), and 776,970 acres with two or more snags per acre (which exceeds the 100 percent PPC for hairy woodpecker). At one snag per acre this represents 297,752 acre increase from the 559,444 acres of suitable snag habitat documented in the 1990 Umpqua National Forest Plan, and at two snags per acre this represents a 217,526 acre increase of suitable snag habitat. With the current distribution of snag habitat across the Umpqua National Forest increasing as compared to the 1990 Umpqua Forest Plan, primary cavity excavator habitat is being maintained in its amount and distribution to meet the viability requirements of the Umpqua Forest Plan.

Table 2-5
Cavity Excavator Maxim Potential Population Capacity by Snag/Acre as Described in the Umpqua National Forest Plan

	Percent of Maximum Populations (Snags/Acre)				
Cavity Excavators	**100**	**90**	**80**	**70**	**60**
Lewis' woodpecker	0.48	0.43	0.38	0.34	0.29
Acorn Woodpecker	0.7	0.63	0.56	0.49	0.42
Red-Breasted Sapsucker	0.45	0.41	0.36	0.32	0.27
Williamson's Sapsucker	0.33	0.3	0.26	0.23	0.2
Downy Woodpecker	0.16	0.14	0.13	0.11	0.1
Hairy Woodpecker*	1.92	1.73	1.54	1.34	1.15
Pileated Woodpecker	0.06	0.05	0.05	0.04	0.04
*Hairy Woodpecker had the highest snag/acre requirements of the cavity excavating species.					

Within the PCGP Project area in Umpqua National Forest, except for Williamson's sapsucker, the other four Primary Cavity Excavator MIS included in Table 2-4 are associated with Southwest Oregon Mixed Conifer-Hardwood Forests. The acorn woodpecker has a close association with that habitat, but only when oak trees are present; the others are generally associated with Southwest Oregon Mixed Conifer-Hardwood Forests. A close association of a species with a given habitat indicates that it is known to depend on a specific habitat for part or all of its life history requirements (feeding and reproduction) implying that the species has an essential need for a particular habitat for its maintenance and viability (Johnson and O'Neil, 2001). A general association of a species with a given habitat applies to an adaptable species that is supported by a number of habitats that provide for its maintenance and viability (Johnson and O'Neil, 2001).

Since they are dependent on snags, Primary Cavity Excavator MIS would be most likely to inhabit the old growth or late successional stands (≥80 years old) of Southwest Oregon Mixed Conifer-Hardwood Forest that are included in Table 2-1. Hairy woodpeckers, Williamson's sapsucker, and Lewis's woodpeckers have general associations with Westside Riparian

Wetlands and downy woodpeckers are closely associated with that habitat, while acorn woodpeckers have no association with that habitat type.

Forest Management Activities. Past fire management practices have reduced the amount of snag habitat. Because snags are more susceptible to fire than green trees and present control problems when accidentally ignited, they were systematically removed in timber sale and in heavy recreation use areas. In addition, snags are regularly removed from clearcut logging areas because they present a safety hazard to aerial fertilizers, herbicide applicators, and tree planters.

Current management for primary cavity excavators is designed to provide habitat on a continuing basis at the 40 percent potential population capability level or higher. This is accomplished by identifying small, suitable snag management areas throughout commercial forest land at the time of individual timber sale planning. These areas, plus others, are managed to provide suitable snags on a continuing basis (Forest Service, 1990b).

Effects of the Proposed Action. Primary Cavity Excavators could be negatively impacted during construction of the PCGP Project. Direct mortality of young could occur if nest trees are cleared prior to young fledging. Young of acorn woodpeckers remain in nest cavities through early September, young Williamson's sapsuckers fledge by late July, downy woodpeckers remain in nest cavities through late July, and fledgling hairy woodpeckers have been observed in late July. Fledged Lewis's woodpeckers leave the nest area by early August (Marshall et al., 2006). Tree felling during those periods could directly impact young birds. While adults would be able to escape temporary disturbances, adult birds could abandon nests, leaving eggs and chicks vulnerable to predation and the elements. Tree felling within 0.25 mile of one known NSO activity center and within 1.5 mile of a known peregrine falcon eyrie on the Umpqua National Forest will occur after the breeding period for northern spotted owls, from October 1 to the end of February and outside the breeding period for peregrine falcons (from August 1 through the end of December), respectively; this will likely avoid impacting nesting primary cavity excavators in those areas.

Clearing the right-of-way will modify habitat, changing the seral stage and tree species makeup of occupied forests. Construction will remove 123.66 acres of late successional-old growth Southwest Oregon Mixed Conifer-Hardwood Forest and 0.09 acres of Westside Riparian Forest (Table 2-1). Additional potential long-term effects to Primary Cavity Excavators will be removal of 37.61 acres of mid-seral conifer-hardwood forest (≥40 years but ≤80 years old), thereby setting back seral development that would be expected to eventually provide suitable habitat elements including snags.

Unlike the large home ranges of pileated woodpeckers, those of the other Primary Cavity Excavator MIS are relatively small, ranging from 10 ha (25 acres) for Lewis's woodpecker, downy woodpecker, and hairy woodpecker to 50 ha (124 acres) for Williamson's sapsucker (Johnson and O'Neil, 2001). While the amount of late successional-old growth habitat that would be removed by the project is not expected to impact local or regional populations of Primary Cavity Excavators, home ranges of several individuals or pairs could be affected. Since acorn woodpeckers are colonial breeders, multiple individuals could be affected if the Proposed Action removes occupied nesting habitats. Overall, removal of 123.75 acres of potentially suitable primary cavity nester habitat represents approximately 0.02 percent of the 559,444 acres of currently available habitat on Umpqua National Forest; the continued viability of this group of species would be expected.

If Primary Cavity Excavator MIS' home ranges are assumed to be circular, the diameter of a 25-acre home range would be 1,170 feet and that of a 124-acre home range would be 2,600 feet. Blasting at one edge of a home range would attenuate to 55 dBA (at 1,170 feet) or 46 dBA (at 2,600 feet) at the far edges of the home range, depending on home range size. Noise due to construction would be a short term effect to Primary Cavity Excavators and expected to affect them through home ranges since noise levels would be above ambient levels (assumed to be 40 dBA) throughout species' home ranges that are adjacent to the construction right-of-way.

Mitigation. Prior to clearing operations and before or concurrently with timber cruising, Pacific Connector will identify and flag existing snags on the edges of the construction right-of-way and temporary extra work areas where it is feasible to save/conserve them from project clearing operations. These snags will be saved as mitigation to benefit primary and secondary cavity nesting birds, mammals, reptiles, and amphibians. Also during this process, Pacific Connector will flag other large-diameter trees on the edges of the construction right-of-way and temporary extra work areas that can be saved/protected as green recruitment or as habitat/shade trees. Some of these trees would be girdled to create snags to augment the number of snags along the right-of-way to provide habitat structures. See the Leave Tree Protection Plan (Appendix P of the POD).

Other mitigation measures that would minimize impacts to pileated woodpeckers include planting trees within the right-of-way after construction, outside of the 30-foot maintenance corridor (within 15 feet of each side of the pipeline centerline). After tree planting, there will be 36.52 acres of former forest (22.35 acres of late successional-old growth, 6.52 acres of mid-seral forest, and 7.65 acres of clear cut-regenerating forest) that will remain in an herbaceous and/or shrub state within the 30-foot maintenance corridor during the life of the project (Table 2-1).

Noise from blasting, if it is required during construction, will be minimized through application of various measures. Mitigation measures commonly applied to blasting of this type include drilling small (2.5-inch) charge holes, stemming the blast holes with sand and placing inert material on top of the blast area (Michael Minor & Associates, 2008).

In Umpqua National Forest, trees will be felled along at least 0.4 mile of the proposed construction right-of-way in Year 1 beginning October 1 and continuing through February 28 of the following year where one known spotted owl activity center is within 0.25 mile of the proposed project. Additionally, approximately 3.3 miles of the proposed construction right-of-way on Umpqua National Forest will be cleared from August 1 through the end of December within 1.5 miles of a peregrine falcon eyerie outside of the breeding season. Felling trees during these time periods will avoid directly impacting young birds during the nesting season.

To mitigate for loss of cavities and snags within the construction right-of-way, Pacific Connector will create snags in large trees strategically left on the edge of the construction right-of-way by topping and or girdling trees. In addition, the Forest Service has proposed creating snags and placing large wood in habitats adjacent to the proposed pipeline to meet the management objectives of snag densities and enhance areas deficient in coarse woody material. The proposal would treat approximately 570 acres and has been incorporated into the CMP and would accelerate the development of late successional habitat characteristics of structure and diversity (snags/large wood) including suitable nesting structures for pileated woodpeckers. The project would also reduce localized fuel loads while improving habitat in deficient stands (large wood) and provide long-term structure in the event of fire since larger logs maintain moisture longer and are less likely to be fully consumed by fire.

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In addition, Pacific Connector will fund other projects proposed by the Forest Service on the Umpqua National Forest that include decommissioning or closing 13 miles of roads, commercial and/or pre-commercial thinning of up to 5,650 acres to accelerate development of late successional and old growth habitat characteristic among other objectives, and reallocating 585 acres from matrix to LSR designation so that forested habitat within former matrix lands will be managed to obtain late successional forest characteristics. Those additional projects would provide benefits to other primary cavity excavators within the Umpqua National Forest.

Pacific Connector has also prepared a Migratory Bird Special Purpose Permit Application that identifies additional measures that would be implemented to offset potential effects to primary cavity nesters.

Forest Plan Consistency. The Proposed Action will affect forested habitat in Management Area 10 and Management Area 11. The Proposed Action will have to clear snags and downed wood within the construction right-of-way. Removal of snags within either Management Area by the Proposed Action is possible but may be inconsistent with Prescription C5-VI, above.

The Proposed Action is not expected to affect adequate snag habitat within Management Area 10 or 11 and would not limit attaining the 60 percent potential population capability (PPC) for cavity nesters. Prescription C5-VI indicates that new utility corridors may be allowed pending determination by the NEPA (EA) process. Removal of snags within either Management Area by the Proposed Action is possible but inconsistent with Prescriptions C5-VII and C5-VIII, above.

Because the PCGP Project affects less than 0.1 percent of potentially suitable primary cavity nester habitat across the Umpqua National Forest, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of primary cavity nesters is expected on Umpqua National Forest.

2.4 American (Pine) Marten

The pine marten has been identified as a MIS associated with mature or old growth areas in the high elevation (generally greater than 4,500 feet) lodgepole pine and mountain hemlock forest ecoclasses.

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for pine martens and their habitat:

Forest Plan Applicable Forestwide Standards and Guidelines. Broad wildlife coordination guidelines which address leaving snags, down material, unit size, shape, and spatial distribution apply to timber sales and result in the maintenance of habitat (Forest Service, 1990b). Additionally, the direction provides for one habitat area of 160 acres for every 4,000 to 5,000 acres of suitable habitat. Habitat will be distributed in such a way that any given habitat unit will be connected to two or more other suitable habitats.

Management Prescriptions. *Prescription C5-IX, Wildlife – Pine Marten, Dedicated* applies to designated 160-acre areas in the lodgepole pine and mountain hemlock ecoclasses. Its purpose is to preserve suitable habitat for pine marten.

- Wildlife and Fish: Vegetation manipulation or structural improvement designed to enhance wildlife is permitted. Activities designed to produce the desired number of

snags and dead and down material per acre on a continuing basis will be featured and receive high priority. Areas for nonstructural improvement are the priority for this prescription.
- Timber: No timber harvest or salvage is permitted in the designated 160-acre area. No firewood cutting or gathering is allowed.
- Facilities: Minimal roading to remove trees surplus to those needed to meet habitat requirements is permitted. Roads will be physically closed, scarified, and seeded following use.
- The location of utillty/transportation corridors will not be permitted.
- Protection: No snag removal for pre-suppression purposes. No insect or disease control unless it is catastrophic in nature (threatening 50 percent or more of the stand).

Prescription C5-X, Wildlife – Pine Marten, Managed applies to the same area as C5-X except that for each site identify a 748-acre peripheral area managed on a 175-year rotation. This prescription is applied to timber stands that provide suitable habitat characteristics for the pine martin.

- Wildlife and Fish: Vegetation manipulation or structural improvement designed to enhance wildlife is permitted. Activities designed to produce the desired number of snags and dead and down material per acre on a continuing basis will be featured and receive high priority. Areas for nonstructural improvement are priority for this prescription.
- Timber: Timber stands may be fully managed as long as at least 160 acres at any point in time meets the following criteria: (1) enough mature and old-growth trees will be left to provide >50 percent crown closure, (2) provide two snags, plus six replacement trees, per acre, and (3) maintain an average of six down logs (12' dbh x 20') per acre. Logging and subsequent debris disposal shall not damage more than 30 percent of the minor vegetation, on an area basis.
- Commercial and personal use firewood cutting and gathering are permissible when wildlife management objectives can be met.
- Facilities: Conditions described in C5-IX above apply to selected (160 acres) areas. Replacement areas have no special restrictions during initial 90 years of rotation (50 years for lodgepole). During the remaining rotation period only arterial road will be maintained. Other roads will be obliterated or maintained only to protect soil and water values. No administrative facilities are permitted.
- Utility/transportation corridors may be allowed pending determination by the EA process.
- Protection: No snag removal for pre-suppression purposes. No insect or disease control unless it is catastrophic in nature (threatening 50 percent or more of the stand).

Management Area 10 Direction. Pine marten prescriptions (C5-IX and X) are assigned to locations which meet the distribution requirements set out in the Forestwide wildlife standards and guidelines. Where these locations overlap other prescription assignments which harvest timber, the managed prescription (C5-X) is assigned. Where these locations overlap other prescription assignments which do not harvest timber, the dedicated prescription (C5-IX) is assigned.

Management Area 11 Direction. Not applicable.

Species Status in the Project Area. No systematically collected population data are available for this species (Forest Service, 1990c). However, because little logging activity or other

disturbance occurs in its habitat and because annual trapping efforts are moderate to light, it was expected that populations were stable and near habitat capacity (Forest Service, 1990c).

Habitat. The habitat requirement on the Forest is considered to be the mountain hemlock and lodgepole pine types generally above 4,500 feet elevation where ground cover and overhead cover with adequate down trees are available. Large openings (over 100 yards) and areas devoid of overhead cover are not considered suitable habitat (Forest Service, 1990b). There was an estimate of 121,389 acres of mountain hemlock and lodgepole pine suitable available for pine marten habitat on the Umpqua National Forest in 1990 (Forest Service, 1990c).

Current amounts of pine marten habitat are derived from a habitat suitability model created by Davis and Chapman (2008, Appendix A), as well as a query of data on lodgepole pine and mountain hemlock distribution based upon 2006 imagery (Ohmann et al. 2010, Table 2-6). Modeled pine marten habitat is 133,483 acres, an increase of 12,094 acres of suitable habitat from the 1990 estimate. While the pine marten is an MIS for mountain hemlock and lodgepole pine, the modeled habitat exceeds the current modeled distribution of mountain hemlock and lodgepole pine habitat (Ohmann et al. 2010) as the habitat model is trained upon observations of pine marten, which includes observations of individuals in dispersal habitat of differing ecoclasses like Douglas-fir and white fir forest types. Therefore the modeled habitat exceeds the acres of mountain hemlock and lodgepole pine distribution, which was the only forest types considered in previous models.

Table 2-6
Amounts of Pine Marten Habitat Modeled by Davis and Chapman (2008), as well as Lodgepole and Mountain Hemlock Habitat Derived from Ohmann et al. (2010)

Pine Marten Habitat Model Classes	**Acres**	**Acres in Protected Lands**	**% Habitat in Protected Lands**
Marginal	85,081	33,004	39
Suitable	38,610	24,772	64
Highly Suitable	9,792	5,575	57
Total	*133,483*	*63,352*	*47*
Lodgepole and Mountain Hemlock Distribution	**Acres**	**Acres in Protected Lands**	**% Habitat in Protected Lands**
Lodgepole or Mountain Hemlock	87,388	35,305	40
Lodgepole and Mountain Hemlock	29,811	18,072	61
Total	*117,199*	*53,378*	*46*

In the PCGP project area, pine martens have no association with Southwest Oregon Mixed Conifer-Hardwood Forest habitats although they may be present in Westside Riparian Wetlands at high elevations (Johnson and O'Neil, 2001). The presence of pine martens would depend on appropriate structural conditions including snags, down logs, and rock outcrops. A species noted as present in a habitat type indicates that it occasionally uses a habitat that provides only marginal support for its maintenance and viability (Johnson and O'Neil, 2001). The habitats affected by the Proposed Action are not specifically suitable habitats for pine martens.

Forest Management Activities. Fire can negatively affect marten habitat by destroying ground and overhead cover and consuming dead and down material.

Recreation activity was not considered to be heavy enough to influence this species now or in the foreseeable future, at the time of the Forest Plan completion. Trapping of these fur bearing animals over the last 20 years has been light and localized to small areas.

Broad wildlife coordination guidelines which address leaving snags, down material, unit size, shape, and spatial distribution apply to timber sales and result in the maintenance of habitat.

Effects of the Proposed Action. Dispersing pine marten may utilize habitats within the PCGP Project area on Umpqua National Forest for dispersal (i.e., Douglas-fir and white-fir; see recent habitat modeling efforts in 2008). However, based on habitats/elevation of habitats that will be affected by the Proposed Action (Southwest Oregon Mixed Conifer-Hardwood Forest) and habitats that are generally utilized by pine martens on the Umpqua National Forest (mountain hemlock and lodgepole pine above 4,500 feet elevation), the Proposed Action is not expected to affect this species on the Umpqua National Forest and will not contribute to a negative trend in viability on the Umpqua National Forest for American marten. Due to the high amount of habitat within protected lands (Table 2-6) and increases in modeling accuracy of suitable pine marten habitat on the Umpqua National Forest, the Umpqua is maintaining a viable amount and distribution of pine marten habitat as described by the 1990 Forest Plan.

2.5 Roosevelt Elk

Roosevelt elk has been identified as an indicator species for their socio economic importance and as a habitat indicator for big game winter range habitat. This species could be used to evaluate the effects of managed forest conditions and may provide some information for animal communities associated with early successional vegetative stages. Elk also require specific habitat conditions during the winter period (Forest Service, 1990c).

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for Roosevelt elk and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines.

- Established big game travel lanes will not have their character altered through precommercial thinning.
- When planning timber sales in important big game areas, a habitat effectiveness model ("A Model to Evaluate Elk Habitat in Western Oregon" or similar model) will be used to compare the impact of various alternatives on big game habitat.

Management Prescriptions.
Prescription C4-I, for Winter Range—Normal, applies to south-facing areas in the Umpqua National Forest. It includes these areas below 3,500 feet elevation with less than 70 percent slope, as well as other mapped areas.

- Wildlife and Fish: Consider projects designed to enhance forage production such as seeding, planting, and fertilizing. Projects to improve habitat for other wildlife and fish are permitted. The use of K-V funding for this type of work is encouraged.
- Timber: Timber harvest within each subunit of the winter range will be scheduled to best provide a stable, even production of forage and cover. Normally, no less than 8 percent or more of lands suitable for timber production will be cut each decade. Vegetation management activities will consider winter range browse and forage objectives. In winter range areas consider minimal acceptable tree stocking levels. In winter range areas, use spot treatment for release.
- Unit size will average 20 acres or less and units will be shaped to optimize edge. Created openings will be separated by areas not classified as created openings. An area will no longer be considered a created opening when tree height averages 15 feet,

except in areas of foreground and middleground where tree height averages 20 feet. Salvage is permitted. Clearcut is the preferred regeneration technique. Felling, yarding, hauling, and road construction may be restricted between December 1 and April 30 if unacceptable impacts to big game animals are expected to occur. Precommercial thinning treatments should insure animal access to at least 50 percent of the area treated.

- Facilities: Dead end local roads and roads not needed to access other areas will be closed during the period Dec. 1 - April 30. Closures may be physical or administrative. Through roads may be closed from December 1 - April 30 if needed. Limited administrative use may be allowed. Utility/transportation corridors may be allowed.
- Protection: Where possible, broadcast burning is the preferred slash disposal technique. Standard insect and disease control is allowed.

The Four-Part Winter Range—Optimum, Prescription C4-II, also applies to south-facing areas below 3,500 feet with less than 70 percent slope and other mapped areas. This prescription provides for an optimum mix of forage and cover through the application of a combination of rotation lengths to specified percentages of each winter range.

- Wildlife and Fish: Encourage projects designed to enhance forage production such as seeding, planting and fertilizing. Projects to improve habitat for other wildlife and fish are permitted. The use of K-V funding for this type of work is encouraged.
- Timber: The area will be managed as four separate parts. Ten percent will be managed for permanent openings (natural or created). These areas will be seeded to a grass and/or shrub mix. Conifers will be removed to maintain value of the permanent opening.

  (a.) Fifty percent of the area will be managed on a short rotation (60 years). Clearcutting is the preferred regeneration technique. Average unit size will be 20 acres. Vegetation management activities will consider winter range forage and browse objectives. Spot treatments are preferred. May delay release up to five years to maintain productive forage. Maintain minimum acceptable stocking through precommercial and commercial thinning. (b.) Twenty percent of the area will be managed as hiding cover and visual protection from roads with an unmanaged 100-year rotation. No release, precommercial, or commercial thinning unless needed to improve cover values. Clearcutting is the preferred harvest technique. Unit size 20-acre average. (c.) Twenty percent of the area will be managed to produce optimum thermal cover (200 year rotation). Release of stand shall be done in a manner that protects hardwoods and provides multi-level stands. Precommercial thinning of stand is encouraged, but commercial thinning is not permitted. Spatial orientation of these different components is an important element of this prescription. Felling, yarding, hauling, and road construction may be restricted between Dec. 1 and April 30 If unacceptable impacts to big game are expected to occur. (d.) In winter range areas consider minimal acceptable tree stocking levels and use spot treatment for release.
- Facilities: Dead end local roads and roads not needed to access other areas will be closed during the period December 1 through April 30. Closures may be physical or administrative. Through roads may be closed from December 1 through April 30 if needed.
- New utility and transportation corridors will be discouraged, but where no reasonable alternatives exist, corridors will be located to impose the least impact.
- Protection: Where possible, broadcast burning is the preferred slash disposal technique. Appropriate suppression responses will be utilized for all wildfires. Precommercial thinning slash treatment should insure animal access to at least 50 percent of the area

treated. Standard insect and disease control is allowed. These are high priority areas for law enforcement.

The Prescription C4-III, Winter Range – Meadow, applies to the Thorn Prairie/Mountain Meadows area of the Diamond Lake Ranger District and is not applicable to the Proposed Action.

Management Areas 10 Direction. Not applicable.

Management Areas 11 Direction. This Management Area includes forest and meadow lands inventoried as suitable winter range. Big game habitat objectives are best met through the management of Prescription C4-II, which is located in the better winter range areas with at least 25 percent of the of the inventoried winter range in each resource scheduling area (RSA) assigned to it. Prescription C4-I is assigned to lands suitable for timber production which are not needed for other wildlife habitat objectives. At least 20 percent of the land in this prescription assignment needs to be in Stage 5 or Stage 6 vegetation.

Species Status in the Project Area. Big game inventories on the Umpqua National Forest are conducted by the Oregon Department of Fish and Wildlife (ODFW). Inventory methods include spotlight sampling, aerial counts of wintering elk, analysis of harvest data, and population modeling. Forest population (as determined by the ODFW at the time of the Forest Plan release) varies annually, but the numbers center around 2,000 Roosevelt elk. The following ODFW wildlife management units occur on the Umpqua National Forest: Dixon, Indigo, and Evans Creek.

ODFW's Evans Creek Wildlife Management Unit 29 coincides with the portion of the Umpqua National Forest within which the Proposed Action is located (MPs 94.69 to 122.61). ODFW (2012) has compiled harvest data on Roosevelt elk within Wildlife Management Unit 29 for the 2011 season and prior harvest seasons from 2003 (ODFW, 2012). From 2003 though 2011 days per harvest of elk and percent hunter success were relatively consistent. In the 2007 and 2008 harvest, elk hunters spent nearly twice as much time per elk harvested with only half the success rate as other years in Management Unit 29 (Table 2-7).

Table 2-7
Harvest Statistics for Roosevelt Elk within the
Evans Creek Wildlife Management Unit 29, 2003-2011

Year	Total Hunters	Total Hunter Days	Harvest			Days per Harvest	Percent Hunter Success
			Total Males (antlered)	Total Non-Males (non-antlered)	Total		
2011	474	2656	28	49	77	34	16
2010	444	2807	16	32	48	58	11
2009	552	2845	49	34	83	34	15
2008	377	2632	23	4	27	97	7
2007	579	3162	26	5	31	102	5
2006	267	1723	26	4	30	57	11
2005	304	1500	43	1	44	34	14
2004	428	2276	36	16	52	44	12
2003	426	3049	21	27	48	64	11

The population data for Roosevelt elk in Wildlife Management Unit 29 are limited; however, the recent numbers of calves per adult cow (young per adult female) appear to have declined from 2000-2001 when the highest calf production was documented since 1998 (Table 2-8). The declining trend is not significant. However using data from 2000 through 2012, the decline is significant ($P < 0.10$); see Figure 2-2.

Decreasing productivity (Table 2-8) and the increased hunter effort per animal harvested (days per harvest) in Table 2-7 appear to be consistent with an overall declining population of Roosevelt elk in Evans Creek Wildlife Management Unit 29 and the project area. In the past, ODFW has conducted population trend counts of elk along a fixed route near the end of winter (Table 2-8) but no count data are available since 2006.

In other ODFW wildlife management units on the Umpqua National Forest (Dixon and Indigo Unit) not affected by the PCGP Project, elk are meeting the ODFW management objectives; therefore, populations of Roosevelt elk on the Umpqua National Forest are being maintained at viable levels to ensure their continued existence on the Forest.

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Table 2-8
Population Trends and Annual Productivity for Roosevelt Elk within the Evans Creek Wildlife Management Unit 29, 1998-2012

Year	Population Index [1]	Young per Adult Female [2]
2012	-	0.30
2011	-	0.33
2010	-	0.39
2009	-	0.28
2008	-	0.24
2007	-	0.46
2006	1.7	0.32
2005	1.4	0.27
2004	3.4	0.29
2003	-	0.37
2002	2	0.34
2001	2.2	0.52
2000	1.7	0.50
1999	3.3	0.38
1998	-	0.34

[1] **Population Index** is ODFW's Trend Count for the Hunt Area which is conducted along a fixed route each year, usually at the end of winter (ODFW, 2012).
[2] **Productivity** data is young per female from ODFW's Composition Count data reported as Young per 100 Females counted in December (ODFW, 2012).

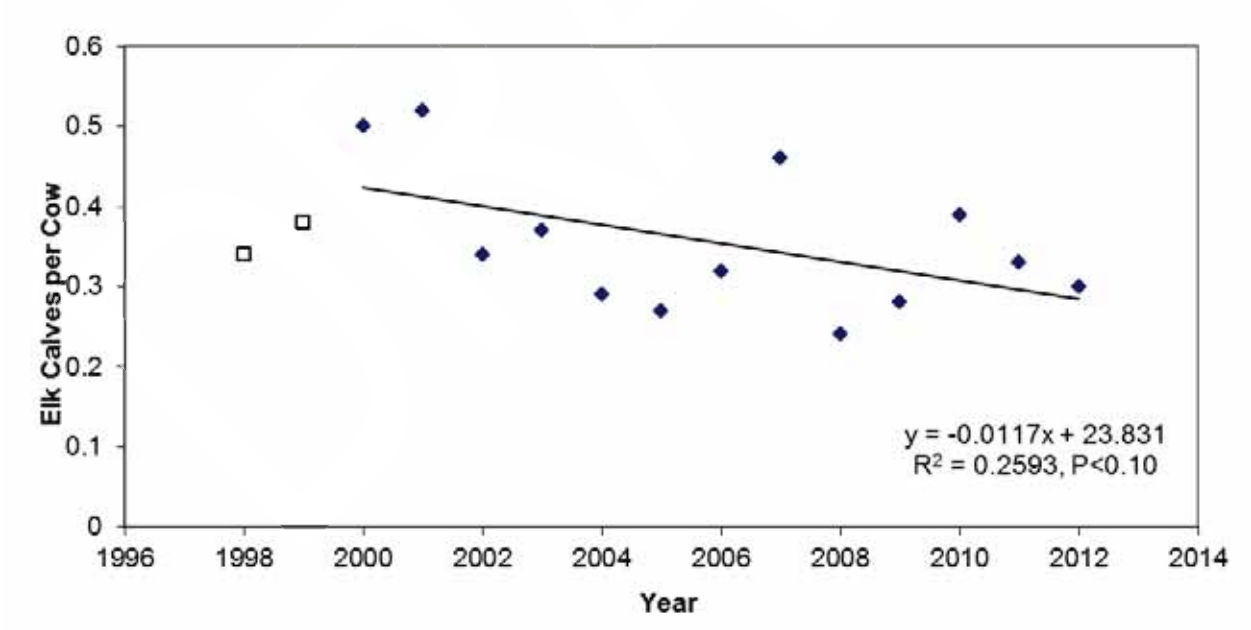


Figure 2-2
Trend in Productivity (Calf per Adult Cow) of Roosevelt Elk in the Evans Creek Wildlife Management Unit 29 Which Coincides with the PCGP Project on the Umpqua National Forest

Habitat. Elk depend on a mosaic of early forage-producing and later cover-forming stages of forest in close proximity. Clearcuts can be primary foraging areas, with peak production and use about five to eight years after logging (Verts and Carraway, 1998). Approximately 90 percent of use of foraging areas by elk occurs within about 400 feet of cover sufficient to hide 90 percent of a standing elk at 200 feet. This cover may be provided by later stages of shrub and open sapling stand stages, and later stages of forest. For thermal cover, forested areas with trees about 40 feet or taller with about 70 percent canopy closure are preferred in both summer and winter. Nearly all thermal cover habitat is within about 1,200 feet of foraging areas (Verts and Carraway, 1998). Winter range for elk occurs at elevations less than 3,500 feet and usually on slopes with southerly aspect. An exception occurs on the Diamond Lake Ranger District where animals winter at somewhat higher elevations. Elk wintering occurs almost entirely on Umpqua National Forest land. In 1990, the Umpqua National Forest Plan estimated that there are approximately 202,371 acres of areas having conditions capable of providing winter habitat for elk. Early successional stages are considered prime forage producing areas, the mid-stages can provide hiding cover and thermal cover, and the late stages provide optimum thermal cover (Forest Service, 1990c).

Roosevelt elk have general associations with Southwest Oregon Mixed Conifer-Hardwood Forest and Westside Riparian Wetlands habitats (Johnson and O'Neil, 2001), both of which are present within the project area. Summer elk forage consists of a combination of lush forbs, grasses, and shrubs, which is usually attained at higher elevations within wet meadows, springs, and riparian areas in close proximity to forested stands. Forage becomes less abundant and accessible in winter and the nutritional quality declines. Winter range is usually within forested sites which provide protection against weather, as well as lichens and other plants used as forage (ODFW, 2003a). The Proposed Action will cross 0.65 mile of big game winter range on the Umpqua National Forest. The big game winter range, classified by the Forest Service, is within sensitive big game range as delineated by ODFW.

Nearly the entire Umpqua National Forest has the potential to be suitable elk habitat, either as summer range or winter range. Summering occurs on most areas of the Forest, although habitat quality and animal distribution vary considerably. The highest use occurs in areas where forage-producing openings are in proximity with suitable cover. Summer range forage is not limiting current or future population growth. Adequate usable winter forage is considered to be the limiting factor to deer and elk populations (Forest Service, 1990c).

Forest Management Activities. Historically, elk populations and their distribution were dependent on naturally occurring fires, wind storms, or insect infestations that created openings in the more or less uniform timber stands. Early fire protection efforts, until the early 1950s, appear to have resulted in depressed elk numbers. Available evidence indicates that low numbers of elk did occur on the Forest, mostly at high elevations on the Diamond Lake District and in the Rogue-Umpqua Divide area. With the advent of logging and the resulting created openings, fire suppression efforts are no longer a significant factor in suppressing elk numbers and may be beneficial from the standpoint of protecting and maintaining cover areas.

Herbicides can affect big game animals in several ways; if extensive, continuous areas are treated at one time, a shortage of forage can occur. However, if herbicide use is timed to occur when target brush species have grown out of reach of the animals, the resprouting that results can be beneficial.

Other human influences can be considered in three broad areas: (1) mortality, (2) harassment, and (3) habitat impacts. Mortality occurs during the hunting season, through poaching, and by

accidents with vehicles. Harassment is a significant factor during winter months when animal energy reserves are low. In areas where activities such as recreation or logging take place, unintentional harassment may occur.

The objective is to provide maximum forage utility while maintaining suitable cover in close proximity to foraging areas. In addition, winter range management involves scheduling timber harvest activities to insure adequate forage and cover through time, controlling disturbance and harassment during critical periods, and identifying enhancement opportunities.

Effects of the Proposed Action. Direct mortality of Roosevelt elk due to the Proposed Action is possible if vehicles collide with animals traveling to and from construction sites. Numerous studies have shown that both Rocky Mountain elk and Roosevelt elk are sensitive to human disturbances such as motorized travel on and off roads (Rowland et al., 2000). Roads are generally avoided by elk when they are open, but are heavily utilized by elk as travel corridors when closed. Several herds of elk are known to winter on the western slopes of the Cascades (ODFW, 2003a). In general, deer and elk return to habitats from which they have vacated within some relatively short period of time which would likely depend on the time of year, available hiding cover, and duration of local disturbances.

Construction of the PCGP Project will remove 146 acres of forested habitat (Table 2-1) including approximately 87 acres of late successional-old growth, 30 acres of mid-seral forest, and 29 acres of clearcut-regenerating forest within the Umpqua National Forest. Roosevelt elk are likely to be generally associated with the Southwest Oregon Mixed Conifer-Hardwood Forest type affected and all structural conditions of affected forest (shrub-seedling, small tree, medium tree, large tree, giant tree; single and multi-story forests; open, moderate, and closed canopy forests). An additional 45 acres of forested habitat would be affected in the short-term within Uncleared Storage Areas (UCSAs). The project will also remove 0.09 acre of Forested Wetland and 10 acres of developed urban environs. Roosevelt elk are generally associated with a variety of Westside Riparian Wetland structural conditions and low density urban conditions (Johnson and O'Neil, 2001). Given that Roosevelt elk are such generalists, effects to any one type of structural habitat condition with replacement by another structural stage (e.g. shrub-seedling, grass-forb) will not adversely affect the species. Removal of approximately 146 acres of elk winter habitat represents approximately 0.07 percent of the 202,371 acres of winter habitat (foraging, hiding, and thermal cover) estimated on Umpqua National Forest in 1990 (Forest Service, 1990c). It is expected that management of forest since 1990 has increased the amount of available elk winter habitat; therefore, effects from the PCGP Project would be even less.

A study conducted in Alberta (Brusnyk and Westworth, 1985) focused on forage and browse production on a 17-year old pipeline right-of-way and on a 2-year old pipeline right-of-way. They compared big game use (moose, deer, and elk) of forage on the two rights-of-way to use in adjacent undisturbed forest ecotones and undisturbed forest. Browse production was most extensive on the 17-year old corridor which was utilized most by moose (though they are not present in the PCGP Project area).

Elk utilized forage on the 2-year old right-of-way primarily where portions were adjacent to forested habitats. The principal conclusion of this study was that pipeline corridors increased local habitat diversity and that diversity – juxtapositions of browse or forage to undisturbed forested habitat – influenced use of the corridors by ungulates, not necessarily due to increased vegetative production, *per se,* within pipeline rights-of-way (Brusnyk and Westworth, 1985). Following reclamation of the pipeline corridor, Roosevelt elk may utilize the corridor for travel

and for foraging, depending on vegetation species planted and rapidity of successful revegetation.

After construction of the PCGP Project, there will possibly be a secondary impact (Comer, 1982) on harvest rates with upgraded access to previously inaccessible areas; hunters are expected to achieve greater success, at least temporarily, with increased access. Big game species utilizing a cleared right-of-way, vegetated with herbaceous species, are more likely to be harvested than animals in forested habitat. Increased public recreation along the right-of-way in the fall hunting season, especially along access points, has been documented elsewhere (Crabtree, 1984).

Access could increase poaching of game animals and nongame wildlife on a local level. Enforcement of wildlife regulations is the responsibility of the Oregon State Police, Fish and Wildlife Division. Individual incidences of illegal harvest are reported in the Fish and Wildlife Division Newsletter. From those records it appears that poaching is somewhat commonplace in southwest Oregon. In the April 2007 edition, a deer poaching investigation in the vicinity of the proposed route (Eagle Point, Jackson County) led to 130 charges, including 23 felonies, against 8 suspects. Those particular crimes involved several black-tailed deer (Freeman, 2006) but, according to the April 2007 Fish and Wildlife Division Newsletter, other species that have been poached include elk, turkeys, and even livestock. There is no information to relate poaching effects to wildlife population status.

Mitigation. Mainline and facility construction is planned to begin spring 2016 with the in-service date scheduled for fourth quarter 2017. Timber clearing will occur concurrent, but prior to construction, with the exception of approximately 3.7 miles of timber that will be cleared in the fall / winter in areas within 0.25 mile of NSO activity centers and within 1.5 mile of peregrine falcon eyries (beginning in fall 2015). However, this area with NSO and peregrine presence is outside of big game winter range on Umpqua National Forest and should not affect use of winter range by elk. Construction and timber removal activities in 2016 and 2017 are scheduled to take advantage of the drier periods of the year to minimize winter construction, to reduce potential environmental impacts and construction safety risks, and ultimately reducing disturbance to elk utilizing big game winter range. Restoration of construction disturbance is expected to begin once construction is completed; restoration would start as early as fall 2016 and continue into 2017 and would be completed by the end of the winter season in early 2017/2018 when forest, wetland, and riparian plantings would be installed. Depending on site-specific conditions, it may be necessary to continue restoration through spring 2018. As required by FERC's Upland Plan, Pacific Connector consulted with the NRCS, the BLM, and the Forest Service regarding specific seeding dates and recommended seed mixtures for the project area. The recommendations have been incorporated into the project-specific ECRP. The ECRP describes the procedures that will be implemented to minimize erosion and enhance revegetation success for the entire project, the procedures that will be utilized to minimize the spread of noxious weeds as a result of project construction, and the silvicultural prescriptions that will be implemented in areas that are outside the permanent easement. Seeding mixtures and inhibition of noxious weeds will enhance forage production.

To minimize potential entrapment of deer and elk within the open trenches during pipeline construction within delineated big-game winter and summer range, Pacific Connector will leave trench segments (>5 feet wide) of the proposed pipeline alignment untrenched and herbaceously vegetated (every 0.5 mile and at visible wildlife game trails) to serve as a route (i.e., green bridge or landscape connector) for big game across the construction right-of-way until pipe is ready to be installed (Forman et al., 2003). Alternatively, Pacific Connector will

install soft plugs (backfilled trench materials) in the trench after excavation at these distances to provide wildlife passage. Additionally, 20-foot gaps will be left in spoil and topsoil stockpiles at all hard or soft plug locations and a corresponding gap in the welded pipe string will be left in these locations. Suitable ramps will be installed from the bottom of the trench to the top to prevent potential wildlife entrapment within the trench.

Vegetation management over the long-term will benefit winter range browse and forage for Roosevelt elk. Approximately 39.5 acres of vegetation within the 30-foot maintenance corridor will be periodically maintained by mowing, cutting, and trimming (either by mechanical or hand methods). In upland areas, the permanent easement will be maintained in a condition where trees or shrubs greater than 6 feet tall will be controlled (cut or trimmed) within 15 feet on either side of the centerline (for a total of 30 cleared feet). Maintenance activities are expected to occur approximately every 3-5 years depending on the growth rate of vegetation. During maintenance, vegetation will be cut/trimmed in 4 to 6-foot lengths and scattered across the permanent easement to naturally decompose and to discourage OHV traffic, as well as benefit wildlife habitat. Vegetation management over the long-term will benefit winter range forage for Roosevelt elk.

Forest Plan Consistency. On the Umpqua National Forest, big game winter range timing limitations are from December 1 through April 30. Construction activities would occur within approximately 0.65 mile of designated big game winter range on the Umpqua National Forest and could occur during those timing limitations. However, Pacific Connector would target the drier periods of the year to construct the pipeline, where possible, which would minimize disturbance to Roosevelt elk within designated habitat during that period. Big game travel lanes will not be blocked by construction or operation of the Proposed Action. Roosevelt elk are expected to utilize the project right-of-way for travel and foraging. Prescription C4-II allows for the possibility of new utility and transportation corridors, although discouraged, if no reasonable alternatives exist. The Proposed Action would be consistent with the Forest Plan.

Because the PCGP Project affects less than 0.1 percent of elk winter habitat across the Umpqua National Forest, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of Roosevelt elk is expected on Umpqua National Forest.

2.6 Columbian Black-tail Deer

The Columbian black-tail deer has been identified as an indicator species for their socio economic importance and as a habitat indicator for big game winter range habitat. This species has a high level of public interest associated with hunting and requires specific habitat conditions during the winter period.

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for Columbian black-tail deer and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines.

- Established big game travel lanes will not have their character altered through precommercial thinning.
- When planning timber sales in important big game areas, a habitat effectiveness model ("A Model to Evaluate Elk Habitat in Western Oregon" or similar model) will be used to compare the impact of various alternatives on big game habitat.

Management Prescriptions. Management prescriptions for big game described above for Roosevelt elk also apply to Columbian black-tail deer.

Management Areas Direction. Management area direction for big game described above for Roosevelt elk also apply to Columbian black-tail deer.

Species Status in the Project Area. Long-term, systematically collected data are available for this species, collected annually by the Oregon Department of Fish and Wildlife. Data are collected on population trends, sex ratios, winter mortality, and harvest. Forestwide populations are estimated by the ODFW to be between 8,000 and 14,000 animals. The following ODFW wildlife management units occur on the Umpqua National Forest: Dixon, Indigo, and Evans Creek.

ODFW's Evans Creek Wildlife Management Unit 29 coincides with the portion of the Umpqua National Forest within which the Proposed Action is located (MPs 94.69-122.61). ODFW (2012) has compiled harvest data on black-tailed deer within Wildlife Management Unit 29 for the 2011 season and prior harvest seasons starting in 2003 (ODFW, 2012). From 2003 through 2011, days per harvest of deer and percent hunter success have been relatively consistent (Table 2-9).

Table 2-9
Harvest Statistics for Black-Tailed Deer within the
Evans Creek Wildlife Management Unit 29, 2003-2011

Year	Total Hunters	Total Hunter Days	Harvest			Days per Harvest	Percent Hunter Success
			Total Males (antlered)	Total Non-Males (non-antlered)	Total		
2011	2391	15844	758	31	789	20	33
2010	2922	19252	795	52	847	23	29
2009	3223	21504	851	39	890	24	28
2008	3158	20685	953	30	983	21	31
2007	2916	18488	842	41	883	21	30
2006	2709	16827	735	29	764	22	28
2005	2234	14801	791	25	816	18	37
2004	2429	14980	674	31	705	21	29
2003	2673	18006	749	28	777	23	29

Unlike Roosevelt elk in Wildlife Management Unit 29, the black-tailed deer population does not appear to be decreasing during the period from 1998 to 2012, but neither does it appear to be increasing. There is no significant trend in fawns per doe (young per adult female) nor is there any significant trend in ODFW's Trend Count for deer in the Hunt Area which is conducted along a fixed route each year, usually at the end of winter (Table 2-10). In addition to fall composition count surveys, ODFW (2012) has also conducted annual spring composition counts that provided ratios of young per adult deer (adult bucks and does). The two ratios of young per adult (fall Ratio A and spring Ratio B in Table 2-10) allow estimation of young overwinter survival relative to adult overwinter survival. Those estimates are included in Table 2-10 and indicate that juvenile black-tailed deer in the Evans Creek Wildlife Management Unit 29 have had very high overwinter survival rates relative to adult deer - estimates near or greater than 1 - since 1998.

In other ODFW wildlife management units on the Umpqua National Forest (Dixon and Indigo Unit) not affected by the PCGP Project, black-tailed deer are meeting the ODFW management objectives; therefore, populations of black-tailed deer on the Umpqua National Forest are being maintained at viable levels to ensure their continued existence on the Forest.

Table 2-10
Population Trends, Annual Productivity, and Estimated Overwinter Survival for Juvenile Black-tailed Deer within the Evans Creek Wildlife Management Unit 29, 1998-2012

Year	Population Index [1]	Young per Adult Female [2]	Young per Adult – Fall (Ratio A) [3]	Young per Adult – Spring (Ratio B) [4]	Maximum Overwinter Juvenile Survival Rate [5]
2012	3.8	0.60	0.47	0.67	1.76
2011	2.5	0.47	0.38	0.38	1.01
2010	4.1	0.46	0.37	0.60	1.38
2009	5.5	0.55	0.43	0.58	1.26
2008	5.1	0.58	0.46	0.63	1.32
2007	-	0.61	0.48	-	-
2006	5.0	0.68	0.54	0.59	1.21
2005	5.1	0.60	0.49	0.71	1.81
2004	-	0.52	0.39	0.30	0.92
2003	6.3	0.41	0.33	0.48	0.96
2002	0.0	0.62	0.50	0.67	1.27
2001	3.0	0.60	0.53	0.37	0.97
2000	3.6	0.48	0.38	0.53	0.94
1999	3.8	0.70	0.57	0.70	1.64
1998	2.7	0.53	0.43	0.42	-

[1] **Population Index** is ODFW's Trend Count for the Hunt Area which is conducted along a fixed route each year, usually at the end of winter (ODFW, 2012).
[2] **Productivity** data is young per female from ODFW's Composition Count data reported as Young per 100 Females counted in December (ODFW, 2012).
[3] **Ratio A** (White et al., 1996) is the ratio of Young per Adult, derived from Composition Count data (Males per 100 Females and Young per 100 Females) counted in December (ODFW, 2012).
[4] **Ratio B** (White et al., 1996) is the ratio of Young per Adult (Young per 100 Adults) counted in March (ODFW, 2012).
[5] **Maximum Overwinter Juvenile Survival** is related to ratios ***A*** and ***B*** and to the following relationship of adult over-winter survival rate ($\hat{S}_a$) and juvenile over-winter survival rate ($\hat{S}_j$) by the formula (see equation 9 in Paulik and Robson, 1969): $\hat{S}_j / \hat{S}_a = \boldsymbol{B}/\boldsymbol{A}$ or $\hat{S}_j = \hat{S}_a (\boldsymbol{B}/\boldsymbol{A})$. Since many of the estimates of maximum juvenile survival rates are greater than 1, they indicate survival of adults was less than juveniles over winter which is highly unlikely.

Habitat. Black-tail deer prefer early successional stages created by clearcuts or burns, providing grasses, forbs, and shrubs (ODFW, 2003b; Csuti et al, 2001). Most black-tails summering in the high Cascades winter at lower elevations on the west slope, although some wintering may occur east of the Cascade crest (ODFW, 2003b). Winter range for black-tail deer occurs at elevations less than 3,500 feet and usually on slopes with southerly aspect. An exception occurs on the Diamond Lake Ranger District where animals winter at somewhat higher elevations. Some wintering of black-tail deer occurs on private land, but it is not felt that the number of animals is large enough to justify detailed analysis. In 1990, the Umpqua National Forest Plan estimated that there are approximately 202,371 acres of areas having conditions capable of providing winter habitat for black-tail deer. Early successional stages are

considered prime forage producing areas, the mid-stages can provide hiding cover and thermal cover, and the late stages provide optimum thermal cover (Forest Service, 1990c).

Black-tailed deer have general associations with all habitats that are present in the project area including Southwest Oregon Mixed Conifer-Hardwood Forest and Westside Riparian Wetlands habitats (Johnson and O'Neil, 2001). Most black-tails that summer in the high Cascades winter at lower elevations on the west slope, although some wintering may occur east of the Cascade crest (ODFW, 2003b). Winter loss of black-tailed deer is generally far less than for mule deer, because the snow does not remain on the valley floors for extended periods and a crust does not form on the surface as it does on the east side of the Cascades (ODFW, 2003b). The Proposed Action will cross 0.65 mile of big game winter range on the Umpqua National Forest. The big game winter range, classified by the Forest Service, is within sensitive big game range as delineated by ODFW.

Forest Management Activities. Historically, black-tail deer follow patterns similar to those of the Roosevelt elk. Historic populations were highest in areas of naturally occurring fires, windstorms, and insect infestations that created openings in fairly uniform timber stands. In addition, low numbers of deer could be found in old growth forests. The effects of controlling naturally occurring wildfire can be considered as limiting the amount of optimal habitat available for black-tail, although under the current management, this shortfall in habitat has been compensated for by openings created through logging. The burning of debris following logging is considered positive black-tail management.

The influence of humans on black-tail deer are similar to those discussed for Roosevelt elk and involve (1) direct mortality, (2) harassment, and (3) habitat modification. Mortality occurs through legal and illegal hunting and by accidents with motor vehicles. Harassment of deer during the winter months when energy reserves are low is not as much of a concern as with elk because they do not tend to herd and are generally less visible.

Winter weather and habitat conditions appear to be the main factor controlling overall population numbers. Extreme winter weather can significantly reduce populations.

Timber harvesting in low elevation areas (below 3,500 feet) creates considerable acreage of suitable forage. After timber harvest there is an initial surge of productive forage followed by declines in forage production once stands have reached pole-sapling size.

Current deer management is keyed to the harvest and management of timber stands and emphasizes the production of suitable forage and cover on a sustained basis. Most of the Forest's winter range areas have been identified and general management guidelines are applied to them. The objective is to provide available forage and suitable cover in close proximity. In addition, the management of winter ranges involves scheduling timber harvest activities to insure adequate forage and cover through time, controlling disturbance and harassment during critical periods, and identifying habitat enhancement opportunities.

Effects of the Proposed Action. Direct mortality of black-tailed deer due to the Proposed Action is possible if vehicles collide with animals traveling to and from construction sites. Similar to mule deer, vehicle collisions with black-tailed deer may increase with traffic volume, particularly during winter (Arnold, 1978; Reed, 1981; Romin and Bissonette, 1996). Black-tailed deer are likely to avoid access roads and construction areas similar to mule deer which generally avoid roads (Rost and Baily, 1979). In general, deer and elk return to habitats from which they have

vacated within some relatively short period of time which would likely depend on the time of year, available hiding cover, and duration of local disturbances.

Potential impact to black-tailed deer from noises generated from construction activities may be similar to mule deer and can be evaluated to an extent, such as noise from vehicles and/or increased road traffic, blasting, and aerial fly-overs. For example, effects of short-duration seismic exploration (blasting) have been documented. Mule deer respond with alert postures, occasionally running for short distances, but did not shift home ranges or otherwise avoid seismic blast 2 miles away (Ihsle, 1982). Mule deer did avoid areas of seismic exploration that were closer (0.6 mile away) but whether avoidance was due to human presence, noise, or a combination was not distinguishable (Horejsi, 1979).

Construction of the PCGP Project will remove 146 acres of forested habitat (Table 2-1) including approximately 87 acres of late successional-old growth, 30 acres of mid-seral forest, and 29acres of clearcut-regenerating forest. Black-tailed deer are likely to be generally associated with the Southwest Oregon Mixed Conifer-Hardwood Forest type affected and all structural conditions of affected forest (shrub-seedling, small tree, medium tree, large tree, giant tree, single and multi-story forests, open, moderate, and closed canopy forests). An additional 45 acres of forested habitat would be affected in the short-term within Uncleared Storage Areas (UCSAs). The project will also remove 0.09 acre of Forested Wetland and 10 acres of developed urban environs. Black-tailed deer are generally associated with a variety of Westside Riparian Wetland structural conditions and low density urban conditions (Johnson and O'Neil, 2001). Given that black-tailed deer are such generalists, effects to any one type of structural habitat condition with replacement by another structural stage (e.g. shrub-seedling, grass-forb) will not adversely affect the species. Removal of approximately 146 acres of deer winter habitat represents approximately 0.07 percent of the 202,371 acres of winter habitat (foraging, hiding, and thermal cover) estimated on Umpqua National Forest in 1990 (Forest Service, 1990c). It is expected that management of forest since 1990 has increased the amount of available deer winter habitat; therefore, effects to black-tail deer winter habitat would likely be less than described.

A study conducted in Alberta (Brusnyk and Westworth, 1985) focused on forage and browse production on a 17-year old pipeline right-of-way and on a 2-year old pipeline right-of-way. They compared big game use (moose, deer and elk) of forage on the two rights-of-way to use in adjacent undisturbed forest ecotones and undisturbed forest. Browse production was most extensive on the 17-year old corridor which was utilized most by moose (though they are not present in the PCGP Project area).

Deer appeared to utilize browse in the 17-year old corridor but returned to adjacent undisturbed forest, probably utilizing available hiding or thermal cover. Deer utilized the corridors for travel in early winter prior to limiting snow depths. The principal conclusion of this study was that pipeline corridors increased local habitat diversity and that diversity – juxtapositions of browse or forage to undisturbed forested habitat – influenced use of the corridors by ungulates, not necessarily due to increased vegetative production, *per se,* within pipeline rights-of-way (Brusnyk and Westworth, 1985). Following reclamation of the pipeline corridor, black-tailed deer may utilize the corridor for travel and for foraging, depending on vegetation species planted and rapidity of successful revegetation.

After construction of the PCGP Project, there will possibly be a secondary impact (Comer, 1982) on harvest rates with upgraded access to previously inaccessible areas; hunters are expected to achieve greater success, at least temporarily, with increased access. Big game species

utilizing a cleared right-of-way, vegetated with herbaceous species, are more likely to be harvested than animals in forested habitat. Increased public recreation along the right-of-way in the fall hunting season, especially along access points, has been documented elsewhere (Crabtree, 1984).

Access could increase poaching of game animals and nongame wildlife on a local level. Enforcement of wildlife regulations is the responsibility of the Oregon State Police, Fish and Wildlife Division. Individual incidences of illegal harvest are reported in the Fish and Wildlife Division Newsletter. From those records it appears that poaching is somewhat commonplace in southwest Oregon. In the April 2007 edition, a deer poaching investigation in the vicinity of the proposed route (Eagle Point, Jackson County) led to 130 charges, including 23 felonies, against 8 suspects. Those particular crimes involved several black-tailed deer (Freeman, 2006) but, according to the April 2007 Fish and Wildlife Division Newsletter, other species that have been poached include elk, turkeys, and even livestock. There is no information to relate poaching effects to wildlife population status.

Mitigation. Mitigation for impact to Roosevelt elk would also apply to black-tailed deer.

Forest Plan Consistency. On the Umpqua National Forest, big game winter range timing limitations are from December 1 through April 30. Construction activities would occur within approximately 0.65 mile of designated big game winter range on the Umpqua National Forest and could occur during those timing limitations. However, Pacific Connector would target the drier periods of the year to construct the pipeline, where possible, which would minimize disturbance to Columbian black-tailed deer within designated habitat during that period. Similar to management of Roosevelt elk, the Proposed Action would be consistent with the Forest Plan Standards and Guidelines, Management Prescriptions, and Management Area Directions related to black-tailed deer.

Since there is no significant trend in fawns per doe (young per adult female) nor is the any significant trend in ODFW's Trend Count for deer in the Evans Wildlife Management Unit 29 **(**Table 2-10), there is no reason to expect that deer winter range carrying capacity on the Forest would be limited by the Proposed Action. Indeed, estimated young overwinter survival relative to adult overwinter survival indicates that juvenile black-tailed deer in the Evans Wildlife Management Unit 29 have had very high overwinter survival rates relative to adults (Table 2-10), which may indicate carrying capacity objectives of the Forest are being achieved. The Proposed Action would be consistent with the Forest Plan.

Because the PCGP Project affects less than 0.1 percent of black-tail deer winter habitat across the Umpqua National Forest, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of Columbian black-tail deer is expected on Umpqua National Forest.

2.7 Peregrine Falcon

The peregrine falcon was identified as an indicator species because it was classified as an endangered species under the Threatened and Endangered Species Act of 1973 (ESA) when the Forest Plan was developed. With the banning of DDT and other chlorinated hydrocarbons and successful captive breeding, rearing, and release of over thousands of peregrines annually, FWS (1999a) determined that the species had recovered and removed peregrine falcons from the list of Threatened and Endangered Species in 1999. Although no longer listed as

threatened under the ESA, peregrine falcons remain protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712).

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for peregrine falcons and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines.

- All proposed activities within areas designated for management under the bald eagle or peregrine falcon prescription will first be coordinated with the USFWS as required by consultation procedures.

Management Prescriptions. Forest Plan *Prescription C3-1, Peregrine Falcon*, applies to known and selected potential peregrine falcon nest sites and the area within a three-mile radius of nest site. It is intended to meet the requirements of the Endangered Species Act of 1973. However, since the species has been delisted, consultation with the FWS may no longer be required for projects which could have an impact on it.

- Wildlife and Fish: These sites are high priority for annual monitoring. Any proposed enhancement project or management technique must be reviewed and coordinated with the FWS.
- Timber: No programmed harvest within the immediate vicinity of the nest site. Restrict timber harvest activity between January 1 and July 31 as needed to reduce disturbance during nesting season. Within a 1.5-mile radius of nest site, if determined necessary, restrict timber sale activity during January 1 - July 31. Review all timber sales in the 1.5-mile zone with FWS. Within a 3-mile radius of a nest, manage harvest schedule to provide a diversity of age classes. Maintain 50 percent of the stands in pole size or larger. Where possible, leave five or more hardwoods per acre in regeneration units. Modify herbicide application to provide at least 25 percent of the original hardwood component. Manage snags at 40 percent or more of potential population capacity.
- Facilities: Roads within 1.5 miles may be blocked permanently or closed to use January 1 - July 31, if needed to reduce disturbance during nesting season. Road construction or reconstruction within 1.5 miles will not normally take place during January 1 - July 31. New utility and transportation corridors will be discouraged. Where no reasonable alternatives exist, corridors will be located to impose the least impact as determined in the EA process.
- Protection: No use of chemicals to control insect and disease outbreaks within the 1.5-mile radius except under recommendation from FWS.

Management Area 10 Direction. Inventoried sites for peregrine falcons on MA 10 are assigned to Prescription C3-I.

Management Area 11 Direction. Not applicable.

Species Status in the Project Area. The Umpqua National Forest Plan monitoring calls for annual monitoring of all known peregrine falcon sites, and to report the number of active nests. At the time of the decision for the Umpqua Forest Plan (1990b) there were seven known nesting pairs, and in 2011 there were 16 known nesting pairs on the Forest that have fledged 183 young since 1990. The Umpqua is now considered a source population for peregrine falcons in southwestern Oregon, and the peregrine reproduction has been increasing with numbers of eyries detected, as well as number of young fledged. Therefore, the peregrine population on

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the Umpqua is being maintained at a viable level, with a positive trend in population size on the Umpqua National Forest.

A peregrine falcon eyrie on the Umpqua National Forest within the vicinity of the proposed action has been active for several years. The eyrie is approximately 0.2 mile southwest of PCGP Milepost (MP) 112.32 (T32S, R2W, Section 35).

Habitat. Throughout its vast range, the peregrine falcon has adapted to a wide array of nesting and prey habitats. In Oregon, the bird is found to nest on cliffs ranging in height from 75 to 1500 feet, as well as man-made structures such as bridges (Marshall et al., 2006). The average occupied cliff size in the Cascade Mountain Range is 229 feet. Cliff nests are on ledges or potholes with and without protective overhangs (Marshall et al., 2006). Nests previously built and occupied by ravens, golden eagles, and red-tailed hawks have also been located as nesting spots for falcons in Oregon (Marshall et al., 2006).

Peregrine falcons are associated with Westside Riparian-Wetlands and Southwest Oregon Mixed Conifer-Hardwood Forest habitats, both of which occur on the Umpqua National Forest and are crossed by the Proposed Action.

Forest Management Activities. The influence of fire and timber harvest can be considered in two ways: (1) as they affect the nest site and (2) as they affect the food base. Fire or harvest in the immediate vicinity of the nest site can be detrimental, if the site is severely modified so that it may no longer be suitable. To some extent, how much disturbance would be tolerated depends on the quality of the site and the characteristics of the individual birds. Because peregrines are long-ranging birds, fire or logging will not significantly affect the food base and may actually increase the food base if it results in an increase in the passerine (songbird) bird population.

Unusual or prolonged disturbance of nesting birds can lead to reproductive failure. The species' intense defensive behavior plus the high public interest in this species warrant limiting disturbance during the courtship and nesting period. Any changes in the characteristics of the nest site, through logging or road construction, would also be detrimental to the birds.

Effects of the Proposed Action. Although peregrine falcons were delisted, the Umpqua National Forest continues to apply temporal and spatial buffers identified within the Umpqua Forest Plan to protect peregrine falcon eyries. No disturbances are allowed within 1.5 miles of active nest sites from January 1 through July 31. Since the eyrie is at a higher elevation than the construction right-of-way and there is likely no intervening tree cover, noise generated by construction at the eyrie is predicted to range from 45 dBA (centerline surveying of the ditch) to 66 dBA (ditching with mitigated rock blasting) at the closest distance of 0.2 mile. That noise level is likely to be below levels (85 dB) that normally scare birds (Golden et al., 1980).

Disturbance of the adults could lead to egg or chick abandonment, leaving them vulnerable to predators and the elements. In extreme cases of disturbance, for example the sudden appearance of a human or machinery very close to a nest, the adult may leave so quickly as to knock eggs or chicks out of the nest (White et al., 2002).

Mitigation. Pacific Connector would apply the spatial buffer to approximately 3.3 miles of the PCGP construction right-of-way on the Umpqua National Forest, from MP 111.10 to MP 113.43, to avoid impacts to the nesting peregrine falcon. No timber clearing or construction activities would occur within 1.5 miles of the active peregrine falcon eyrie from January 1 through July 31. No additional mitigation has been proposed.

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Forest Plan Consistency. Since Peregrine Falcons are no longer listed under the ESA, Forest Plan Prescription C3-I, Peregrine Falcon, intended to meet the requirements of the Endangered Species Act of 1973, is no longer applicable. Nevertheless, the Proposed Action will be consistent with current temporal and spatial buffers to protect peregrine falcon eyries on the Umpqua National Forest. And, as noted above, the peregrine population on the Umpqua is being maintained at a viable level, with a positive trend in population size on the Umpqua National Forest. Since the project will not directly affect nesting habitat (no cliff habitat affected), seasonal restrictions will be applied during timber removal and construction activities, and Umpqua National Forest is considered a source population for peregrine falcons, the continued viability of the species would be expected.

2.8 Bald Eagle

The bald eagle was chosen as a management indicator species for the Forest because it was classified as a threatened species under the ESA (Forest Service, 1990b). However, the species is no longer listed under the Act; the bald eagle was removed from the list of threatened and endangered species (FWS, 2007). Although no longer listed as threatened under the ESA, bald eagles remain protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d) and the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712). The bald eagle is associated with larger bodies of water on the Umpqua National Forest.

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for bald eagles and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines.

- Active raptor nest sites identified in project planning or during project work should be protected from human disturbance until fledging or nesting is complete.
- All proposed activities within areas designated for management under the bald eagle prescription will first be coordinated with the FWS as required by consultation procedures.

Management Prescriptions. *Prescription C3-II, Bald Eagle, Maintained,* applies to areas within a 20-chain radius of known and selected potential bald eagle nest sites. Under the Forest Plan this prescription was intended to meet the requirements of the Endangered Species Act of 1973 and requires preparation of a site-specific management Plan within three years of Forest Plan approval.

- Wildlife and Fish: These sites are high priority for annual monitoring. Any proposed enhancement project or management technique must be reviewed and coordinated with the FWS.
- Timber: The following direction applies within a five-chain radius of active or alternate nest sites: No programmed harvest; no salvage. No silviculture-related activities January 1 through August 31.
- The following direction applies between five and ten chains from the nest:
  Three or more overmature trees shall be left. No more than 10 percent of the area may be impacted per decade. Use of toxic chemicals is prohibited. No salvage permitted. All activities prohibited January 1 through August 31. Commercial and personal-use firewood cutting shall be an incidental secondary product of timber harvest. Firewood cutting and gathering for on-site use is permitted.

- Facilities: No corridors, roads or trails will be constructed within 400 feet of nest trees. Within 650 feet, no construction or reconstruction between February 15 and August 15. New utility and transportation corridors will be discouraged. Where no reasonable alternatives exist, corridors will be located to impose the least impact. Existing facilities are allowed.
- Protection: No use of chemicals to control insect and disease problems within the 1.5-mile radius except under recommendation from FWS.

Management Areas 10 and 11 Direction. Not applicable.

Species Status in the Project Area. This species is associated with larger bodies of water on the Umpqua, and the only known nest sites are on the Diamond Lake Ranger District. The Umpqua National Forest Plan monitoring plan calls for annual monitoring of all known bald eagles on the Umpqua National Forest to determine site occupancy and productivity on an annual basis. At the time of the decision of the Umpqua National Forest Plan (Forest Service, 1990b) there were two nest sites (one at Diamond Lake and one at Lemolo Lake), and in 2011 there were four known nesting pairs on the Umpqua National Forest that have fledged 60 eagles since 1990. The trend for bald eagle reproduction has been increasing over the 21 years since the Umpqua National Forest Plan was signed. No bald eagles nest within the vicinity of the Proposed Action on the Umpqua National Forest.

There are no Midwinter Bald Eagle Survey locations near the Forest (Steenhof et al., 2008) but there are three count routes along the Rogue River near Medford and Gold Hill within 20 miles of the pipeline route and within 30 miles of the southern boundary of Umpqua National Forest. Results of midwinter bald eagle counts from the three routes indicate that wintering bald eagles have been increasing along the Rogue River between 1988 and 2005 and have likewise been significantly increasing along the Pacific Coast (including the Northern Pacific Rainforest and Coastal California ecoregions, see Steenhof et al., 2008). No additional data is available for the Midwinter Bald Eagle Surveys after 2008. However, the Audubon has been collecting bald eagle information near Umpqua National Forest and the Audubon CBC Medford count circle data also show a significant increasing trend of wintering bald eagles from 1992 to 2012, $P < 0.001$ (Figure 2-3).

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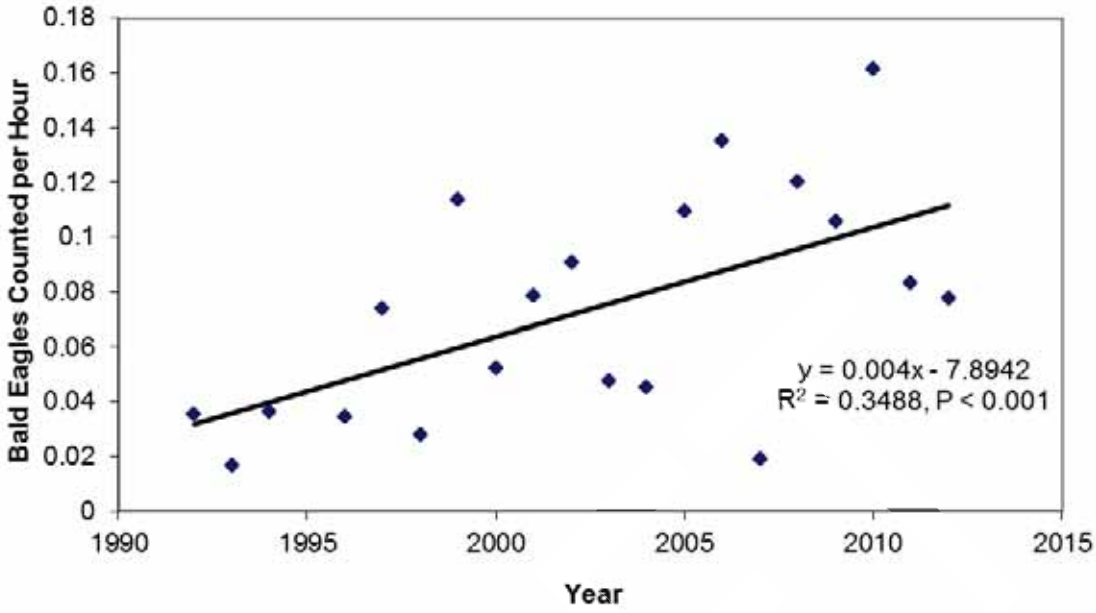


Figure 2-3
Total Bald Eagles Counted During the Audubon CBC Medford Surveys, 1992-2012

Habitat. Habitat requirements for this species are considered to be suitable nest sites and large lakes and rivers which serve as a food source. Suitable nest sites are generally within view of their feeding grounds near water (Forest Service, 1990c). Bald eagles are common in the vicinity of freshwater lakes and rivers and saltwater (Smith et al., 1997). Nests are built on large, prominent trees and snags, usually within a mile of water, and are almost always reused (Isaacs and Anthony, 2004). Bald eagle nesting, feeding, and wintering areas are known or potentially occur on or near the project area.

Bald eagles are associated with most habitat types that occur within the Umpqua National Forest in proximity to waterbodies, including Westside Riparian-Wetlands and Southwest Oregon Mixed Conifer-Hardwood Forest.

In the Pacific Northwest, bald eagles may begin nest repairs in December but courtship and pair bonding generally occur during January and February (Stinson et al., 2001). Adults begin incubating eggs by mid to late March, and this lasts for 35 days or so and young hatch near the end of April (Stinson et al., 2001). Juveniles typically fledge during July, 11 to 13 weeks after hatching (Stinson et al., 2001) but may remain in the nest vicinity for a month, usually through August (Isaacs et al., 1983). Immediately before and during egg laying and early incubation are considered the most critical, during which even temporary abandonment by adults can leave eggs or young susceptible to chilling and inclement weather, excessive solar heating, and predation (Romin and Muck, 1999).

Forest Management Activities. Habitat destruction through logging, road construction, and recreational development has in the past had the most affect on this species throughout its range. Recent public awareness and concerns have reduced this kind of detriment, at least on public lands.

Unintentional harassment or malicious destruction of nests and shooting eagles does occur, although it has not been a problem on this Forest. Public awareness has benefited this species.

The current management for this species requires, as a minimum, preparing a site-specific management plan for each bald eagle site. Plans will be coordinated and reviewed with the FWS (Forest Service, 1990c).

Effects of the Proposed Action. Bald eagles are sensitive to human disturbances during nesting periods (Fraser et al., 1985; Johnson, 1990; Grubb et al., 1992) and at other times of the year (Stalmaster and Newman, 1978; Knight and Knight, 1984; McGarigal et al., 1991). Stinson et al. (2001) reviewed bald eagle responses to various human activities at different times in the annual cycle (nesting, roosting, foraging) and summarized various distances at which bald eagles might be expected to be adversely affected (displacement, nest abandonment) by such actions as residential developments, logging, road building, boating, recreational use, and presence of pedestrian traffic at several locales across North America. While noting that there was a high degree of variability in bald eagle response, Stinson et al. (2001) recommended spatial buffers of 1,640 feet (0.31 mile) to reduce bald eagle avoidance of shorelines with pedestrian or boat traffic and 1,690 feet (0.32 mile), a threshold within which breeding bald eagles exhibit alert responses. No bald eagles nest on the Umpqua National Forest within the vicinity of the Proposed Action (within 1 mile or closer); therefore, no effects to nesting bald eagles are expected.

Mitigation. No mitigation specifically targeting impact to bald eagles is proposed within Umpqua National Forest.

Forest Plan Consistency. Since Bald Eagles are no longer listed under the ESA, Forest Plan Prescription C3-II, Bald Eagle, intended to meet the requirements of the Endangered Species Act of 1973, is no longer applicable. The Proposed Action will not be inconsistent with the Forest Plan related to management of Bald Eagles. As reported above, bald eagle reproduction on the Umpqua National Forest has been trending slightly positive over the past 21 years, therefore Bald Eagle populations on the Umpqua National Forest are being maintained at viable levels. The PCGP Project will not remove known bald eagle nests or impact its habitat. Therefore, the PCGP Project will not contribute to a negative trend in bald eagle viability on the Umpqua National Forest.

2.9 Water Quality Indicator Species

Steelhead have been selected as indicator species because they occupy a variety of habitat across the Umpqua National Forest. Streams on the forest are classified based on the present and foreseeable uses made of the water, and the potential effects of on-site changes on downstream uses. Class I streams are direct sources of water used as a public water supply (more than 10 percent of the public water supply's watershed) or provide habitat usable by anadromous salmonids. Class II streams provide habitat usable by resident salmonids. Class III streams are perennial streams which are not Class I or II. Class IV streams are intermittent or seasonal streams which are not Class I or II. These stream classes are referenced extensively in the fish habitat management prescriptions detailed below.

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for Water Quality Indicator Species and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines. Fisheries standards and guidelines in the Forest Plan, and listed below, are not specific to Forest fish indicator species but are primarily designed for the goal of maintaining, enhancing, and protecting habitat for populations of resident and anadromous fish both on and off the Forest.

- Maintain all effective shading vegetation on perennial streams. Utilize silvicultural practices to establish shade on perennial streams where they are currently lacking.
- Maintain or improve soil stability adjacent to all streams. When slope stability risks are high or very high, use stability buffer specifications found in Forest Plan Soil Productivity standards and guidelines.
- Retain all existing instream large woody material, streamside snags, and streamside downed material within riparian areas of perennial streams (Class I, II, and III streams) that will not create a blockage to fish passage. Retain standing trees which are likely to fall into the stream in the future.
- Protect riparian areas from prescribed fire and equipment when treating slash in adjacent harvest unit, where practical.
- Fall timber directionally away from riparian areas to protect full width of residual vegetation, where practical.
- Do not apply pesticides within the riparian areas.
- Keep total fine sediment (<1.0 millimeter) to less than 20 percent by weight in spawning gravels.
- Design new stream crossings to provide for unimpeded fish passage and correct existing passage problems on a prioritized schedule.
- Locate new roads outside riparian areas, preferably on ridgetops, except where a stream crossing is necessary. Road reconstruction should not further degrade riparian areas.

Management Prescriptions. Similar to the Forestwide Standards and Guidelines, management prescriptions for fish are not always specific to the forest indicator species for fish, but provide for maintaining and improving fish habitat in general. There are several management prescriptions for fish and fish habitat that apply only to specific areas or stream sections on the Forest. In some cases, these areas are not crossed by the PCGP Project and so the management prescriptions are not included here.

Riparian objectives are to maintain or improve effective shade, existing sediment delivery, existing woody material for fish habitat, aquatic food source, and free salmonid fish passage. Temperature increases on Class I and II streams and lakes and ponds will be limited to the quantitative criteria in Oregon State basin standards (OAR Chapter 340). Existing stream temperatures exceed those limits in the Umpqua and Willamette basin standards, so temperature will not be increased.

Prescription C2-I, Riparian Area Class I and II Streams, Lakes, and Ponds, applies to streams and adjacent riparian areas that provide habitat for either anadromous or resident salmonids, and wildlife. It includes lakes and ponds greater than one acre, along with their riparian areas, and streams which supply water to public water systems. The riparian unit extends from 50 to 250 feet (average 100 feet), measured horizontally from each streambank at the bankfull flow mark. The prescription concentrates on maintaining existing wildlife and fish habitat, as well as existing water quality and quantity. Environmental alteration is permitted in order to meet riparian objectives. Minor changes caused by other resource activities must be mitigated to meet water quality, fish, and wildlife needs.

Prescription C2-II, Riparian Area Class III Stream, applies to perennial streams, lakes, ponds and adjacent riparian areas which do not provide salmonid fish habitat. The riparian unit extends 30 to 150 feet (average 50 feet) from each streambank at bankfull flow mark. The prescription concentrates on maintaining existing water quality and quantity. Moderate environmental alteration consistent with riparian objectives is permitted.

Riparian objectives are to provide large woody material and maintain or improve effective shade, existing sediment delivery, and aquatic food sources on Class III streams unless a site-specific assessment shows that shade removal will not result in temperature increases or degradation of aquatic habitat on downstream Class I or II waters.

Prescription C2-III, Riparian Area Class IV Stream, applies to streams with defined streambanks and seasonal surface streamflow, usually described as first- and often second-order channels. The riparian unit extends 30 to 150 feet (average 50 feet), measured horizontally from each streambank at bankfull flow mark. This prescription maintains existing water quality and quantity by maintaining existing channel, bank, and sideslope stability. Extensive environmental alteration consistent with riparian objectives is permitted.

Riparian objectives are to minimize sediment delivery to Class IV streams, and to maintain the existing channel profile with a vegetation rootmat in the streambank and stable woody material in the channel.

Prescription C2-IV, Fish Habitat Class I and II Streams, Lakes, and Ponds, applies to streams and adjacent riparian areas that provide habitat for either anadromous or resident salmonids, and lakes and ponds greater than one acre and their adjacent riparian area. The riparian unit extends from 100 to 200 feet (150-foot average), measured horizontally from the streambank at bankfull flow mark. This prescription protects and maintains the quality of anadromous and resident salmonid fish and wildlife habitat via structural and nonstructural means, as well as aquatic organism food sources and water quality and quantity. Environmental alteration is permitted in order to meet riparian objectives. Minor changes caused by other resource activities must be mitigated to meet water quality, fish, and wildlife needs.

Riparian objectives are to maintain or improve effective shade and existing sediment delivery on Class I and II streams, lakes, and ponds, and to maintain existing and future woody material, aquatic food sources and free fish passage. Temperature increases on Class I and II streams and lakes and ponds will be limited to the quantitative criteria in Oregon State basin standards (OAR Chapter 340). Existing stream temperatures are above those limits in the Umpqua and Willamette basin standards, so temperatures will not be increased.

Prescription C2-V, Fish Habitat Class III Streams applies to perennial streams, lakes, ponds, and adjacent riparian areas which do not provide salmonid fish habitat. The riparian area extends 30-150 feet (average 50 feet), measured horizontally from each streambank at the bankfull flow mark. The prescription protects and maintains aquatic food sources, water quality and quantity, and wildlife habitat. Moderate environmental alteration is permitted consistent with riparian objectives.

Riparian objectives are to provide large woody material, and maintain or improve effective shade, existing sediment delivery and aquatic food sources on Class III streams unless a site-specific assessment shows that shade removal will not result in temperature increases or degradation of aquatic habitat on downstream Class I or II waters.

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Prescription C2-VI, Fish Habitat Class IV Streams applies to streams with defined streambanks and seasonal surface streamflow, usually described as first- and often second-order streams. The riparian unit extends 30 to 150 feet (average 50 feet), measured horizontally from each streambank at bankfull flow mark. This prescription protects and maintains wildlife habitat and downstream fish habitat as well as water quality and quantity by protecting groundcover vegetation in the riparian area. Moderate environmental alteration consistent with riparian objectives is permitted. Riparian objectives are to minimize sediment delivery to Class IV streams, and to maintain the existing channel profile with a vegetation root mat in the streambanks and stable woody material in the channel.

Management Areas. The PCGP Project will cross portions of Forest Plan Management Areas 10 and 11. These MAs also contain river and stream drainages that are represented as resource scheduling areas (RSA) in the Forest Plan. The South Umpqua River in the vicinity of the project area is divided into five RSAs: Cow Creek, Elk Creek, Jackson Creek, the Upper South Umpqua, and the Lower South Umpqua. The PCGP Project courses along the boundary shared by the Cow Creek (02) and Elk Creek (04) RSAs and intersects both of them. The RSAs in MAs 10 and 11 are assigned management prescriptions (described above) relative to fish habitat and presence.

Management Area 10 Direction. Riparian and fish habitat prescriptions are assigned for Class I, II, III and IV streams in this MA in order to meet management requirements or protect habitat for anadromous fish. In areas without anadromous fish (Resource Scheduling Areas (RSA): 2, 11-16 and 20-22), prescriptions are assigned as follows: prescription C2-I to Class I and II streams and lakes and ponds, prescription C2-ll to Class III streams, and C2-Ill to Class IV streams. In RSAs 4 through 10, fish habitat prescriptions are assigned as follows: prescription C2-IV to Class I and II streams and lakes and ponds, prescription C2-V to Class III streams, and prescription C2-VI to Class IV streams.

Prescription C2-Vlll is assigned on Class I streams with demonstrated unique anadromous fish populations. Prescription C2-Vll is assigned on all anadromous fish pools signed by the Oregon Department of Fish and Wildlife. These two prescriptions do not apply to areas crossed by the PCGP project area.

Management Area 11 Direction. Riparian and fish habitat prescriptions are assigned to each RSA in order to meet management requirements or protect habitat for anadromous fish. These prescriptions are assigned to inventoried Class I and II streams. Class III and IV streams that are regularly inventoried as a part of watershed management are also assigned special riparian prescriptions. In all RSAs without anadromous fish (RSAs: 02, 11-15, 20-22), MR riparian prescriptions are assigned as follows: prescription C2-I to Class I and II streams and lakes and ponds; prescription C2-ll to Class III streams, and C2-Ill to Class IV streams. In RSAs 04 through 10, fish habitat prescriptions are assigned as follows: prescription C2-IV to Class I and II streams and lakes and ponds; prescription C2-V to Class III streams, and prescription C2-VI to Class IV streams. In RSAs 17 and 18 within the boundaries of MA 11, special fish habitat prescriptions are assigned as follows: prescription C2-IV to Class I and II streams and lakes and ponds, prescription C2-IV to Class III streams, and prescription C2-VI to the remaining Class IV streams. These prescriptions identify the maximum amount of vegetative disturbance permissible in a riparian area, other assigned prescriptions may indicate less disturbance.

Prescription C2-Vlll is assigned on Class I streams with demonstrated unique anadromous fish populations. Prescription C2-Vll is assigned on all anadromous fish pools signed by the Oregon

Department of Fish and Wildlife. These two prescriptions do not apply to areas crossed by the PCGP Project.

Species Status in the Project Area. Winter steelhead may be located in tributaries of the South Umpqua River, including the Upper Cow Creek watershed where the PCGP Project crosses the Forest. Winter steelhead is the largest run of steelhead on the Forest and populations in the ODFW South Umpqua Species Management Unit (SMU) are not considered to be at risk (ODFW, 2005). Summer steelhead are not known to be present in the project area within the Forest (ODFW, 2009 and Forest Service, 1990c).

In Tributaries to the Umpqua River, winter steelhead migrate upstream and spawn from January through May, egg incubation and fry emergence last from January through June, and downstream juvenile migration begins in February and ends in mid-July (ODFW, 2003c). In tributaries to the Rogue River between Marial and Lost Creek, winter steelhead may migrate upstream from September through mid-May but spawning is from mid-February though mid-May, egg incubation and fry emergence is from mid-February through June, and downstream juvenile migration is from mid-February through June. Juvenile rearing in both drainages is likely to be throughout the year (ODFW, 2003c).

Winter steelhead are not likely to occur in the stream reaches affected by the Proposed Action within the Umpqua National Forest. The pipeline will cross two perennial and one intermittent tributaries to the East Fork of Cow Creek and the East Fork of Cow Creek between MP 109.33 and MP 109.78, but the ODFW winter steelhead distribution in those waterbodies does not extend to the reaches crossed by the pipeline (ODFW, 2009). The pipeline will be within the riparian zone of a Tributary to West Fork Trail Creek but will not cross the waterbody within the Umpqua National Forest. Winter steelhead do occur within the West Fork Trail Creek but not in the tributary near MP 110.76 (ODFW, 2009).

Habitat. Within the Umpqua National Forest, the pipeline route crosses four perennial streams (three of them assumed to be fish-bearing, the other is unknown) and one intermittent stream (fish presence is unknown) within the South Umpqua–Upper Cow Creek Fifth Field Watershed. The pipeline also will pass through the riparian zone of one intermittent stream (fish presence is unknown) that is adjacent to the pipeline but within the Upper Rogue River–Trail Creek Fifth Field Watershed.

Riparian zones associated with East Fork of Cow Creek and the tributaries that will be crossed are forested with late successional-old growth forest and/or mid-seral forest (Table 2-11). Likewise, the riparian zone associated with the Tributary to West Fork Trail Creek is forested by mid-seral forest but a developed road and rock quarry (altered habitat) are also within the riparian zone that will be crossed by the pipeline.

Table 2-11
Summary of Habitats Removed by the Proposed Action from Riparian Zones Extending One-Site Potential Tree Height From Stream Banks and Riparian Reserves, Extending up to Two Site-Potential Tree Heights From Stream Banks on the Umpqua National Forest

Fifth Field	Forested Habitat [1]	Other Habitat [1]	Riparian Zone Lands

Watershed (Hydrologic Unit Code) and Riparian Zone	Late Successional-Old Growth	Mid-Seral Forest	Regenerating Forest	Clearcut Forest	Total	Forested Wetland	Non-Forested Wetland	Unaltered Non-Forested Habitat	Agriculture	Altered Habitat	Total	
Upper Cow Creek (HU 1710030206)												
One Site Potential Tree Height (187 feet)	2.06	3.48	1.43	0	5.82	0	0.09	0	0	0.57	0.66	7.63
Riparian Reserve	2.58	3.48	3.44	0	9.74	0	0.09	0	0	0.72	0.81	**10.55**
Trail Creek (HUC 1710030706)												
One Site Potential Tree Height (159 feet)	0	1.47	0	0	1.47	0	0	0	0	2.45	2.45	3.92
Riparian Reserve	0	1.47	0	0	1.47	0	0	0	0	2.45	2.45	**3.92**
Both Watersheds Total												
One Site Potential Tree Height	2.06	4.95	1.43	0	7.29	0	0.09	0	0	3.02	3.11	11.55
Riparian Reserve	2.58	4.95	3.44	0	11.21	0	0.09	0	0	3.17	3.26	14.47

Effects of the Proposed Action. Construction of the Proposed Action will remove a total of 7.29 acres of forested vegetation within one site-potential tree height of all riparian zones crossed on the Umpqua National Forest and at total of 11.21 acres of forested vegetation within Riparian Reserves crossed (Table 2-11). Effects to salmonids (Oregon Coast coho and Southern Oregon/Northern California Coast coho), to instream habitats, and to riparian zones during pipeline construction and operation were analyzed and discussed in detail in the Biological Assessment. Those same affects are assumed to apply to steelhead and are summarized below:

- Removal of trees will decrease shade and cause an increase in stream water temperatures that are expected to be immeasurable.
- Construction during summer and early fall is likely to affect invertebrates that are prey to juvenile coho but will also coincide with periods of lowest fish use and lowest instream flow rates. Effects to prey are expected to be temporary and localized.
- Some herbicides may have toxic effects on aquatic organisms and may bioaccumulate while others do neither. Herbicides will not be used within 100 feet of a waterbody's mean high water mark.
- The contribution by the Proposed Action to cumulative effects by harvested timber within riparian zones on non-federal lands within the Action Area is expected to be a very small portion of overall cumulative effects within the reasonably foreseeable future.
- Turbidity adversely affects juvenile coho. Turbidity produced by dry open-cut construction methods to cross streams is estimated to temporarily affect the water columns immediately downstream (within 10 meters) from all instream construction sites.
- Construction requiring blasting to cross 13 streams could cause mortality to fish, eggs, and larvae by rupturing swim bladders and addling egg sacs. Adult and juvenile coho will be removed and/or prevented from being within 50 feet of blasting sites to the maximum extent possible.

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- Fish salvage will occur within isolated construction sites, possibly when adult and juvenile coho are present.
- Lack of LWD is a limiting factor in most streams. Removal of Mid-Seral riparian forest (40-80 years old) will have long-term effects to recruitment of LWD and removal of Late Successional or Old Growth forest (≥80 years old) will have permanent effects to recruitment of LWD because planted conifers will not attain those age classes within the 50-year life of the project.

Mitigation. Conservation measures to mitigate effects to salmonids within streams impacted by construction of the pipeline have been provided and discussed in the Biological Assessment for the Proposed Action. Those measures are summarized below:

- Construction across and proximate to all perennial and intermittent streams within the Riverine analysis area will be during the dates recommended by ODFW to conduct in-water construction. Construction will not coincide with steelhead upstream migration, spawning, egg incubation or fry emergence although juvenile steelhead may be present during construction.
- All waterbodies supporting fisheries will be backfilled with material (gravel, cobble or other rock substrates) removed from the trench with the upper 1-foot of the trench backfilled with clean gravel which will provide substrate for benthos and potential spawning sites for coho.
- Pacific Connector proposes to place 21 pieces of LWD within the Upper Cow Creek watershed at streams crossed or adjacent to the pipeline centerline to compensate for loss of riparian forests during construction within the Umpqua National Forest.
- Riparian forests will be replanted to within 15 feet of the pipeline centerline which will mature during the 50-year life of the project to provide shade and LWD to many waterbodies.

In addition to these measures, Pacific Connector has developed a Compensatory Mitigation Plan (CMP) to mitigate for unavoidable and/or unmitigated effects of the project. On the Umpqua National Forest, Pacific Connector will provide funding to the Forest Service to decommission 53-57.5 miles of roads and repair stream crossings at 32 locations which will provide benefits to steelhead and aquatic habitats in the Forest. Additionally, Pacific Connector will fund commercial and pre-commercial thinning on up to 1,240 acres that will also include fuel treatments to reduce risk of stand-replacing fire events. Downed wood and snag creation within 1,132 acres will also be funded and may occur within riparian zones and eventually contribute to large woody debris.

Forest Plan Consistency. Overall the Proposed Action will be consistent with fisheries standards and guidelines in the Forest Plan, included at the beginning of this section. As listed above, the implementation of mitigation measures and CMP will maintain, enhance and protect habitats of resident and anadromous fish on and off the Forest through placing large woody debris at affected streams, reducing fire risks, avoiding use of pesticides, improving stream crossings that will reduce blockage and sediment delivery. The PCGP Project will not contribute to a negative trend in steelhead viability on the Umpqua National Forest.

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3.0 ROGUE RIVER-SISKIYOU NATIONAL FOREST

Species. The Management Indicator Species for the Rogue River-Siskiyou National Forest are Columbian black-tail deer, Roosevelt elk, pine marten, northern spotted owl, pileated woodpecker, and all woodpeckers (primary cavity nesters). Species are designated as MIS for the following reasons: 1) they are dependent on specialized habitat conditions; 2) they require early, mature, or old-growth forest conditions for optimum habitat; 3) traditional game species; and 4) threatened, endangered, or sensitive species (Forest Service, 1990d).

Wildlife habitat management to rehabilitate, maintain, or improve habitats will emphasize (Forest Service, 1990d) indicator species' habitats, as well as others; examples include signing or creation of wildlife trees, manipulating stand or vegetation structure to optimize habitat components desired, improving nesting and roosting sites, restricting access during key time frames, improving forage, and providing adequate distribution of water sources (Forest Service, 1990d). Black-tailed deer and Roosevelt elk habitat will be managed to provide adequate forage, hiding cover, and thermal cover conditions throughout the summer and winter range. The pine marten, pileated woodpecker, and spotted owl represent mature and old-growth forest habitat conditions.

The northern spotted owl is now listed under the Endangered Species Act and its status is covered extensively under separate cover in the Biological Assessment.

Management Strategies 26, Restricted Riparian, and 28 are the only management strategies affected by the project. Management Strategy 26 encompasses 19,512 acres (Forest Service, 1990d).

Habitats. MIS on the Rogue River-Siskiyou National Forest are associated with a variety of habitats found throughout the forest. However, the PCGP Project will affect only those habitats included in Table 3-1, below. In Table 3-1, the areas (acres) of existing forested habitats (Montane Mixed Conifer Forest and Southwest Oregon Mixed Conifer-Hardwood Forest) within one or more seral stages (clearcut-regenerating forest, mid-seral forest, late successional-old growth forest) that will be removed during construction and affected during operation are provided in addition to all other affected habitat type categories. Effects by the project have been summarized by project component (facility) during construction and during operation of the pipeline. Generally, most long-term disturbance by the project is due to a 30-foot wide maintenance corridor, centered on the pipeline, that is maintained in a herbaceous and/or shrub state for the life of the project. Table 3-1 is referenced in discussions for each MIS in the sections, below.

The forested habitat (Johnson and O'Neil, 2001) corresponds to vegetation categories described by the Oregon Gap Analysis Project (Oregon Gap; Kagan et al., 1999) and mapped in the project area. For Southwest Oregon Mixed Conifer-Hardwood Forest, the corresponding vegetation categories include 1) Douglas-fir-White Fir/Tanoak-Madrone Mixed Forest, and 2) Douglas-fir Dominant-Mixed Conifer Forest (Kagan et al., 1999) and were discussed above for the Umpqua National Forest.

Montane Mixed Conifer Forest habitat (Johnson and O'Neil, 2001) in Table 3-1 corresponds to the True Fir-Hemlock Montane Forest vegetation type (Kagan et al., 1999) which is described as multi-story closed canopy forests. It also has canopy co-dominance of Pacific silver fir and/or noble fir along with both western and mountain hemlock. Other tree species present may include Douglas-fir, western white pine, subalpine fir, Alaska yellow cedar, and grand fir. Shrub layer is dense and diverse with a number of deciduous and evergreen shrubs. It is found in middle to higher elevations (Kagan et al., 1999).

Table 3-1
Summary of Construction and Operation-Related Disturbance (acres[1]) to Corresponding Wildlife Habitat Categories (Johnson and O'Neil, 2001) in the Rogue River-Siskiyou National Forest

Facility	Forest –Woodland Seral Stage[2]	Forest-Woodland			Grassland-Shrubland		Developed		Open Water	Total
		Montane Mixed Conifer Forest	Southwest Oregon Mixed Conifer-Hardwood Forest	Forest-Woodland Sub-Total	Shrub-Steppe	Grasslands	Developed-Urban and Mixed Environs	Roads		
CONSTRUCTION DISTURBANCE										
Pipeline Facilities										
Construction Right-of-Way	**L-O**	11.95	59.38	71.33	1.87	2.06		9.42	0.14	157.2
	M-S	6.71	5.22	11.93						
	C-R	22.73	37.71	60.44						
	Tot	41.39	102.31	143.7						
Hydrostatic Discharge Sites[3]	**L-O**									0
	M-S									
	C-R									
	Tot									
Rock Source/ Disposal	**L-O**									0
	M-S									
	C-R									
	Tot									
Temporary Extra Work Areas	**L-O**	0.69	5.34	6.03	4.62	1.70	12.3	3.25		52.14
	M-S	0.17	0.21	0.38						
	C-R	11.72	12.19	23.91						
	Tot	12.58	17.74	30.32						
Uncleared Storage Areas[4]	**L-O**	4.07	32.26	36.33	0.51	0.46		2.51	0.09	70.41
	M-S	3.57	1.30	4.87						
	C-R	11.67	13.98	25.65						
	Tot	19.31	47.54	66.85						
Total Construction Disturbance	**L-O**	16.71	96.98	113.69	7.00	4.22	12.3	15.18	0.23	279.75
	M-S	10.45	6.73	17.18						
	C-R	46.12	63.88	110.00						
	Tot	73.28	167.59	240.87						
OPERATION DISTURBANCE										
Pipeline Facilities										
30-foot Maintenance Corridor	**L-O**	3.96	19.04	23.00	0.58	0.63		2.31	0.04	49.77
	M-S	2.39	1.56	3.95						
	C-R	7.22	12.04	19.26						
	Tot	13.57	32.64	46.21						

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Facility	Forest –Woodland Seral Stage [2]	Forest-Woodland			Grassland-Shrubland		Developed		Open Water	Total
		Montane Mixed Conifer Forest	Southwest Oregon Mixed Conifer-Hardwood Forest	Forest-Woodland Sub-Total	Shrub-Steppe	Grasslands	Developed-Urban and Mixed Environs	Roads		
Total Operation Disturbance	L-O	3.96	19.04	23.00	0.58	0.63		2.31	0.04	49.77
	M-S	2.39	1.56	3.95						
	C-R	7.22	12.04	19.26						
	Tot	13.57	32.64	46.21						

[1] Acres disturbed were evaluated using GIS; footprints for each component (temporary construction right-of-way, temporary extra work areas, temporary access roads, uncleared storage areas, pipe storage yards, aboveground facilities, permanent easement, and 30-foot maintenance corridor) were overlaid on the digitized vegetation coverage.

[2] Forest-Woodland Seral Stages are L-O, Late Succession/Old Growth assumed to be ≥80 years old; M-S, Mid-Seral assumed to be ≥40 but ≤80 years old; C-R, Clearcut-Regenerating Forest assumed to be ≤40 years old.

[3] Small brush or trees may be cleared by a rubber-tired rotary or flail motor (brush hog) or by hand with machetes/chainsaws. No soil disturbance will occur. A rubber-tired or track hoe will be utilized to lay the discharge line and to remove the saturated haybales or filter bags upon completion of hydrostatic discharge.

[4] PCGP uncleared storage areas (UCSAs) will not be cleared of trees during construction. These areas will be used to store forest slash, stumps and dead and downed log materials that will be removed and scattered across the right-of-way after construction during restoration and are considered as temporary insignificant habitat modifications.

Other habitat types affected by the Proposed Action within the Rogue River-Siskiyou National Forest (Table 3-1) include:

Shrub-Steppe is a mosaic of grasses (mostly introduced) and shrubs that include big sagebrush subspecies, such as Wyoming, basin, and mountain. Other shrubs found within this cover type include low, silver, and three-tip sagebrush, and rabbitbrush. A variety of bunchgrasses are scattered with the shrubs, although overgrazing has limited their presence (Kagan et al., 1999).

Grasslands. West of Cascades, Oregon Gap aggregated this category with agriculture. This habitat contains less than 30 percent tree or shrub cover and is generally used for livestock grazing. Bunchgrasses dominate native-dominated sites, with mosses, lichens, and native forbs occurring throughout. Found at lower elevations (Johnson and O'Neil, 2001). Within the PCGP Project area, this vegetation type is found within Coos, Douglas, and Jackson counties.

Other types, Developed-Urban and Mixed Environs, Roads, and Open Water, have similar characteristics to those described above for the Umpqua National Forest.

3.1 Northern Spotted Owl

The NSO was selected as a MIS for mature and old growth habitat in the 1990 Rogue River – Siskiyou National Forest Plan (Forest Service, 1990d). The NSO was proposed for listing under the Endangered Species Act (ESA) when the Rogue River - Siskiyou National Forest's Plan was signed in 1990, and was officially listed as Threatened in 1992. The Northwest Forest Plan (BLM and Forest Service, 1994) amended the Rogue River's Forest Plan (Forest Service, 1990d), and was designed to ensure the population viability of the NSO. In 1994, there were approximately 154,102 acres of suitable NSO NRF habitat that were modeled on the Rogue River – Siskiyou National Forest, and 195 inventoried NSO pairs or resident singles assumed present on the Rogue River – Siskiyou National Forest (Forest Service and BLM, 1994). In 1990, prior to extensive NSO surveys from 1990 to 1994, there was 105 known NSO pair on Rogue River – Siskiyou National Forest (Forest Service, 1990d). Since the NSO is now listed under the Endangered Species Act, it is covered extensively under separate cover in the

Biological Assessment prepared for the Proposed Action. A summary of the status of NSOs and its habitat on Rogue River - Siskiyou National Forest is included here, including affects to NSO habitat by the PCGP Project. Additional information can be reviewed in the Biological Assessment.

Rogue River – Siskiyou National Forest occurs within three physiographic provinces within the range of the northern spotted owl in Oregon: Klamath Mountains, West Cascades, and East Cascades. To assess the current condition of NSO habitat in the Rogue River – Siskiyou National Forest, a new dataset was used to analyze NSO habitat. In 2011, the 2010 Gradient Nearest Neighbor (GNN) dataset (http://www.fsl.orst.edu/lemma/main.php?project=imap&id=home) was used to assess suitable NRF habitat for spotted owls within the NWFP area (see Davis et al. 2011). This model applied to the Rogue River - Siskiyou National Forest predicts that there is approximately 203,402 acres of suitable NSO NRF habitat available, which is an increase of 49,300 acres of suitable NSO habitat from what was predicted in the 1994 Northwest Forest Plan (Forest Service and BLM, 1994). Through surveys for spotted owls that have occurred on the Rogue River – Siskiyou National Forest since 1990, with the majority of recent survey efforts through demographic studies, there are more than 195 pairs of NSO or resident singles documented to have occurred or are occurring on the Rogue River – Siskiyou National Forest (Rogue River – Siskiyou National Forest, 2013 GIS data layer). This is similar to the number of NSO pairs and resident singles documented on Rogue River - Siskiyou National Forest as reported in the 1994 Northwest Forest Plan (Forest Service and BLM, 1994).

The proposed PCGP Project affects NSO habitat (high NRF, NRF, dispersal only, and capable habitat as defined by FWS in the Conservation Framework developed for the Proposed Action; see PC Trask & Associates, 2013) on Rogue River - Siskiyou National Forest within the West and East Cascades physiographic provinces. All NSO habitat affected from the Proposed Action on Rogue River - Siskiyou National Forest occurs within NSO home ranges; some of the NSO home ranges analyzed for this project on Rogue River – Siskiyou National Forest are not "known" NSO sites, but sites determined to be a "best location" from survey efforts conducted for the PCGP Project. Nineteen NSO home ranges with a radius of 1.2 miles (13 known, 6 PCGP best location) occur within the PCGP Project area and will have NSO habitat affected, including habitat from six NSO core areas (3 known, 3 PCGP best location) and two nest patches (1 known, 1 PCGP best location). Table 3-2, below identifies the amount of NSO habitat removed by the PCGP Project in Rogue River - Siskiyou National Forest. Overall, the PCGP Project would remove approximately 77.38 acres of NRF habitat (high NRF and NRF, combined), which is approximately 0.04 percent of the 203,402 acres of NRF habitat available within Rogue River – Siskiyou National Forest.

Table 3-2
Summary of NSO Habitat Removed (acres)
within Rogue River - Siskiyou National Forest

NSO Habitat	Construction Right-of-Way	Temporary Extra Work Space	Total Habitat Removed
High NRF	2.75	0	2.75
NRF	68.61	6.03	74.63
Dispersal Only	11.93	0.38	12.31
Capable	60.47	23.91	84.38
Total NSO Habitat	**143.76**	**30.32**	**174.08**

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3.2 Columbian Black-tailed Deer

The black tailed deer is listed as an indicator species because of its economic importance in Region 6 (Forest Service, 1990d). The entire Rogue River-Siskiyou National Forest is summer and/or winter range (Forest Service, 1990d) for Columbian black-tailed deer. Summer and winter range habitat are both important to the black-tailed deer since their survival depends on the condition and presence of winter range, and on early successional vegetation stages or non-forest habitat for forage in summer range (Forest Service, 1990d). Deer summer range capability indices are useful indicators for species needing non-forested habitat for survival (Forest Service, 1990d).

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for Columbian black-tailed deer and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines.

- Manage habitat to provide adequate forage, hiding cover, and thermal cover conditions throughout summer and winter range.
- Habitat capability levels are to be consistent with those needed to meet and sustain state big game population benchmark levels, which are the number of deer that must be produced on an ODFW Management Unit before restrictions or regulations designed to limit excessive harvest can begin to be relaxed (Forest Service, 1990d). Benchmarks must be reached prior to initiation of antlerless hunts. (Forest Service, 1990d)
- The Forest Plan allocates 67,700 acres to winter range management. Since 1990, the Forest Plan anticipated that deer winter range carrying capacity would improve as management objectives for deer winter range needs were implemented; these improvements were expected to result in a capability to support up to 16,700 deer, which is 10 percent above the ODFW benchmark level of 15,200 deer (Forest Service, 1990d) on the Forest. Big game winter range timing limitations are December 1-April 30. Construction constraints deem that there shall be no disturbance within designated habitat during that period (App. 3D, 54).

Management Prescriptions. *Management Strategy (MS) 26, Restricted Riparian,* and *MS 28, Late Successional Reserves*.

Management Strategy 26 goals are to protect the riparian habitats associated with perennial streams for wildlife, fishery, and other beneficial uses, and to protect perennial streams from harmful water temperature variations, blockages, and sediment deposits.

- Deer: Maintain summer range to provide forage, hiding, and thermal cover. Restricted operating period Apr 1-June 30 may be imposed in identified fawning or calving areas.
- Recreation-Road Natural: Manage for Retention Visual Quality Objective, by blending and shaping regeneration openings with natural terrain, and assessing visual resource impacts in all project analyses.
- Wildlife, Fish, and Plants: Maintain existing fish habitat capability. If sensitive species are found, avoidance or other mitigation shall be used for species whose viability has been identified as a concern. Specific practices are outlined for the following species: Northern Spotted Owl, osprey, goshawk, woodpeckers, elk, bald eagle, and peregrine falcon.
- Timber: Harvest is not programmed and normally would not occur.
- Water: Evaluate effects on stream courses.

Species Status in the Project Area. Black-tailed deer are found throughout the entire Rogue River-Siskiyou National Forest. ODFW conducts surveys for black-tailed deer within portions of three Oregon Wildlife Management Units (WMU) that occur within the Rogue River – Siskiyou National Forest: Applegate, Dixon, and Rogue. Based on ODFW estimations of total deer population within three ODFW WMUs (Dixon, Applegate, and Rogue), the population of black-tailed deer was estimated at 12,000 animals in Rogue River National Forest at the time of the Rogue River National Forest Plan in 1990. The 1990 Forest Plan estimated that the black-tailed deer population was expected to increase by 15 percent per decade for the first two decades, then return to then-current growth levels and stabilize by the end of the sixth decade (Forest Service, 1990d). Trend data from ODFW indicate that the population had declined by approximately 24 percent since peak years in the early 1960s (Forest Service, 1990d). With the exception of fluctuations generated by extreme weather conditions, the 1990 deer population was described as healthy, and its numbers adequate to provide success to one out of every 4 to 5 hunters (Forest Service, 1990d).

ODFW's Rogue WMU 30 coincides with the portion of the Rogue River National Forest within which the Proposed Action is located (MPs 122.61-168.85). ODFW (2012) has compiled harvest data on black-tailed deer within Wildlife Management Unit 30 for the 2011 season and prior harvest seasons beginning with 2003 (ODFW, 2012). From 2003 through 2011, days per harvest of deer and percent hunter success demonstrate a slight increase in hunter effort per animal harvest from 2004 through 2011, but no significant trends are apparent (Table 3-3).

Thermal cover had become limiting on many areas of the forest by 1990 and for the next 20 to 30 years it was expected that forage could become limiting. As a result, the deer population was expected to remain constant for a time then drop somewhat from 2010-2030. Since deer are not as sensitive to these habitat factors as elk, actual population variations were thought to be less drastic than indicated by the habitat conditions. In 1990, the National Forest Service believed that increased demand for deer hunting might not be met in the future (Forest Service, 1990d); however, that possibility does not appear supported by harvest data in Table 3-3.

Table 3-3
Harvest Statistics for Black-Tailed Deer within the Rogue Wildlife Management Unit 30, 2003-2011

Year	Total Hunters	Total Hunter Days	Harvest			Days per Harvest	Percent Hunter Success
			Total Males (antlered)	Total Non-Males (non-antlered)	Total		
2011	9128	61503	1524	15	1539	40	17
2010	9478	63782	1303	38	1341	48	14
2009	9703	63092	1631	28	1659	38	17
2008	10608	70626	2116	30	2146	33	20
2007	10326	64071	2002	31	2033	32	20
2006	9158	56285	1574	12	1586	35	17
2005	7279	44293	1326	33	1359	33	19
2004	8682	56245	1794	18	1812	31	21
2003	9478	64424	1307	134	1441	45	15

Annual reports for each WMU provided by ODFW include 1) a population index - ODFW's Trend Count for animals in the WMU, conducted along a fixed route each year, usually at the end of winter, 2) productivity (young per female from ODFW's Composition Count data reported in December), and 3) an estimate of the maximum overwinter juvenile survival rate (derived from

composition count data in December and composition count data the following March). There is no significant trend in fawns per doe (young per adult female); however, there is a significant increasing trend in ODFW's Population Index from 1998 through 2012 in Table 3-4 (r-square = 0.4382, P<0.01). Estimated young overwinter survival relative to adult overwinter survival indicates that juvenile black-tailed deer in the Rogue Wildlife Management Unit 30 have had very high overwinter survival rates relative to adult deer - estimates near or greater than 1 - since 1998 (Table 3-4).

Table 3-4
Population Trends, Annual Productivity, and Estimated Overwinter Survival for Juvenile Black-tailed Deer within the Rogue Wildlife Management Unit 30, 1998-2012

Year	Population Index [1]	Young per Adult Female [2]	Young per Adult – Fall (Ratio A) [3]	Young per Adult – Spring (Ratio B) [4]	Maximum Overwinter Juvenile Survival Rate [5]
2012	10.0	0.51	0.38	0.42	1.11
2011	10.7	0.45	0.38	0.51	1.75
2010	10.4	0.39	0.29	0.50	1.93
2009	12.1	0.36	0.26	0.55	2.11
2008	10.2	0.38	0.26	0.49	1.31
2007	10.6	0.53	0.37	0.55	1.43
2006	8.1	0.43	0.38	0.61	1.22
2005	5.5	0.69	0.50	0.63	1.82
2004	-	0.44	0.35	0.45	1.97
2003	6.5	0.29	0.23	0.38	1.10
2002	0.0	0.41	0.34	0.43	1.24
2001	6.0	0.45	0.35	0.57	1.66
2000	7.3	0.43	0.34	0.40	0.88
1999	7.1	0.53	0.45	0.57	1.63
1998	6.7	0.42	0.35	0.42	-

[1] **Population Index** is ODFW's Trend Count for the Hunt Area which is conducted along a fixed route each year, usually at the end of winter (ODFW, 2012).
[2] **Productivity** data is young per female from ODFW's Composition Count data reported as Young per 100 Females counted in December (ODFW, 2012).
[3] **Ratio A** (White et al., 1996) is the ratio of Young per Adult, derived from Composition Count data (Males per 100 Females and Young per 100 Females) counted in December (ODFW, 2012).
[4] **Ratio B** (White et al., 1996) is the ratio of Young per Adult (Young per 100 Adults) counted in March (ODFW, 2012).
[5] **Maximum Overwinter Juvenile Survival** is related to ratios ***A*** and ***B*** and to the following relationship of adult over-winter survival rate ($\hat{S}_a$) and juvenile over-winter survival rate ($\hat{S}_j$) by the formula (see equation 9 in Paulik and Robson, 1969): $\hat{S}_j / \hat{S}_a = \boldsymbol{B}/\boldsymbol{A}$ or $\hat{S}_j = \hat{S}_a\,(\boldsymbol{B}/\boldsymbol{A})$. Since many of the estimates of maximum juvenile survival rates are greater than 1, they indicate survival of adults was less than juveniles over winter which is highly unlikely.

Habitat. Black-tailed deer are year-round residents of the Forest and rely upon several different successional stages of vegetation to meet their life needs. Areas with heavy canopy closure are used during all seasons. In summer, areas of heavy canopy closure are used to facilitate thermal regulation during periods of high temperatures. During winter, heavy canopy closure moderates temperatures and intercepts snowfall during winter storms. The reduction of snow depth under heavy canopy reduces energetic expenditure during movements of deer and provides areas of browse that would normally be under the snow surface. Areas with little or no

overstory canopy cover are important for deer as forage areas. Forest gaps and natural openings provide optimal conditions for shrubs and forbs to grow, which deer depend on for forage. Quality deer ranges provide both forested conditions for thermal regulation and hiding/escape cover interspersed with open areas for optimal foraging conditions.

Deer winter range was considered to be below 4,000 feet elevation in 1990 (Forest Service, 1990d). Core winter range is that portion of total winter range occupied by 90 per cent of the population 90 percent of the winters. If unusually severe snow conditions make core winter range unsuitable, the deer tend to move off-Forest to lower elevation on private and BLM lands. These areas were referred to as critical winter range.

Currently forage habitat for deer is the primary limiting factor on the Rogue River – Siskiyou National Forest, constituting less than ten percent of the Forest land base. The west side of the Forest provides good forage in designated big game winter range for black-tail deer due to a preponderance of low elevation non-conifer forest lands and an active fuels and habitat enhancement program. In 2011, there was approximately 66,451 acres of available forage on Rogue River – Siskiyou National Forest, including 8,837 acres of shrublands and grasslands. Deer thermal and hiding cover have increased significantly across the Forest, although some areas of big game winter range still do not provide the amount prescribed in the Rogue River Management Plan (Forest Service, 1990d). In 2011, there was approximately 203,402 acres of mature forest that is expected to provide both optimal thermal and hiding cover, and an additional 336,360 acres of forested habitat that could provide thermal cover and hiding cover for Columbian black-tailed deer.

Black-tailed deer use of habitats on the Rogue River-Siskiyou National Forest within the vicinity of the proposed action are assumed to be similar to those described above, for black-tailed deer on the Umpqua National Forest. Black-tailed deer have general associations with all terrestrial habitats that are present in the project area including forested-woodland types, grassland-shrubland types, and developed (urban and mixed environs) types (Johnson and O'Neil, 2001). Most black-tailed deer that summer in the high Cascades winter at lower elevations on the west slope, although some wintering deer may occur east of the Cascade crest (ODFW, 2003b). Winter loss of black-tailed deer is generally far less than for mule deer, because the snow does not remain on the valley floors for extended periods and a crust does not form on the surface as it does on the east side of the Cascades (ODFW, 2003b). The Proposed Action will cross 2.0 miles of Lake Creek deer winter range on the Rogue River-Siskiyou National Forest which includes ODFW very sensitive wildlife areas. Lake Creek deer winter range includes approximately 119,325 acres of habitat, of which 8,349 acres occurs within Rogue River – Siskiyou National Forest.

Forest Management Activities. Timber harvest activities have created the most impacts on deer populations. Browse created by conversion of old-growth timber to young, thrifty stands has caused a large expansion in the number of animals. However, in many cases, the amount and arrangement of thermal/hiding cover has not allowed for full utilization of the forage. Development of the road system has also had a detrimental effect due to increased harassment and hunter access (Forest Service, 1990a).

Any pest control that removes palatable grasses, forbs, and brush directly affects the suitability of the habitat; wildfire produces the same effects. However, these activities can also be beneficial if they return the vegetation to more forage-producing seral stages (Forest Service, 1990a).

Effects of Proposed Action: Direct mortality of black-tailed deer due to the Proposed Action is possible if vehicles collide with animals traveling to and from construction sites (see discussion under Umpqua National Forest, Section 2.6, above). Black-tailed deer would be expected to avoid noise from vehicles and/or increased road traffic, blasting, and aerial fly-overs. Seasonal road closures on public lands have been applied to big-game winter range within National Forest lands to minimize the effect of winter stress on deer and elk. Following reclamation of the pipeline corridor, black-tailed deer may utilize the corridor for travel and for foraging, depending on vegetation species planted and rapidity of successful revegetation. After construction of the PCGP Project, there will possibly be a secondary impact (Comer, 1982) on harvest rates with upgraded access to previously inaccessible areas; hunters are expected to achieve greater success, at least temporarily, with increased access. In addition, increased access could increase poaching of game animals and nongame wildlife on a local level (see discussions under Umpqua National Forest, Section 2.6, above).

No information has been found that identifies specific deer fawning areas or fawning habitats within the Rogue River-Siskiyou National Forest. Construction may coincide with fawning generally in late spring (May-early June). Fawning areas may be proximate to winter ranges or may be at higher elevations than winter range. If construction is in progress, parturient females will most likely avoid construction areas though the extent (distance) of avoidance cannot be estimated. Avoidance of construction areas by big game during winter and during parturition is also expected and may adversely affect animals in one or more ways, including increased energy expense if they escape from disturbances or are displaced to areas of deeper snow accumulation, use of suboptimal habitats that do not provide adequate functions (food, shelter, escape cover), and use of habitats that increase the risk of predation. The expected consequences of these responses would be decreased over-winter survival and decreased natality potentially related to embryo resorption, abortion, and/or predation of neonates (for example, see Bradshaw et al., 1998).

Construction of the PCGP Project will remove 174 acres of forested habitat (Table 3-1) including 77 acres of late successional-old growth, 12 acres of mid-seral forest, and 84 acres of clearcut-regenerating forest within Rogue River – Siskiyou National Forest. Black-tailed deer are likely to be generally associated with the forest types affected and all structural conditions of affected forest (shrub-seedling, small tree, medium tree, large tree, giant tree, single and multi-story forests, open, moderate, and closed canopy forests). An additional 67 acres of forested habitat would be affected in the short-term within Uncleared Storage Areas (UCSAs). The project will remove approximately 6 acres of shrub, 4 acres of grassland, and 12 acres of developed urban environs. Black-tailed deer are generally associated with a variety of shrub/grassland structural conditions, grass-forb habitats, and low density urban conditions (Johnson and O'Neil, 2001). Given that black-tailed deer are such generalists, effects to any one type of structural habitat condition with replacement by another structural stage (eg. shrub-seedling, grass-forb) will not adversely affect the species.

Removal of 174 acres of forested habitat (77 acres of late successional/old-growth habitat) and 22 acres of non-forested habitat, which is approximately 0.04 percent of available optimal thermal cover habitat (203,402 acres), 0.29 percent of available foraging habitat (66,451 acres), and 0.03 percent of available hiding cover (539,762 acres), is not expected to have an impact on the local or regional population of Columbian black-tailed deer. The overall effects will result in a small and insignificant reduction in thermal and hiding cover with the removal of forested habitat immediately after construction, but will increase available forage for black-tailed deer within the revegetated right-of-way within the maintenance corridor for the life of the Project. Given that black-tailed deer are such habitat generalists, effects to any one type of structural

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habitat condition with replacement by another structural stage (eg. shrub-seedling, grass-forb) will not adversely affect the species.

Approximately 31 acres of habitat (26 forested acres and 5 acres of non-forested habitat) removed will occur within Lake Creek deer winter range on Rogue River – Siskiyou National Forest, which is approximately 0.4 percent of the available 8,349 acres of deer winter range that occur within the Lake Creek unit on the Forest. Removal of such a small percentage of designated winter range habitat is not expected to affect black-tailed deer on the Rogue River – Siskiyou National Forest.

Mitigation. The Proposed Action will cross approximately 2.0 miles of Lake Creek deer winter range on the Rogue River-Siskiyou National Forest and remove approximately 31 acres of forested and non-forested habitat, which includes ODFW very sensitive wildlife areas. Mainline and facility construction is planned to begin spring 2016 with the in-service date scheduled for fourth quarter 2017. Timber clearing will occur concurrent, but prior to construction. Construction and timber removal activities in 2016 and 2017 are scheduled to take advantage of the drier periods of the year to minimize winter construction, to reduce potential environmental impacts and construction safety risks, and ultimately reduce disturbance to black-tailed deer utilizing big game winter range. No spotted owl activity centers are within 0.25 mile of the PCGP Project in Lake Creek deer winter range, therefore no timber harvest is expected to be scheduled outside of the NSO breeding season during the winter months. Impact to wintering Columbian black-tailed deer should be minimized during timber removal and construction activities.

After pipeline construction, deer use open areas for foraging (Jageman, 1994). The PCGP Project right-of-way provides an opportunity for developing high quality feeding areas (Lees, 1989) for deer species, especially if noxious weeds are controlled and high quality native forage is seeded. As required by FERC's Upland Plan, Pacific Connector consulted with the NRCS, the BLM, and the Forest Service regarding specific seeding dates and recommended seed mixtures for the project area, including an important winter forage species, wedgeleaf ceanothus, in riparian areas and areas outside of the 30-foot maintenance corridor on National Forest lands. The recommendations have been incorporated into the project-specific ECRP. The ECRP describes the procedures that will be implemented to minimize erosion and enhance revegetation success for the entire project, the procedures that will be utilized to minimize the spread of noxious weeds as a result of project construction, and describes the silvicultural prescriptions that will be implemented in areas that are outside the 30-foot maintenance corridor. Seeding mixtures and inhibition of noxious weeds will enhance forage production. Restoration of construction disturbance is expected to begin once construction is completed; restoration would start as early as fall 2016 and continue into 2017 and would be completed by the end of the winter season in early 2017/2018 when forest, wetland, and riparian plantings would be installed. Depending on site-specific conditions, it may be necessary to continue restoration through spring 2018.

Vegetation management over the long-term will benefit winter range browse and forage for Columbian black-tailed deer. Vegetation within the 30-foot maintenance corridor will be periodically maintained by mowing, cutting, and trimming (either by mechanical or hand methods). In upland areas, the 30-foot maintenance corridor will be maintained in a condition where trees or shrubs greater than 6 feet tall will be controlled (cut or trimmed) within 15 feet either side of the centerline (for a total of 30 cleared feet). Maintenance activities are expected to occur approximately every 3 to 5 years depending on the growth rate of vegetation. During maintenance, vegetation will be cut/trimmed in 4 to 6-foot lengths and scattered across the

permanent easement to naturally decompose and to discourage OHV traffic, benefit wildlife habitat, and to decompose naturally.

Open trenches during PCGP Project construction have the potential to entrap deer. Within delineated big-game winter and summer range, Pacific Connector will leave trench segments (>5 feet wide) of the proposed pipeline alignment untrenched and herbaceously vegetated (every 0.5 mile and at visible wildlife game trails) to serve as a route (i.e., green bridge or landscape connector) for big game across the construction right-of-way until pipe is ready to be installed (Forman et al., 2003). Alternatively, Pacific Connector will install soft plugs (backfilled trench materials) in the trench after excavation at these distances to provide wildlife passage. Additionally, 20-foot gaps will be left in spoil and topsoil stockpiles at all hard or soft plug locations and a corresponding gap in the welded pipe string will be left in these locations. Suitable ramps will be installed from the bottom of the trench to the top to prevent potential wildlife entrapment within the trench.

Forest Plan Consistency. On the Rogue River-Siskiyou National Forest, big game winter range timing limitations are December 1 to April 30. Construction activities would occur within approximately 2.0 miles of designated big game winter range on the Rogue River – Siskiyou National Forest and could occur during those timing limitations. However, Pacific Connector would target the drier periods of the year to construct the pipeline, where possible, which would minimize disturbance to black-tailed deer within designated habitat during that period. Big game travel lanes will not be blocked by construction or operation of the Proposed Action. Columbian black-tailed deer are expected to utilize the project right-of-way for travel and foraging and was discussed, above.

Since there is no significant trend in fawns per doe (young per adult female) nor is the any significant trend in ODFW's Trend Count for deer in the Rogue Wildlife Management Unit 30 **(**Table 3-4), there is no reason to expect that deer winter range carrying capacity on the Rouge River – Siskiyou National Forest would be limited by the Proposed Action. Indeed, estimated young overwinter survival relative to adult overwinter survival indicates that juvenile black-tailed deer in the Rogue Wildlife Management Unit 30 have had very high overwinter survival rates relative to adults (Table 3-4) which may indicate carrying capacity objectives of the Forest are being achieved. The Proposed Action would be consistent with the Forest Plan.

Because the PCGP Project affects less than 0.1 percent of deer thermal cover / hiding cover across the Rogue River – Siskiyou National Forest, and will increase the amount of available forage for deer within the maintained 30-foot pipeline corridor, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the Columbian black-tail deer is expected on Rogue River - Siskiyou National Forest.

3.3 Roosevelt Elk

Roosevelt elk was selected as a management indicator species because of the species economic importance and demand for elk hunting. Elk were chosen as an indicator for winter range and thermal cover. The Roosevelt elk is dependent on winter range for survival (Forest Service, 1990d). The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for Roosevelt elk and their habitat:

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Applicable Forest Plan Forestwide Standards and Guidelines.
The management of Roosevelt elk winter range is critical for the maintenance of existing herds, and even more so in order to increase the population. Winter range generally lies below 4,000 feet, but can be quite variable. It can be divided into three separate areas based on amount and type of use, which include core, critical, and peripheral areas. Core winter range is utilized by 90 percent of the animals during 90 percent of the winters. Peripheral winter range is an area used by a few animals in most winters or by large numbers during mild winters; it does little in maintaining the big game population since either few animals use it or conditions are mild so that little stress is placed on the animals. Critical winter range is the area the animals concentrate in during extremely severe winters. It is usually a small segment of the core winter range that is located at the lowest elevations or otherwise provides a special set of properties which allow survival under extreme conditions. Critical winter range is most useful in preventing total loss of a population during extremely severe winters. Under these conditions, a large proportion of the wintering animals are either trapped on less favorable areas or are otherwise unable to move to critical winter range. Sufficient numbers are able to survive on these critical winter range areas to repopulate the summer range, should large numbers of animals die on the other winter range areas (Forest Service, 1990a).

Management Prescription. *MS 26, Restricted Riparian*

- Elk: Maintain summer range to provide forage, hiding and thermal cover. Restricted operating period April 1 to June 30 may be imposed in identified fawning or calving areas.
- See description for Black-tailed deer, Section 2.1, above.

Species Status in the Project Area. The historic elk population in the vicinity of the Rogue River-Siskiyou National Forest was affected by the loss of cover on much of the lands beyond the forest boundaries, which resulted in the loss of much winter range capability off the Forest. This relative lack of cover appears to inhibit migration to the even lower elevation areas that might be capable of supporting the animals; therefore, elk are wintering at higher elevations than they historically may have, resulting in winter range being a limiting factor to further growth of the present elk herds. The opportunity for further recolonization of the remaining habitat on the Dead Indian Plateau as well as within the Siskiyou Mountains portion of the Forest still remains (Forest Service, 1990d).

In the early 1980s, lower cow/calf ratios and reduced calf-survival rates due to late calf crops occurred. Because of the decline, restrictions were placed on the hunting season and a cooperative road closure program was instituted. The result was an improved bull/cow ratio (11 to 12 bulls/100 cows) for the years following the changes (Forest Service, 1990d). As a result of continued herd expansion into previously unoccupied habitat, the elk population was expected to increase at about 5 percent per year, with occupancy of all available range in next 20 to 30 years, from 2010 through 2030. However, it was not expected that the increases will meet hunter demands because increased restrictions and regulations have been placed upon the hunting public to reduce the pressure on the existing herd (Forest Service, 1990d).

The Rogue River – Siskiyou National Forest falls within portions of six wildlife management units: Sixes, Powers, Chetco, Applegate, Dixon, and Rogue. Elk are found throughout the Rogue River-Siskiyou National Forest, except within the Applegate Management Area. Data from ODFW's elk census shows annual fluctuations (ODFW, 2012), but in general, show a steady increase in elk numbers throughout the 1980's. Elk numbers peaked in the early 1990's and remained relatively stable until the early 2000's when they show a slight decline.

ODFW's Rogue WMU 30 coincides with the portion of the Rogue River-Siskiyou National Forest within which the Proposed Action is located (MPs 122.61 – 168.85). ODFW (2012) has compiled harvest data for Roosevelt elk within WMU 30 for the 2011 season and prior harvest seasons beginning with 2003 (ODFW, 2012). ODFW harvest data from 2003 through 2011 indicate that days per harvest of Roosevelt elk and percent hunter success have been relatively consistent, showing no significant trends (Table 3-5).

Table 3-5
Harvest Statistics for Roosevelt Elk within the Rogue Wildlife Management Unit 30, 2003-2011

Year	Total Hunters	Total Hunter Days	Harvest			Days per Harvest	Percent Hunter Success
			Total Males (antlered)	Total Non-Males (non-antlered)	Total		
2011	3193	18163	134	63	197	92	6
2010	3142	18753	109	90	199	94	6
2009	3244	18299	130	97	227	81	7
2008	3974	21753	145	119	264	82	7
2007	3645	18790	144	106	250	75	7
2006	3280	17125	167	76	243	70	7
2005	3289	16703	156	50	206	81	6
2004	3651	21971	142	64	206	107	6
2003	4248	24286	198	125	323	75	8

As of 1990, the population had been increasing 5 to 8 percent per year, with an estimated existing population of 900 animals. Expansion depends on the condition and availability of winter range, both on and off the National Forest, and the quality of habitat available on summer range. A predictive model, assuming adequate core winter range and based upon seral stages and road use factors, indicates a capability to support about 1,800 elk on the Prospect and Butte Falls Districts. If elk occupied all available habitat on Rogue River-Siskiyou National Forest, a capability to support over 3,000 elk was predicted (Forest Service, 1990d).

Although population data for Roosevelt elk in Wildlife Management Unit 30 are limited, the number of calves per adult cow (young per adult female) appear to have been declining since 1998, but the trend is not significant (Table 3-6). However, the limited population index for Roosevelt elk in the Rogue WMU shows a significant decreasing trend ($P<0.05$) from 1999 through 2004 (Figure 3-1). No population indices are available beyond 2004.

Table 3-6
Population Trends and Annual Productivity for Roosevelt Elk within the Rogue Wildlife Management Unit 30, 1998-2006

Year	Population Index [1]	Young per Adult Female [2]
2012	-	0.28
2011	-	0.37
2010	-	0.30
2009	-	0.36
2008	-	0.34
2007	-	0.25
2006	-	0.40
2005	-	0.28

Year	Population Index [1]	Young per Adult Female [2]
2004	2.1	0.37
2003	-	0.40
2002	3.0	0.34
2001	2.8	0.34
2000	3.3	0.31
1999	3.9	0.41
1998	-	0.41

[1] **Population Index** is ODFW's Trend Count for the Hunt Area which is conducted along a fixed route each year, usually at the end of winter (ODFW, 2012).
[2] **Productivity** data is young per female from ODFW's Composition Count data reported as Young per 100 Females counted in December (ODFW, 2012).

Based on management of winter range under guidelines in the Forest Plan, improved winter range conditions and a better balance in winter and summer range could result in a capability to support up to 2,700 elk (higher than the ODFW benchmark level of 1,750 animals) within 5 or 6 decades past 1990 (Forest Service, 1990d). However, the population index trend revealed in Figure 3-1 does not indicate that positive population growth has occurred.

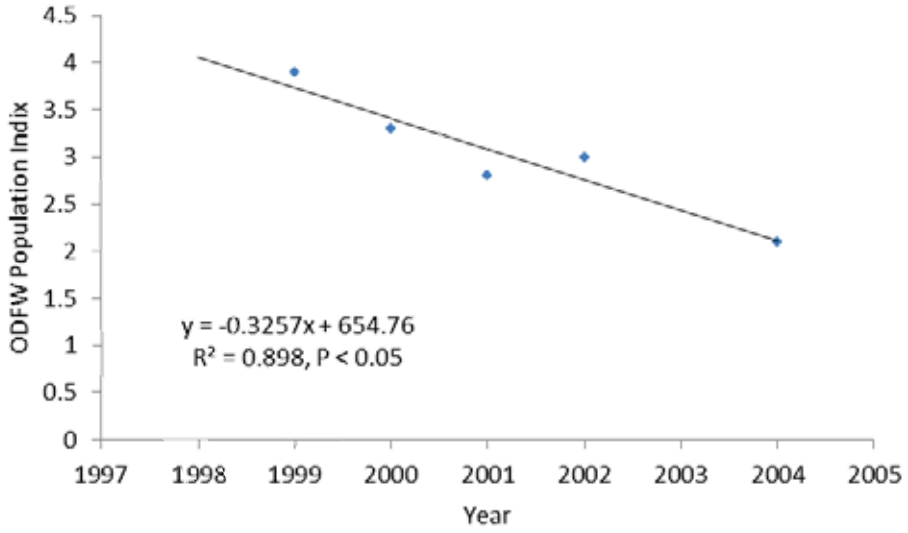


Figure 3-1
Trend in ODFW's Population Index (see footnote to Table 3-5) for Roosevelt Elk in the Rogue Wildlife Management Unit 30 Which Coincides with the PCGP Project on the Rogue River-Siskiyou National Forest

Habitat. The Roosevelt elk is a grazing and browsing animal (Forest Service, 1990d). It forages on ground/shrub or understory vegetation (Johnson and O'Neil, 2001). It is dependent on winter range for survival, and benefits from early successional stages for forage throughout its range (Forest Service, 1990d). Cover is an important component of elk habitat and provides both thermal and hiding properties. During summer it provides cooler, shaded areas for elk to bed during the heat of the day. During winter it provides a warmer, protected environment out of

the cold, wind, rain, or snow. Lichens and other plants associated with cover can be an important source of forage for wintering animals. Adequate thermal cover reduces the energy needed by elk and contributes to over winter survival (ODFW, 2003d). During winters of heavy snowfall, elk in the Cascades move to lower elevations in November and December, and move back up in March and April for spring green-up. Altitudinal movements occur in the Cascade Range, but rarely is snow depth sufficient to cause movements in the Oregon Coast Range (Johnson and O'Neil, 2001).

Winter range is usually within forested sites which provide protection against weather, as well rich with lichens and other plants used as forage (ODFW, 2003b); however, in Jackson County, winter range also consists of other habitat types such as grassy meadows, recent clearcuts, industrial forest lands, agricultural fields, orchards, and urban edges. Most elk range is on BLM and National Forest Service lands (ODFW, 2003b); however, within the PCGP Project area, most winter range occurs on private lands (Forest Service, 1990d). There is insufficient critical elk winter range on the Rogue River-Siskiyou National Forest to carry the ODFW benchmark level of 2,000 animals during severe winters, resulting in increased dependence on private land pastures as elk winter range with resulting conflicts from loss of needed livestock forage and/or damage to property or tree seedlings (Forest Service, 1990a). Since inception of the NWFP (Forest Service and BLM, 1994), the Rogue River National Forest has emphasized retention of both nesting/roosting/foraging (NRF) and dispersal habitats for northern spotted owl. An increase in NSO NRF and dispersal habitat has also provided additional optimal thermal cover for elk.

Elk winter range occurs mostly on the Butte Falls and Prospect Ranger Districts, of which approximately 30 percent of winter range has been identified as core winter range. In good condition, core winter range can relieve some of the burden from the critical winter range areas, since fewer animals will die even in the extreme winters. All critical winter range on the Forest is located within the core winter range (Forest Service, 1990d).

In 2011, there was approximately 66,451 acres of available forage on Rogue River – Siskiyou National Forest, including 8,837 acres of shrublands and grasslands, which was a significant increase from 18,354 acres estimated in the 1994 NWFP. In 2011, there was approximately 203,402 acres of mature forest that is expected to provide both optimal thermal and hiding cover, and an additional 336,360 acres of forested habitat that could provide hiding cover/thermal cover for Roosevelt elk. This was also an increase from the amount of thermal and hiding cover estimated in the 1994 NWFP: approximately 63,181 acres of mature forest was expected to provide optimal thermal cover and hiding cover for elk, and an additional 355,605 acres of other forested habitat was expected to provide hiding cover/thermal cover for Roosevelt elk.

Roosevelt elk have general associations with Montane Mixed Conifer and Southwest Oregon Mixed Conifer-Hardwood forested types, Westside Grasslands, and may be present in Urban and Mixed Environs (Johnson and O'Neil, 2001). They have no apparent association with Shrub-Steppe habitats (Johnson and O'Neil, 2001) that will be affected by the Proposed Action within the Rogue River-Siskiyou National Forest.

Forest Management Activities. Current timber harvesting has created a large amount of available forage but has also decreased available thermal and hiding cover. Total cover has remained at or above adequate levels, although the distribution is not great, with large distances between cover patches in some areas, and thermal cover shortages in other areas. This may be limiting some sub-populations to 20 percent of their potential. During warm summers, heat

build-up on an exposed animal creates a heavy thermal load which takes energy to eliminate. This energy could have been stored as fat for winter (Forest Service, 1990a).

Much of the land adjacent to the forest is capable of being winter range. Due to harvest practices on these adjacent lands, much of the winter range carrying capacity has been lost. Much of the forest's summertime elk population historically wintered on these adjacent lands. As the population increases, it is expected that there will be increased conflicts with private landowners, resulting in increased pressure on the remaining forest winter range (Forest Service, 1990a).

Due to past timber harvest, an imbalance in forage and cover is likely to occur from 2010 to 2030. At that time, existing harvest areas will likely have reached the pole seral stage and will be shading out most forage production, and there will not be sufficient remaining older stands to be harvested to provide adequate replacement forage areas (Forest Service, 1990a). Forage needed to meet deer and elk needs on winter range portion of range allotments is reserved for wildlife, which could result in restrictions in grazing allotments if forage production is inadequate. In 1990, there were problems in some riparian zones and meadows, and it was felt that the conflicts would increase in subsequent years (Forest Service, 1990a).

Any pest management activities that remove grass or browse species in summer or winter range can affect the elk. Wildfire creates habitat if sufficient thermal and hiding cover remain; fire suppression has decreased elk habitat to some extent over the last 50 years since it has allowed the early seral stages to mature, thereby reducing forage supply. However, controlled fire activities after timber harvest have created favorable seral stages for expansion of the population. The most critical habitat problems for summer range are: road development, loss of forage areas, and difficulties in managing the road system to lessen impacts on elk (Forest Service, 1990a).

Numerous studies have shown that Roosevelt elk are sensitive to human disturbances such as motorized travel on and off roads (Rowland et al., 2000). Roads are generally avoided by elk when they are open, but are heavily utilized by elk as travel corridors when closed (ODFW, 2003b).

Effects of the Proposed Action. Direct mortality of Roosevelt elk due to the Proposed Action is possible if vehicles collide with animals traveling to and from construction sites (see discussion under Umpqua National Forest, Section 2.5, above). Elk would be expected to avoid noise from vehicles and/or increased road traffic, blasting, and aerial fly-overs. Seasonal road closures on public lands have been applied to big-game winter range within National Forest lands to minimize the effect of winter stress on deer and elk. Following reclamation of the pipeline corridor, Roosevelt elk may utilize the corridor for travel and for foraging (Brusnyk and Westworth, 1985), depending on vegetation species planted and rapidity of successful revegetation. After construction of the PCGP Project, there will possibly be a secondary impact (Comer, 1982) on harvest rates with upgraded access to previously inaccessible areas; hunters are expected to achieve greater success, at least temporarily, with increased access. In addition, increased access could increase poaching of game animals and nongame wildlife on a local level (see discussions under Umpqua National Forest, Section 2.5, above).

Unlike big game winter ranges, no information has been provided that identifies specific elk calving areas or habitats. Even so, with elk habitats distributed throughout the project area, construction may coincide with calving times, generally in late spring (May to early June). Calving areas may be proximate to winter ranges or may be at higher elevations than winter

range. If construction is in progress, parturient females will most likely avoid construction areas though the extent (distance) of avoidance cannot be estimated. Avoidance of construction areas by big game during winter and during parturition is also expected and may adversely affect animals in one or more ways, including increased energy expense if they escape from disturbances or are displaced to areas of deeper snow accumulation, use of suboptimal habitats that do not provide adequate functions (food, shelter, escape cover), and use of habitats that increase the risk of predation. The expected consequences of these responses would be decreased over-winter survival and decreased natality potentially related to embryo resorption, abortion, and/or predation of neonates (for example, see Bradshaw et al., 1998).

Construction of the PCGP Project will remove 174 acres of Montane Mixed Conifer Forest and Southwest Oregon Mixed Conifer-Hardwood Forest within Rogue River – Siskiyou National Forest (Table 3-1), both of which have general associations with Roosevelt elk. Effects to those two forest types include removing 77 acres of late successional-old growth, 12 acres of mid-seral forest, and 84 acres of clearcut-regenerating forest. Roosevelt elk are likely to be generally associated with the forest types affected and all structural conditions of affected forest (shrub-seedling, small tree, medium tree, large tree, giant tree, single and multi-story forest,,open, moderate, and closed canopy forests). An additional 67 acres of forested habitat would be affected in the short-term within Uncleared Storage Areas (UCSAs). The project will remove approximately 6 acres of shrub, 4 acres of grassland, and 12 acres of developed urban environs. Roosevelt elk are generally associated with a variety of shrub/grassland structural conditions, grass-forb habitats, and low density urban conditions (Johnson and O'Neil, 2001). Given that Roosevelt elk are such generalists, effects to any one type of structural habitat condition with replacement by another structural stage (e.g. shrub-seedling, grass-forb) will not adversely affect the species. The Proposed Action will affect elk winter range but not affect core winter range within the Forest.

Removal of 174 acres of forested habitat (77 acres of late successional/old-growth habitat) and 22 acres of non-forested habitat, which is approximately 0.04 percent of available optimal thermal cover habitat (203,402 acres), 0.29 percent of available foraging habitat (66,451 acres), and 0.03 percent of available hiding cover (539,762 acres), is not expected to have an impact on the local or regional population of Roosevelt elk. The overall effects will result in a small and insignificant reduction in thermal and hiding cover with the removal of forested habitat immediately after construction, but will increase available forage for elk within the revegetated right-of-way within the maintenance corridor for the life of the Project.

Mitigation. The Proposed Action will cross approximately 2.0 miles of Lake Creek winter range on the Rogue River-Siskiyou National Forest, which includes ODFW very sensitive wildlife areas. Mainline and facility construction is planned to begin spring 2016 with the in-service date scheduled for fourth quarter 2017. Timber clearing will occur concurrent, but prior to construction. Construction and timber removal activities in 2016 and 2017 are scheduled to take advantage of the drier periods of the year to minimize winter construction, to reduce potential environmental impacts and construction safety risks, and ultimately reduce disturbance to Roosevelt elk utilizing big game winter range. Therefore impact to wintering Roosevelt elk should be minimized during timber removal and construction activities.

Open trenches during PCGP Project construction have the potential to entrap elk. Within delineated big-game winter and summer range, Pacific Connector will leave trench segments (>5 feet wide) of the proposed pipeline alignment untrenched and herbaceously vegetated (every 0.5 mile and at visible wildlife game trails) to serve as a route (i.e., green bridge or landscape connector) for big game across the construction right-of-way until pipe is ready to be

installed (Forman et al., 2003). Alternatively, Pacific Connector will install soft plugs (backfilled trench materials) in the trench after excavation at these distances to provide wildlife passage. Additionally, 20-foot gaps will be left in spoil and topsoil stockpiles at all hard or soft plug locations and a corresponding gap in the welded pipe string will be left in these locations. Suitable ramps will be installed from the bottom of the trench to the top to prevent potential wildlife entrapment within the trench.

After pipeline construction, elk tend to use pipeline rights-of-way for feeding areas, especially when hunting is not occurring (Lees, 1989). The PCGP Project right-of-way provides an opportunity for developing high quality feeding areas (Lees, 1989) for elk species, especially if noxious weeds are controlled and high quality native forage is seeded. Big-game winter range disturbed by the PCGP Project during construction will be revegetated with preferred elk forage species as recommended by ODFW, BLM, and Forest Service, including an important winter forage species, wedgeleaf ceanothus, in riparian areas and areas outside of the 30-foot maintenance corridor on National Forest lands.

The recommendations have been incorporated into the project-specific ECRP. The ECRP describes the procedures that will be implemented to minimize erosion and enhance revegetation success for the entire project, describes the procedures that will be utilized to minimize the spread of noxious weeds as a result of project construction,and describes the silvicultural prescriptions that will be implemented in areas that are outside the permanent easement. Seeding mixtures and inhibition of noxious weeds will enhance forage production.

Vegetation within the 30-foot wide maintenance corridor will be periodically maintained by mowing, cutting, and trimming (either by mechanical or hand methods). In upland areas, the 30-foot maintenance corridor will be maintained in a condition where trees or shrubs greater than 6 feet tall will be controlled (cut or trimmed) within 15 feet either side of the centerline (for a total of 30 cleared feet). Maintenance activities are expected to occur approximately every 3-5 years depending on the growth rate of vegetation. During maintenance, vegetation will be cut/trimmed in 4 to 6-foot lengths and scattered across the permanent easement to naturally decompose and to discourage OHV traffic, benefit wildlife habitat, and to decompose naturally. Vegetation management over the long-term will benefit winter range forage for Roosevelt elk.

Forest Plan Consistency. On the Rogue River-Siskiyou National Forest, big game winter range timing limitations are December 1 to April 30. Construction activities would occur within approximately 2.0 miles of designated big game winter range on the Rogue River – Siskiyou National Forest and could occur during those timing limitations. However, Pacific Connector would target the drier periods of the year to construct the pipeline, where possible, which would minimize disturbance to Roosevelt elk within designated habitat during that period. Additionally, big game travel lanes will not be blocked by construction or operation of the Proposed Action.

Based on management of winter range under guidelines in the Forest Plan, improved winter range conditions and a better balance in winter and summer range could result in a capability to support up to 2,700 elk (higher than the ODFW benchmark level of 1,750 animals) within 5 or 6 decades past 1990 (Forest Service, 1990d). However, the population index trend revealed in Figure 3-1 does not indicate that positive population growth has occurred. Roosevelt elk are expected to utilize the project right-of-way for travel and foraging. The Proposed Action would be consistent with the Forest Plan.

Because the PCGP Project affects less than 0.1 percent of elk thermal cover / hiding cover across the Rogue River – Siskiyou National Forest, and will increase the amount of available

forage for elk within the maintained 30-foot pipeline corridor, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the Roosevelt elk is expected on Rogue River - Siskiyou National Forest.

3.4 American (Pine) Marten

The Pine marten is an indicator species for all species dependent upon mature and old-growth habitat (Forest Service, 1990d). Pine martens represent those species utilizing mature conifer forests which need mature habitat areas spaced closer than 5 to 6 miles apart. They are not generally found at elevations below 4,000 feet on the Forest and do not appear to have an upper elevation restriction, which makes it an especially important indicator for those species capable of utilizing high elevation habitat or that are less mobile than either the northern spotted owl or pileated woodpecker (Forest Service, 1990a).

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for pine martens and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines. *None specified for MS 26, but these are the general guides for the Forest:*

- Habitat capability objectives have been set in each Management Area, ranging from 40 percent of potential population capability in Areas programmed for intensive timber harvest, to 100 percent of potential capability in Areas with less intensive or no scheduled timber production (Forest Service, 1990d).
- The pine marten uses seral stages III-IV, closed sapling pole, large mature, and old growth, with seral stages V and VI its principal habitat. In 1986, the maximum dispersal distance between habitat areas was recommended to be one habitat for every 4,000-5,000 acres. Juvenile marten dispersal up to 25 miles has been observed (Forest Service, 1990d).
- Home ranges are from 160 acres for females with the males ranging up to 15 miles in their activities. A contiguous area of 160 acres (composed of multi-layered stands with a crown closure equal to or greater than 50 percent in mature or old-growth) is considered the minimum necessary (Forest Service, 1990d).

Management Prescriptions. Based on distributional requirements, management requirements are met with the establishment of 29 pine marten areas above 4,000 feet. The combined habitat networks for the spotted owl, pileated woodpecker, and pine marten, along with intertwined riparian, minimum management and reserved areas, serve as interlocking habitat system for all species utilizing older forest and mature habitat (Forest Service, 1990d).

Species Status in the Project Area. Past extensive logging and trapping for pelts led to extirpation in some areas of Oregon; however, martens have been re-introduced to Oregon. On the Rogue River - Siskiyou National Forest, marten are known to occur on the High Cascades, Wild Rivers, Gold Beach and Powers Ranger Districts. There are few and only undocumented records or sighting from the Siskiyou Mountains, namely along the Siskiyou Crest from Mt. Ashland through the Applegate Valley to the Illinois Valley.

Population capabilities were estimated at 250 pairs in 1990 (Forest Service, 1990d). Populations and the mature habitat dependent species they represent are expected to drop 10 to 20 percent in the first 3 to 5 decades, before returning to 1990 or slightly greater levels in

later decades (Forest Service, 1990d). In 1990, there were no comprehensive population surveys. Sightings by the Forest Service have been mapped (with one exception, all sightings were at 4,200 to 6,500 feet elevation) (Forest Service, 1990d). The High Cascades Ranger District conducted numerous presence/absence surveys for forest carnivores throughout the District during the 1990's and 2000's. Throughout these efforts, marten have been found to be prevalent at elevations 4,000 feet and higher. However, an estimate of how many pairs is not available.

ODFW maintains records on Oregon furbearer harvest and catch/unit effort. These records include information on marten in the southern Oregon Cascades and Coast Ranges. Catch/unit effort and total kill is widely variable since 1990, with peaks in the late 1990's. No trend (positive or negative) in population numbers is apparent based on this information (see Table 3-7). Populations in high-elevation habitats are probably stable, but loss of habitat due to human encroachment in low and mid-elevation areas has resulted in population declines and local extirpations (Johnson and O'Neil, 2001).

Table 3-7
Annual County Harvest Summary from ODFW for
Rogue River-Siskiyou National Forest

Forest	County	Total # of martens harvested (1969-present)	Range of years harvest was reported	Range of harvested marten/ year
Rogue River NF	Douglas	167	1971-1992	2-47 /year
	Jackson	47	1973-1994	1-12 /year
	Josephine	0	0	0
	Klamath	525	1969-1995	1-66 per year
	Subtotal	739		
Siskiyou NF	Coos	10	1969-1988	1-4 /year
	Curry	11	1969-1989	1-3 /year
	Josephine	0	0	0
	Subtotal	21		

Habitat. American marten are typically associated with late-seral coniferous forests and closed canopies, large trees, and abundant snags and down wood (Zielinski et al., 2001). Thomas et al. (1993) and FEMAT (1993) also report a strong relationship of marten with riparian areas.

Marten use a variety of structures for rest and den sites. Resting and denning sites offer protection from predation and thermal stress; thus, availability of quality denning sites likely increases the rates of survival and fecundity in marten (Raphael and Jones, 1997). A breeding female pine marten can be supported on 160 acres of quality habitat. Female home range is estimated at 160 acres, although research varies on the necessary size of the area. Pine martens require dead and down material for foraging, cover, and denning, and six down logs/acre is the minimum down material requirement (Forest Service, 1990a). Denning can also take place in slash, snags, and live trees. Densities of snags are relatively high in Montane Mixed Conifer Forests, late-seral stands and naturally provide more dead wood habitat across the landscape than the other habitat types. Montane Mixed Conifer Forests likely provides the best habitat for marten. Only a small portion of the landscape in the lodgepole pine forest, small/medium tree stands are capable of providing dead wood habitat for marten. In Oregon

and Washington, lodgepole pine rarely grows large enough to provide denning or resting sites for marten. However, high density piles of smaller down logs may provide subnivean access points and resting sites (Bull and Blumton, 1999, Bull and Heater, 2000, Jones and Raphael, 1991, Raphael and Jones, 1997).

In addition to providing rest and den sites, down wood is an important component of marten habitat because the primary prey of martens is small mammals associated with down wood. These small mammals include voles (*Microtus sp.*) red-backed voles (*Clethrionomys gapperi*), snowshoe hares (*Lepus americanus*) and squirrels in northeast Oregon (Bull and Blumton, 1999, Bull, 2000). Subnivean (under snow) spaces created by logs provide marten with access to prey during the winter (Bull and Blumton, 1999, Buskirk and Ruggiero, 1994, Sherburne and Bissonette, 1994). Pine martens also eat insects, birds, fruits, and nuts (Forest Service, 1990a).

The marten has a home range of approximately 450 acres. A minimum contiguous area of 160 acres with a crown closure equal to or greater than 50 percent in seral stages V and VI is considered necessary. A maximum spacing of habitat areas (to allow interaction with adjacent animals) is considered to be three miles. Based on distributional requirements, the management requirements of managing habitat to maintain viable populations of wildlife is met with the establishment of 93 pine marten areas above 4,000 feet in elevation (Forest Service, 1990d).

Currently there is far more marten denning and resting habitat available and more habitat within reserve land allocations for marten than was planned for in the original Rogue River National Forest Management Plant. According to the 2010 Gradient Nearest Neighbor (GNN) dataset (http://www.fsl.orst.edu/lemma/main.php?project=imap&id=home), suitable habitat for marten (represented by mature and late-successional forest), on the Forest is currently approximately 116,883 acres; of that, 90,923 acres (78 percent) are in reserve land allocations with no programmed timber harvest. In addition, there are ninety-five 100-acre spotted owl core areas totaling 9,500 acres identified outside of LSRs on the Cascade side of the Forest that also provide for suitable habitat for marten. It is very likely that the forest is providing a sufficient amount of habitat and in a spatial juxtaposition for far more marten pairs than the 93 originally thought to be needed across the Forest to provide for long term viability for this species. The forest believes that the population trend for this species is likely stable and that population viability will be provided for within reserve lands on the forest.

Pine martens are associated with the following habitat types that occur within the Rogue River-Siskiyou forest and which will be affected by construction of the PCGP Project: they are closely associated with Montane Mixed Conifer Forest and occurrence is uncertain in Southwest Oregon Mixed Conifer-Hardwood Forest (Johnson and O'Neil, 2001).

Forest Management Activities. Pest management should not bother pine martens since they usually occur in recently cut-over areas which they use infrequently. Wildfire would have a serious effect (Forest Service, 1990a) on pine martens by destroying ground and overhead cover and consuming dead and down material.

Effects of the Proposed Action. Within Montane Mixed Conifer Forest, pine martens may feed and breed within various forest structural conditions including small tree, medium tree, large tree, and giant tree conditions, single and multi-story, and open moderate and closed canopies, but only if snags, down logs, and/or rock outcrops are present for denning (Johnson and O'Neil, 2001). Removal of approximately 54 acres of Montane Mixed Conifer Forest over approximately 4.0 miles on the eastern portion of Rogue River – Siskiyou National Forest, of

which more than half of the acres crossed are early seral forest (13 acres of late successional-old growth forest, 7 acres of mid-seral forest, and 34 acres of clearcut-regenerating forest) would affect the equivalent of approximately one-third a female home range (160 acres). It is not expected that removal of 54 acres of Montane Mixed Conifer Forest would affect the population of martens on Rogue River – Siskiyou National Forest. Overall, removing approximately 54 acres of Montane Mixed Conifer Forest will affect approximately 0.05 percent of available habitat (116,883 acres) on Rogue River – Siskiyou National Forest. All habitat effects would occur within lands managed as LSRs, reducing the amount of available suitable habitat on reserved lands (90,923 acres) by 0.06 percent.

Parturition takes place in March and April, and mating occurs in June through early August. If pine marten home ranges are assumed to be circular, the diameter of a 160-acre home range would be 3,000 feet. Blasting at one edge of that home range (assuming 200 feet of intervening tree cover) would attenuate to 32 dBA at the far edge of the home range and would attenuate to ambient noise (assumed to be 40 dBA) 1,390 feet away. Noise due to construction would be a short term effect (restricted to the period of constriction) to pine martens and expected to affect them only if their home ranges were on or very close to the construction right-of-way.

Mitigation. Mitigation measures that would minimize impacts to pine martens include planting trees within the right-of-way after construction. Conifers would be planted to within 15 feet of each side of the pipeline centerline. After tree planting, there will be approximately 14 acres of former Montane Mixed Conifer Forest (4 acres of late successional-old growth, 2 acres of mid-seral forest, and 7 acres of clear cut-regenerating forest) that will remain in an herbaceous and/or shrub state within the 30-foot maintenance corridor during the life of the project (Table 3-1).

Approximately 1 mile of forested habitat on Rogue River – Siskiyou National Forest occurs within 0.25 mile of NSO activity centers and will be harvested outside of the NSO breeding season and should not affect breeding or parturition activities of pine martens. Timber removal greater than 0.25 mile of NSO activity centers and construction could occur during the breeding and parturition dates for American marten (March through August); however, the majority of construction within Montane Mixed Conifer Forest occurs within clearcut and regenerating forest (34 acres) and should not affect pine martens denning or resting spots, if present. Also, at least 1 mile of construction within 0.25 mile of NSO activity centers will occur after the NSO critical breeding period (March 1 through July 15) and so should further minimize affects to pine marten, if present. Noise from blasting, if it is required during construction, will be minimized through application of various measures. Mitigation measures commonly applied to blasting of this type include drilling small (2.5-inch) charge holes, stemming the blast holes with sand and placing inert material on top of the blast area (Michael Minor & Associates, 2008).

To mitigate for loss of downed wood and snags within the construction right-of-way, Pacific Connector will create snags in large trees strategically left on the edge of the construction right-of-way by topping and or girdling trees. Those trees will eventually contribute to downed wood along the right-of-way. In addition, the Forest Service has proposed creating snags and placing large wood in habitats adjacent to the proposed pipeline to meet the management objectives of snag densities and enhance areas deficient in coarse woody material. The proposal would treat on up to 1,100 acres and has been incorporated into the CMP and would accelerate the development of late successional habitat characteristics of structure and diversity (snags/large wood) and would create structure by placing large wood across the corridor for use by pine martens and other small wildlife species (large wood). The project would also reduce localized fuel loads while improving habitat in deficient stands (large wood) and provide long-term

structure in the event of fire since larger logs maintain moisture longer and are less likely to be fully consumed by fire.

In addition, Pacific Connector will fund other projects proposed by the Forest Service on the Rogue River-Siskiyou National Forest that include decommissioning 53 to 57.5 miles of roads, commercial and/or pre-commercial thinning on up to 1,240 acres to accelerate development of late successional and old growth habitat characteristics, among other objectives, and reallocating 593 acres from matrix to LSR designation so that forested habitat within former matrix lands will be managed to obtain late successional forest characteristics. Those additional projects would provide benefits to pine martens within the Rogue River-Siskiyou National Forest.

Forest Plan Consistency. Implementation of the mitigation measures is expected to increase potential population capabilities for pine martens in areas that would otherwise be subject to intensive timber harvest and would provide for additional interlocking habitats for species utilizing older forest and mature habitat. In these respects, the Proposed Action would be consistent with the Forest Plan.

Because the PCGP Project affects less than 0.1 percent of available marten denning habitat across the Rogue River - Siskiyou National Forest, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the American marten is expected on Rogue River - Siskiyou National Forest.

3.5 Pileated Woodpecker

The pileated woodpecker is an indicator species for all species dependent upon mature habitat (Forest Service, 1990d). Pileated woodpeckers represent primary cavity-creating and cavity-dwelling species that use large, standing dead trees and mature/old-growth timber when nesting, roosting, and foraging (Forest Service, 1990d). The pileated woodpecker represents over 160 wildlife species utilizing mature forest habitat (Forest Service, 1990a).

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for pileated woodpeckers and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines. Nothing is specified in MS 26 for the pileated woodpecker, although there are specifications for woodpeckers generally, as described in the following section. These are general for the Forest:

- Habitat areas should be 300 acres in size, distributed at least every five and one-half miles, with no programmed timber harvest (Forest Service, 1990d).
- Older forest habitat of 300 acres (trees having diameters of 25 inches dbh or greater) are considered necessary for each pair. Areas should be within 5 miles of each other, center to center, and evenly spaced to allow interaction of birds between suitable territories (Forest Service, 1990a).

Management Prescriptions. Specifications for the pileated woodpecker (from "A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region, USDA Forest Service," June 1986) include a five-mile maximum dispersal distance to one habitat area for every 12,000 to 13,000 acres. The size of areas used by pairs during nesting season has ranged from 320 acres in eastern Oregon to 1,357 acres in western Oregon, and the management requirement calls for 300 acres of old growth or mature timber

containing at least 45 snags greater than 20 inches, plus 300 acres of feeding area (Forest Service, 1990a).

Downed logs serve as important sources of food and 300 acres of mature and old-growth timber (trees having diameters of 21-inches DBH or greater) are considered necessary for each pair. Areas should be within 5 miles of each other, center-to-center, and evenly spaced over the Forest to allow interaction of the birds between suitable territories. Based on distributional requirements, the MR of managing habitat to maintain viable populations of wildlife is met with the establishment of 57 pileated woodpecker areas (Forest Service, 1990a).

When possible, 300 contiguous acres of conifers in seral stage V or VI should be maintained. If not possible, habitat may be arranged in blocks of no less than 50 acres and no more than one quarter mile apart (Forest Service, 1990d)

There are timing limitations from March 1 to July 31, as well as construction constraints, calling for no disturbance within 1,320 feet of active pileated woodpecker nests (Forest Service, 1990d).

Species Status in the Project Area. The Forest Service has no historical trend data for the pileated woodpecker; however, the trend of mature and old-growth habitat has been downward, with an estimated 74 percent loss since mid-1800s. Until the early 1970s, few snags, large down woody material or green replacement trees were left in treated stands, and snags were actively cut to avoid fire hazard. As a result, habitat capability is probably less than the trend in mature and old-growth habitat would indicate. However, as long as sufficient large diameter dead trees and downed material are present, pileated woodpeckers appear to be less sensitive to modifications of mature habitat than some other mature habitat dependent species (Forest Service, 1990a).

As of 1990, there were no population surveys. Some non-mature seral stages can provide part of a woodpecker's needs, and a predictive model recognizing varying population densities by seral stage was developed. This model indicates that a population of approximately 900 birds may be supportable. Based on distributional requirements, the Management Requirements for the Forest are met with nine pileated woodpecker areas (Forest Service, 1990a).

The population capability in 1990 was estimated at 930 pileated woodpecker pairs (Forest Service, 1990d). Populations and the mature habitat dependent species they represent were expected to drop 10 to 20 percent in the first 3 to 5 decades after the Plan, before returning to 1990 or slightly greater levels in later decades (Forest Service, 1990d). In June 1998, a pileated woodpecker was recorded just west of the Forest Service Boundary, approximately 1.7 miles from the proposed project (BLM, 2006).

The same data that were collected on 16 National Biological Survey Breeding Bird Survey (BBS) routes (Sauer et al., 2013) that are within the region of the Rogue River – Siskiyou National Forest and PCGP Project and used to evaluate the regional population trend for BCR 5 are discussed in Section 2.2. During a 20-year period from 1993 through 2012, pileated woodpeckers appear to have been significantly increasing ($P < 0.05$) on BBS routes within the PCGP Project vicinity including the Rogue River-Siskiyou National Forest in BCR 5 (Figure 2-1); however, on a shorter trend (i.e., past 10 years) there has been a slight decline in population within BCR 5 in the vicinity of the Proposed Project, but the decline is not significant.

Habitat. Pileated woodpeckers are found primarily in dense mixed-conifer forests or in deciduous tree stands in valley bottoms. They use mature and older, closed canopy stands for nesting and roosting, but may use younger (40-70 years), closed-canopy stands for foraging if large snags are available; large snags and decadent trees are critical habitat components for pileated woodpeckers; down logs do not appear to be an important foraging substrate for pileated woodpeckers on the west side of Oregon and Washington (Hartwig et al. 2004, Mellen et al. 1992, Raley and Aubry 2006). A new nest cavity is excavated each spring, usually in a dead tree, by each pair. Nest cavities are quite large (mean diameter of 8 inches and depth of 22 inches) and are excavated at an average height of 50 feet above the ground. A pair shares and defends the territory all year, and home ranges are large (Marshall et al., 2006).

On the Rogue River-Siskiyou National Forest, pileated woodpeckers forage exclusively on carpenter ants and wood-boring beetle larvae, mostly in decayed wood (Forest Service, 1990a). Older forest habitat meets foraging needs, and other areas next to and including clearcuts with snags and large down woody material are also used (Forest Service, 1990d). Downed logs are important substrates from which food is obtained. For foraging, the most important things are the presence of the correct sizes and numbers of snags and down logs. The pileated woodpecker, as the largest cavity excavator, is important to cavity users that are incapable of creating their own cavities (Forest Service, 1990a).

Currently, there is far more pileated woodpecker habitat available and more habitat within reserve land allocations for pileated woodpeckers than was planned for in the original 1990 Rogue River Resource Management Plan (Forest Service, 1990d). According to the 2010 Gradient Nearest Neighbor (GNN) dataset (http://www.fsl.orst.edu/lemma/main.php?project=imap&id=home), suitable habitat for pileated woodpeckers, represented by mature and late-successional forest, on the Rogue River – Siskiyou National Forest is approximately 203,402 acres; of that, 133,163 acres (56 percent) are in reserve land allocations with no programmed timber harvest. There are still one hundred and fifty-three 100-acre spotted owl core areas totaling 15,300 acres identified outside of LSRs for the Rogue River National Forest. These core areas also provide suitable habitat for Pileated woodpecker. It is very likely that the Rogue River – Siskiyou National Forest is providing habitat for more pileated woodpecker pairs than the 57 originally thought to be needed across the Forest to provide for long term viability for this species. As a result, it is assumed that the population trend for this species is trending up and that viability will be provided for within reserve lands on the Rogue River - Siskiyou National Forest.

Pileated woodpeckers are generally associated with Montane Mixed Conifer Forest and Southwest Oregon Mixed Conifer-Hardwood Forests (Johnson and O'Neil, 2001) that coincide with the PCGP Project (Table 3-1). Since they are dependent on downed wood and snags, pileated woodpeckers would be most likely to inhabit the old growth or late successional stands (≥80 years old) of those forests included in Table 3-1. However research suggests that only a small portion of the landscape in the Southwest Oregon Mixed Conifer-Hardwood Forest, late-seral stands are likely capable of providing nesting and roosting habitat for pileated woodpecker based on snag densities on unharvested plots (see Mellen-McLean et al., 2009).

Forest Management Activities. Pest management that includes spray would have a detrimental effect. Wildfire would destroy nesting and foraging habitat, but also creates new snag habitats and attracts insect infestations (Forest Service, 1990a).

Timber harvest has the most significant effect on habitat for this woodpecker. Forest fragmentation reduces population density and makes birds more vulnerable to predation.

Harvesting and prescribed burning that eliminates or reduces the number of snags, logs, and cover are detrimental (Marshall et al., 2006).

Effects of the Proposed Action. Pileated woodpeckers could be negatively impacted during construction of the PCGP Project through the same direct and indirect effects that were discussed in Section 2.2 above, for the Umpqua National Forest. Timber removal and construction of the proposed action could occur during the breeding season of pileated woodpeckers (March 1 through July 31) and disturb nesting pileated woodpeckers if located within 0.25 mile of the proposed action. Clearing the right-of-way will modify habitat, changing the seral stage and tree species makeup of occupied forests. Construction will remove 12 acres of late successional-old growth Montane Mixed Conifer Forest and 65 acres of late successional-old growth Southwest Oregon Mixed Conifer-Hardwood Forests (Table 3-1). Additional potential long-term effects to pileated woodpeckers will be removal of 12.3 acres of mid-seral conifer-hardwood forest (≥40 years but ≤80 years old), thereby setting back seral development that would be expected to eventually provide suitable habitat elements for pileated woodpeckers, including downed wood and snags.

The amount of late successional-old growth habitat that would be removed by the project is not expected to have an impact on the local or regional population of pileated woodpeckers which have mean home ranges of 478 hectares or 1,180 acres in western Oregon (Mellen, 1987; Mellen et al., 1992). Removal of approximately 77 acres of late successional-old growth habitat, which is approximately 0.04 percent of available habitat (203,402 acres) on the Forest, is not expected to have an impact on the local or regional population of pileated woodpeckers. If all of the impacted late successional-old growth (77 acres) occurred within a bird's or pair's home range, less than 6.5 percent of one home range would be affected. More likely, the Proposed Action would span several home ranges and the overall effect to any single bird or pair would be less than 6.5 percent removal.

If pileated woodpecker home ranges are assumed to be circular, the diameter of a 1,180-acre home range would be 8,090 feet. Blasting at one edge of that home range would attenuate to 30 dBA at the far edge of the home range and would attenuate to ambient noise (assumed to be 40 dBA) 4,630 feet away or a distance equal to 57 percent the diameter of a home range. Noise due to construction would be a short term effect to pileated woodpeckers and would be expected to affect them within only a portion of their home ranges.

Mitigation. Prior to clearing operations and before or concurrently with timber cruising, Pacific Connector will identify and flag existing snags on the edges of the construction right-of-way and temporary extra work areas where it is feasible to save/conserve them from project clearing operations. These snags will be saved as mitigation to benefit primary and secondary cavity nesting birds, mammals, reptiles, and amphibians. Also during this process, Pacific Connector will flag other large-diameter trees on the edges of the construction right-of-way and temporary extra work areas that can be saved/protected as green recruitment or as habitat/shade trees. Some of these trees would be girdled to create snags to augment the number of snags along the right-of-way to provide habitat structures. See the Leave Tree Protection Plan (Appendix P of the POD).

Other mitigation measures that would minimize impacts to pileated woodpeckers include planting trees within the right-of-way after construction. Conifers would be planted to within 15 feet of each side of the pipeline centerline. After tree planting, there will be 46.21 acres of former forest (23.00 acres of late successional-old growth, 3.95 acres of mid-seral forest, and

19.26 acres of clear cut-regenerating forest) that will remain in an herbaceous and/or shrub state within the 30-foot maintenance corridor during the life of the project (Table 3-1).

Timber removal and construction of the proposed action could occur during the breeding season of pileated woodpeckers (March 1 through July 31) and disturb nesting pileated woodpeckers if located within 0.25 mile of the proposed action. However, disturbance would be minimized in at least 1 mile of the proposed action on Rogue River – Siskiyou National Forest where NSO activity centers occur within 0.25 mile of the proposed action and construction activities would not occur during the NSO critical breeding period (March 1 through July 15). In this same area of NSO presence, timber harvest would occur outside of the entire NSO breeding season (after September 30 but before March 1). Felling trees during this time period will avoid directly impacting young birds during the nesting season. Noise from blasting, if it is required during construction, will be minimized through application of various measures. Mitigation measures commonly applied to blasting of this type include drilling small (2.5-inch) charge holes, stemming the blast holes with sand and placing inert material on top of the blast area (Michael Minor & Associates, 2008).

To mitigate for loss of cavities and snags within the construction right-of-way, Pacific Connector will create snags in large trees strategically left on the edge of the construction right-of-way by topping and or girdling trees. In addition, the Forest Service has proposed creating snags and placing large wood in habitats adjacent to the proposed pipeline to meet the management objectives of snag densities and enhance areas deficient in coarse woody material. The proposal would treat up to 1,100 acres and has been incorporated into the CMP and would accelerate the development of late successional habitat characteristics of structure and diversity (snags/large wood) including suitable nesting structures for pileated woodpeckers. The project would also reduce localized fuel loads while improving habitat in deficient stands (large wood) and provide long-term structure in the event of fire since larger logs maintain moisture longer and are less likely to be fully consumed by fire.

In addition, Pacific Connector will fund other projects proposed by the Forest Service on the Rogue River-Siskiyou National Forest that include decommissioning 53-57.5 miles of roads, commercial and/or pre-commercial thinning on up to 1,240 acres to accelerate development of late successional and old growth habitat characteristic among other objectives, and reallocating 593 acres from matrix to LSR designation so that forested habitat within former matrix lands will be managed to obtain late successional forest characteristics. Those additional projects would provide benefits to pileated within the Rogue River-Siskiyou National Forest. During construction, potential impact to nesting pileated woodpeckers and other species by predatory corvids will be addressed by assuring that all contractors practice appropriate trash containment and removal.

Pacific Connector has also prepared a Migratory Bird Special Purpose Permit Application that identifies additional measures that would be implemented to offset potential effects to pileated woodpeckers.

Forest Plan Consistency. A viability assessment was completed by the Forest Ecosystem Management Assessment Team (FEMAT, 1993). The viability outcome for the pileated woodpecker was 100 percent likelihood of Outcome A – “Habitat is of sufficient quality, distribution, and abundance to allow the species population to stabilize, well distributed across federal lands” (Forest Service and BLM, 1994). This outcome determination was based on provisions of: 1) a large system of late-successional reserves, 2) standards and guidelines for riparian reserves, and 3) retention of green trees, snags, and coarse woody debris within the

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matrix. The Forest Service has been implementing the NWFP and monitoring late-successional habitat trends since 1994. The 10-year monitoring report (Haynes et al. 2006) states "…it appears that the status and trends in abundance, diversity, and ecological functions of older forests are generally consistent with expectations of the Plan. The total area of late-successional and old-growth forest (older forests) has increased at a rate that is somewhat higher than expected, and losses from wildfires are in line with what was anticipated." As a result projects consistent with the NWFP should be expected to maintain viability of late-successional associated species such as the pileated woodpecker.

Implementation of the mitigation measures is expected to increase potential population capabilities for pileated woodpeckers in areas that would otherwise be subject to intensive timber harvest and would provide for additional habitats for species utilizing older forest and mature habitat. In these respects, the Proposed Action would be consistent with the Forest Plan. Although some timber clearing and construction (at least 1 mile where NSO occur within 0.25 mile of the proposed action) would occur outside of the pileated woodpecker nesting season, most timber clearing and construction could occur during the pileated woodpecker nesting season (nesting season: March 1 – July 31), potentially within 1,320 feet of an active pileated woodpecker nest. If that occurred, the action would not be consistent with the Forest Plan. See PCGP's Migratory Bird Special Purpose Permit Application that describes measures that would help offset effects to pileated woodpeckers.

Because the PCGP Project affects less than 0.1 percent of late successional forest associated with pileated woodpecker habitat across the Rogue River – Siskiyou National, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the pileated woodpecker is expected on Rogue River - Siskiyou National Forest.

3.6 Primary Cavity Excavators (nesters)

Primary cavity excavators represent those animals which require dead and defective woody material for nesting, roosting, and foraging. They are the common (northern) flicker (*Colaptes auratus*), hairy woodpecker, and downy woodpecker. This also includes the pileated woodpecker, which is discussed separately (Forest Service, 1990d). Snags and down logs, fairly uniformly distributed, provide critical habitat (Forest Service, 1990d).

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for primary cavity excavators and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines.

- To satisfy cavity nester habitat requirements at 60 percent of their potential maximum population, about 200 snags (ranging from 11 inch diameter to over 25 inch diameter) are needed per 100 acres. Snags must be provided continuously through time, and usable snag life is considered to be 20 to 30 years depending on the tree species (Forest Service, 1990a).

Woodpeckers Management Prescriptions. *MS 26, Restricted Riparian*

- For other details on MS 26, see Deer.
- Leave sufficient wildlife trees in coniferous forests to provide for 100 percent of the potential population levels for cavity nesting species. The distribution of numbers and size class necessary to meet 100 percent per 100 acres as follows:

Species distribution should be representative of the site's original stand. Trees selected for retention should maximize use of the stand's cull component; if this does not exist, the proper number will be selected from the next lower class. Material that satisfies the need for down woody material recruitment will come from existing down material that is a result of a silvicultural treatment and from trees that are designated to meet standing wildlife tree requirements. The long-term LWM goal is 10 to 20 pieces of class I and II logs per acre, and all existing class III, IV, and V, except for incidental amounts.

Additional green merchantable trees will not be designated unless none of the other categories exist. The expected life span of snags or dead trees in mixed conifer working groups is 30 years, and in true fir is 20 years. The silvicultural prescription will describe the total number, size, and species of wildlife trees that will be required through the next full rotation of stand being treated.

Down woody material will be included as part of the silvicultural prescription for each stand, with information for the prescription provided by a wildlife biologist site by site. A certified silviculturist will validate the data and include it in the preparation of the final prescription. The logging system required, reforestation needs, slash disposal requirements, and site preparation needs should be compatible with tree distribution needs.

Primary cavity excavator habitat will be met on areas no larger than 60 acres, including adjacent harvest units, in order to provide well distributed habitat and allow adjacent stands to provide the needed wildlife trees for past harvest units where the adjacent stands plus harvest do not exceed 60 acres. Where past harvest units were very large, adjacent stands within 900 feet would be managed at higher wildlife tree levels to bring the overall area to the 40 percent level. When past harvest units were so large that these methods cannot bring the area to the 40 percent level, the remaining shortage will not be provided for, but will be recorded and tracked. Selection of wildlife trees to make up for past deficits will meet the same selection criteria as in newly treated stands. Green merchantable trees will not be girdled to create wildlife snags, until 5 to 7 years after project completion, in order to capture any mortality that may occur during that time (Forest Service, 1990d).

Species Status in the Project Area. In 1990, it was thought that there was a population capability of 49,000 cavity excavator pairs (woodpeckers other than pileated woodpeckers) in the Forest (Forest Service, 1990d). There was no comprehensive inventory, although they are assumed to be highly correlated to snag levels (Forest Service, 1990a). Based on the 1990 assessment, woodpecker populations (as based on mixes of forest habitat types) would remain relatively constant through the fourth decade and then would increase to 100 percent of populations existing previous to the Plan in the fifth decade (Forest Service, 1990d). It was also expected that habitat capability would remain relatively stable or slightly rise through the fifth decade because more snags would be designated to remain than in the past (Forest Service, 1990d).

The historic trend estimates show that woodpeckers seem to be decreasing due to loss of snag habitat through timber harvest and firewood cutting activities. The viable population that would preserve the gene pool is undetermined. The habitat needed to maintain primary cavity excavators at 20 percent of their potential population (minimum viable level) is considered to be 45 snags per 100 acres. The habitat to maintain viable population levels where the species have an opportunity to interact within their environment is 135 snags per 100 acres, ranging in sizes from 11-inch dbh to 25-inch or greater dbh, which equates to 40 percent of their potential population level. Based on these parameters, a population model predicts an existing

population of over 60,000 other woodpeckers (Forest Service, 1990a). In 1994 and 1998, a hairy woodpecker was documented just outside Rogue River – Siskiyou Forest Service boundaries, approximately 2.6 to 2.8 miles from the proposed project (BLM, 2006). In unmanaged forested areas, the total cavity excavator population is limited by territorial needs, not by the availability of wildlife trees (snags). When the FEIS was written, there was a wide range of cavity excavator population capability, from 100 percent in areas not under managed rotation to zero in some areas harvested before the 1980s (Forest Service, 1990a).

The same data that were collected on 16 National Biological Survey BBS routes (Sauer et al., 2013) that are within BCR 5 in the vicinity of the PCGP Project and Rogue River – Siskiyou National Forest and used to evaluate the regional population trends are discussed in Section 2.2. Numbers of northern (common) flicker, hairy woodpecker, and downy woodpecker that were reported on each route were compiled and averaged (numbers per route) for each year, 1993 through 2012 (Table 3-8) to develop a population index.

Table 3-8
Data Compiled for 20-years and Trends of Population Indices (Numbers Counted per BBS Route per Year) for BCR 5 of Primary Cavity Excavator MIS in the Vicinity of Rogue River – Siskiyou National Forest and the PCGP Project

Cavity Nesting Species	Data Compiled for 20 Years, 1993-2012			
	Average Number of Routes per Year	Average Annual Count per Route	Population Index Trend	Comments
Common (Northern) Flicker	10.50	3.71	Decreasing	none
Hairy Woodpecker	10.75	1.16	Significantly Decreasing ($P < 0.05$)	none
Downy Woodpecker	9.05	0.597	Insufficient data	Too few observations per year

During the 20-year period (1993 to 2012), an average of 3.71 northern flickers was observed per BBS route (average of 10.50 routes reporting per year) each year in BCR 5 in the vicinity of Rogue River – Siskiyou National Forest and the PCGP Project. Over the past 20 years, hairy woodpeckers appear to be significantly decreasing ($P < 0.05$) on BBS routes within the vicinity of Rogue River – Siskiyou National Forest and the PCGP Project (Table 3-8 and Figure 3-2). Common flickers are also decreasing in BCR 5 within the vicinity of the Rogue River – Siskiyou National Forest and the PCGP Project, but no significant trend is detectible reviewing both the long-term trend (20-year trend) or a shorter, 10-year trend (Table 3-8). In addition to pileated woodpeckers discussed above (significantly increasing ($P < 0.05$), Section 2.2 and Figure 2-1), hairy woodpeckers are the only other species of cavity nesters included as a MIS with sufficient data to estimate 20-year population trends, indexed as annual counts per route (Figure 3-2).

Habitat. All the primary cavity nester MIS species require snags of appropriate size, species, condition, and density, but these snags must be provided in the right habitat type. Currently there is far more woodpecker habitat available and more habitat within reserve land allocations than was planned for in the original Rogue River – Siskiyou National Forest Resource Management Plan. According to the GNN dataset, approximately 203,402 acres of suitable woodpecker habitat is available on the Rogue River – Siskiyou National Forest, of which 133,163 acres occurs within reserved lands (see discussion for pileated woodpeckers, Section 3.5).

Sub-sections below, for each species summarizes the general habitat type for each species.

Hairy Woodpecker Habitat. In Oregon, the hairy woodpecker can be found in both dry and wet coniferous forests at low to mid-elevations, with the exception of juniper forests. They are found primarily in mixed-conifer and ponderosa pine forests. Hairy woodpeckers also use deciduous forest and riparian areas, especially if adjacent to coniferous forest. Although hairy woodpeckers have been reported to use forested stands at various seral stages (Marshall et al., 2003; Wahl et al., 2005), on the west side of the Cascades they occur in higher densities in mature and old-growth stands. They are common throughout most of their range, although most common in burns or in areas with trees that are dead from or infested with mountain pine beetles, and uncommon to fairly common along the coast and in western interior valleys. They prefer to nest in dead trees with light to moderate decay, and few consistent seasonal movements are known (Marshall et al., 2006).

Hairy woodpeckers are generally associated with the following habitat types that will be affected within the Rogue River-Siskiyou forest: Montane Mixed Conifer Forest, Southwest Oregon Mixed Conifer-Hardwood Forests, and Urban and Mixed Environs. They are present in Westside Grasslands but are expected to feed and breed within the habitats with which they are generally associated (Johnson and O'Neil, 2001). Using DecAID version 2.1 (Mellen-McLean et al., 2009), general snag characteristics used by hairy woodpeckers for each habitat type could be determined. Within forest types affected by the proposed action, hairy woodpeckers are generally associated with moderate to hard snag decay, with the exception of Southwest Oregon Mixed Conifer-Hardwood Forest where all classes of snag decay are used, within Douglas-fir, ponderosa pine, and western hemlock species. Snag size and density of snags per acre are variable, but the hairy woodpecker tends to be associated with smaller snag sizes than the other primary cavity-excavating MIS species in Rogue River – Siskiyou National Forest. Hairy woodpeckers generally use snags that range in size from 10.3 to 30.7 inches for nesting. Forested stands surrounding nest and/or roost sites tend to provide 31.3 to 106.1 snags per acre on average, with higher densities associated with smaller snag sizes (Mellen-McLean et al., 2009).

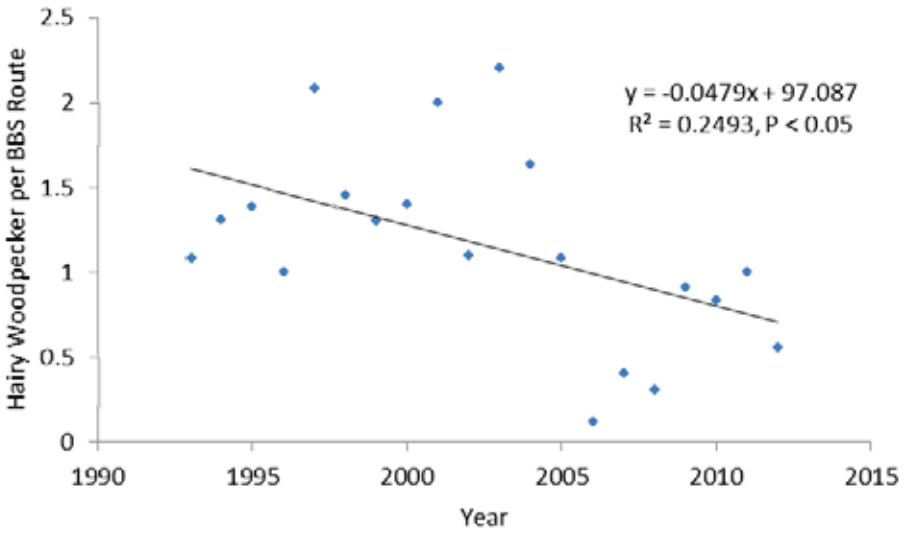


Figure 3-2
20-year Trend in Hairy Woodpeckers Counted per BBS Route
in BCR 5 in the Vicinity of Rogue River – Siskiyou National Forest and the PCGP Project

Downy Woodpecker Habitat. The downy woodpecker is found at low to moderate elevations in deciduous (alder, cottonwood, willow, aspen, and oaks) and mixed deciduous-coniferous forests, and is most abundant in riparian areas and red alder. They show a preference for decayed wood for nesting. Some local movements occur in fall/winter as some individuals move to lower elevations. They nest primarily in dead trees (Marshall et al., 2006; Wahl et al., 2005).

Downy woodpeckers are generally associated with the following habitat types that will be affected within the Rogue River-Siskiyou forest: Southwest Oregon Mixed Conifer-Hardwood Forests, and Urban and Mixed Environs. They are present in Westside Grasslands but are expected to feed and breed within the habitats with which they are generally associated (Johnson and O'Neil, 2001). Using DecAID version 2.1 (Mellen-McLean et al., 2009), general snag characteristics used by downy woodpeckers for each habitat type could be determined. Within forest types affected by the proposed action, downy woodpeckers are generally associated with moderate to hard snag decay within Douglas-fir, red alder, ponderosa pine, and golden chinquapin tree species. Snag size and density of snags per acre are variable. Downy woodpeckers generally use snags for nesting that average approximately 27.8 inches. Forested stands surrounding nest and/or roost sites tend to provide 26.7 to 97.5 snags per acre on average, with higher densities associated with smaller snag sizes (Mellen-McLean et al., 2009).

Northern Flicker Habitat. The flicker is the most ubiquitous woodpecker in Oregon, and is most abundant in open forests and forest edges adjacent to open country. They typically avoid dense forest, and prefer to nest in trees with some decay. Some flickers move to higher elevations in spring (Marshall et al., 2006).

Northern flickers are generally associated with the following habitat types that will be affected within the Rogue River-Siskiyou forest: Montane Mixed Conifer Forest, Southwest Oregon Mixed Conifer-Hardwood Forests, Westside Grasslands, and Urban and Mixed Environs. They are present in Shrub-steppe but are expected to feed and breed within the habitats with which they are generally associated (Johnson and O'Neil, 2001). Using DecAID version 2.1 (Mellen-McLean et al., 2009), general snag characteristics used by northern flickers for each habitat type could be determined. Within forest types affected by the proposed action, northern flickers are generally associated with soft to moderate snag decay, with the exception of Southwest Oregon Mixed Conifer-Hardwood Forest where all classes of snag decay are used, within Douglas-fir, ponderosa pine, western hemlock, and oak species. Snag size and density of snags per acre are variable, but the northern flicker tends to be associated with larger snag sizes than the other two primary cavity-excavating MIS species considered for Rogue River – Siskiyou National Forest. Northern flickers generally use snags that range in size from 17.2 to 35.3 inches for nesting. Forested stands surrounding nest and/or roost sites tend to provide 3.7 to 132.9 snags per acre on average, with higher densities associated with smaller snag sizes (Mellen-McLean et al., 2009).

Forest Management Activities. Depending on the target species, pest management would serve to remove a part of the species' food choice. Wildfire destroys nesting and foraging habitat, but also creates new snag habitat and weakens other trees to the point where they become infected with disease and insects, increasing the food supply. Timber harvesting and firewood cutting are the major activities that affect woodpeckers. The removal of snags and down/dead material would continue the downward trend in population levels (Forest Service, 1990a).

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Effects of the Proposed Action. Primary Cavity Excavators could be negatively impacted during construction of the PCGP Project through the same direct and indirect impacts that were discussed above for the pileated woodpecker (Section 2.2), for the Umpqua National Forest.

Clearing the right-of-way will modify habitat, changing the seral stage and tree species makeup of occupied forests. Similar to effects to pileated woodpeckers discussed above in Section 3.5, construction will remove a total of 77 acres of late successional-old growth Montane Mixed Conifer Forest and Southwest Oregon Mixed Conifer-Hardwood Forests in Rogue River – Siskiyou National Forest (Table 3-1). Additional potential long-term effects to Primary Cavity Excavators will be removal of 12.3 acres of mid-seral conifer-hardwood forest (≥40 years but ≤80 years old), thereby setting back seral development that would be expected to eventually provide suitable habitat elements including snags. Overall, approximately 89.3 acres of potentially suitable woodpecker habitat will be removed, which is 0.04 percent of available habitat (203,402 acres) on Rogue River – Siskiyou National Forest. All habitat effects would occur within lands managed as LSRs, reducing the amount of available suitable habitat on reserved lands (133,163 acres) by 0.07 percent.

Unlike the large home ranges of pileated woodpeckers, those of the other Primary Cavity Excavator MIS are relatively small at 10 ha (25 acres) for the downy and hairy woodpeckers and 50 ha (124 acres) for the northern flicker (Johnson and O'Neil, 2001). While the amount of late successional-old growth habitat that would be removed by the project is not expected to impact local or regional populations of Primary Cavity Excavators, home ranges of several individuals or pairs could be affected.

If Primary Cavity Excavator MIS' home ranges are assumed to be circular, the diameter of a 25-acre home range would be 1,170 feet and that of a 124-acre home range would be 2,600 feet. Blasting at one edge of a home range would attenuate to 55 dBA (at 1,170 feet) or 46 dBA (at 2,600 feet) at the far edges of the home range, depending on home range size. Noise due to construction would be a short term effect to Primary Cavity Excavators and expected to affect them through home ranges since noise levels would be above ambient levels (assumed to be 40 dBA) throughout species' home ranges that are adjacent to the construction right-of-way.

Mitigation. The same mitigation measures that were discussed in Section 3.5 for pileated woodpeckers would also apply to and benefit primary cavity excavators. Pacific Connector has also prepared a Migratory Bird Special Purpose Permit Application that identifies additional measures that would be implemented to offset potential effects to primary cavity nesters.

Forest Plan Consistency. Implementation of the mitigation measures is expected to increase potential population capabilities for primary cavity excavators in areas that would otherwise be subject to intensive timber harvest and would provide for additional habitats for species utilizing older forest and mature habitat. In these respects, the Proposed Action would be consistent with the Forest Plan.

Although some timber clearing and construction (at least 1 mile where NSO occur within 0.25 mile of the proposed action) would occur outside of the primary cavity nester breeding seasons, most timber clearing and construction could occur during the respective nesting season (nesting season: downy woodpecker April 15 to August 31, hairy woodpecker March 1 to August 31, and northern flicker March 15 to August 31; Johnson and O'Neil, 2001), potentially within 1,320 feet of an active primary cavity nester nest. If that occurred, the action would not be consistent with the Forest Plan. See PCGP's Migratory Bird Special Purpose Permit Application that describes measures that would help offset effects to primary cavity nesters.

Because the PCGP Project affects less than 0.1 percent of potentially suitable primary cavity nester habitat across the Rogue River – Siskiyou National, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the primary cavity nesters is expected on Rogue River - Siskiyou National Forest.

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4.0 FREMONT-WINEMA NATIONAL FOREST

Species. The MIS for the Fremont-Winema National Forest include the three-toed woodpecker, pine marten, northern spotted owl, pileated woodpecker, resident trout, mule deer, bald eagle and northern goshawk (Forest Service, 1990e). The bald eagle was listed as threatened or endangered species requiring special management at the time of the Forest Plan's release, but has since been delisted. However, it is included in this discussion because it still remains an indicator species under the current Forest Plan. Old growth communities are used by the northern spotted owl, pileated woodpecker, northern goshawk, three-toed woodpecker, and pine marten. (Forest Service, 1990e). However, the northern spotted owl is now listed under the Endangered Species Act and its status is covered extensively under separate cover in the Draft Biological Assessment and is not discussed here.

Management areas 3A, Scenic Management-Foreground Retention, 3B, Scenic Management-Foreground Partial Retention, 3C, Scenic Management-Middleground Partial Retention, and 18 will be affected by the project.

Habitats. The anticipated Future Condition which was expected in 1990 to have been met by 2000 is that mature and old-growth habitat would decrease but be maintained at or above levels determined to be needed for viable wildlife populations by the Region 6 guide. The condition of the riparian area and the habitat effectiveness for historic big game winter range was expected to have improved. Summer range habitat effectiveness for deer was expected to be at 1990 levels or higher. It was not anticipated that mule deer populations would increase above 1990 levels when based on the assumption of a direct relationship between deer production and habitat. A mule deer study to determine causes of decline would have been completed. The Forest would have provided habitat to meet bald eagle recovery objectives. (Forest Service, 1990e).

It was predicated that fifty years past the time of the 1990 report, riparian areas and streams would have been improved to provide for increased fish production by the third decade, and the fish program would consist primarily of reconstruction and maintenance of improvements. Deer production and populations would remain low. Plans would have been implemented for the recovery of threatened and endangered species and for the management of sensitive species. (Forest Service, 1990e).

MIS on the Fremont-Winema National Forest are associated with a variety of habitats found throughout the forest. However, the PCGP Project will affect only those habitats included in Table 4-1, below. In Table 4-1, the areas (acres) of existing forested habitats (Southwest Oregon Mixed Conifer-Hardwood Forest and Ponderosa Pine Forest and Woodlands) within one or more seral stages (clearcut-regenerating forest, mid-seral forest, late successional-old growth forest) that will be removed during construction and affected during operation are provided in addition to all other affected habitat type categories. Effects by the project have been summarized by project component (facility) during construction and during operation of the pipeline. Generally, most long-term disturbance by the project is due to a 30-foot wide corridor, centered on the pipeline, that is maintained in a herbaceous and/or shrub stated for the life of the project. Table 4-1 is referenced in discussions for each MIS in the sections, below.

The forested habitats (Johnson and O'Neil, 2001) corresponds to vegetation categories described by the Oregon Gap Analysis Project (Oregon Gap; Kagan et al., 1999) and mapped in the project area. For Southwest Oregon Mixed Conifer-Hardwood Forest, the corresponding

vegetation categories include 1) Douglas-fir-White Fir/Tanoak-Madrone Mixed Forest, and 2) Douglas-fir Dominant-Mixed Conifer Forest (Kagan et al., 1999) and were discussed above for the Umpqua National Forest. Likewise, Montane Mixed Conifer habitat (Johnson and O'Neil, 2001) in Table 4-1 was discussed above for the Rogue River-Siskiyou National Forest. Descriptions of Forested and Non-Forested Wetlands were provided in those sections under the Umpqua National Forest and a description of Westside Grasslands was provided for the Rogue River-Siskiyou National Forest. However, Eastside Grasslands also occur within the Fremont-Winema National Forest:

Grasslands (east of Cascades)/Forest-Grassland Mosaic: This type is a mosaic of bunchgrass grasses and conifer forest in the east Cascades. Ponderosa pine, Douglas-fir, white fir, and incense cedar are common conifers, with Idaho fescue generally the dominant grass. Other grasses that can form co-dominances are bluebunch wheatgrass, junegrass, Sandberg bluegrass, and western needlegrass. In stands heavily grazed, cheatgrass and bottlebrush squirreltail can be dominant. Found at mid to low elevations (Kagan et al., 1999). Within the project area, this vegetation type is found within Klamath County and the Fremont-Winema National Forest.

Table 4-1
Summary of Construction and Operation-Related Disturbance (acres [1]) to Corresponding Wildlife Habitat Categories (Johnson and O'Neil, 2001) in the Fremont-Winema National Forest

Facility	Forest – Woodland Seral Stage [2]	Forest-Woodland			Riparian		Grasslands	Roads	Open Water	Total
		Montane Mixed Conifer Forest	Oregon Mixed Conifer-Hardwood	Forest-Woodland Sub-Total	Forested Wetland	Non-Forested Wetland				
CONSTRUCTION DISTURBANCE										
Pipeline Facilities										
Construction Right-of-Way	**L-O**	5.77	29.86	35.63	0.26	0.15	0.69	1.52	0.05	69.65
	M-S	2.43	5.62	8.05						
	C-R	14.47	8.83	23.3						
	Tot	22.67	44.31	66.98						
Hydrostatic Discharge Sites	**L-O**									0
	M-S									
	C-R									
	Tot									
Rock Source/ Disposal	**L-O**									0
	M-S									
	C-R									
	Tot									
Temporary Extra Work Areas	**L-O**	0.56	4.27	4.83			0.22	1.15		11.74
	M-S	0.3	1.08	1.38						
	C-R	3.54	0.62	4.16						
	Tot	4.4	5.97	10.37						

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Facility	Forest – Woodland Seral Stage [2]	Forest-Woodland			Riparian		Grasslands	Roads	Open Water	Total
		Montane Mixed Conifer Forest	Oregon Mixed Conifer-Hardwood	Forest-Woodland Sub-Total	Forested Wetland	Non-Forested Wetland				
Uncleared Storage Areas [3]	L-O	2.96	2.28	5.24				0.05		11.14
	M-S	0.92	0.7	1.62						
	C-R	3.14	1.09	4.23						
	Tot	7.02	4.07	11.09						
Total Construction Disturbance	L-O	9.29	36.41	45.7	0.26	0.15	0.91	2.72	0.05	92.53
	M-S	3.65	7.4	11.05						
	C-R	21.15	10.54	31.69						
	Tot	34.09	54.35	88.44						
OPERATION DISTURBANCE										
Pipeline Facilities										
30-foot Maintenance Corridor	L-O	1.84	9.43	11.27	0.01	0.05	0.26	0.28	0.1	22.03
	M-S	0.84	1.77	2.61						
	C-R	4.68	2.77	7.45						
	Tot	7.36	13.97	21.33						
Total Operation Disturbance	L-O	1.84	9.43	11.27	0.01	0.05	0.26	0.28	0.1	22.03
	M-S	0.84	1.77	2.61						
	C-R	4.68	2.77	7.45						
	Tot	7.36	13.97	21.33						

[1] Acres disturbed were evaluated using GIS; footprints for each component (temporary construction right-of-way, temporary extra work areas, temporary access roads, uncleared storage areas, pipe storage yards, aboveground facilities, permanent easement, and 30-foot maintenance corridor) were overlaid on the digitized vegetation coverage.

[2] Forest-Woodland Seral Stages are L-O, Late Succession/Old Growth assumed to be ≥80 years old; M-S, Mid-Seral assumed to be ≥40 but ≤80 years old; C-R, Clearcut-Regenerating Forest assumed to be ≤40 years old.

[3] Small brush or trees may be cleared by a rubber-tired rotary or flail motor (brush hog) or by hand with machetes/chainsaws. No soil disturbance will occur. A rubber-tired or track hoe will be utilized to lay the discharge line and to remove the saturated haybales or filter bags upon completion of hydrostatic discharge.

4.1 Northern Spotted Owl

The NSO was selected as a MIS for mature and old growth habitat, and in the 1990 Fremont-Winema National Forest Plan there was 28,700 acres of NSO NRF habitat and 23 pairs of NSO reported (Forest Service, 1990f). The NSO was proposed for listing under the Endangered Species Act (ESA) when the Fremont-Winema National Forest's Plan was signed in 1990, and was officially listed as Threatened in 1992. The Northwest Forest Plan (BLM and Forest Service, 1994) amended Fremont-Winema's Forest Plan (Forest Service, 1990e), and was designed to ensure the population viability of the NSO. Since the NSO is now listed under the Endangered Species Act, it is covered extensively under separate cover in the Biological Assessment prepared for the Proposed Action. A summary of the status of NSOs and its habitat on Fremont-Winema National Forest is included here, including affects to NSO habitat by the PCGP Project. Additional information can be reviewed in the Biological Assessment.

Fremont-Winema National Forest occurs within the East Cascades physiographic province. Recent estimates of NSO NRF habitat in the Fremont-Winema National Forest were derived from a raster data set created by the Forest Service Pacific Northwest Research Station - BioMapper Habitat Model (Forest Service, 2004: PNW-GTR-648) and then validated by biologists to ensure that the model matched the habitat requirements of spotted owls on the landscape. BioMapper performs an ecological niche factor analysis that compares ecological conditions that correspond with species presence to conditions across the entire area being analyzed. BioMapper defines nesting-roosting-foraging habitat as areas with tree diameters greater than 18 inches and canopy cover greater than 77 percent. This model applied to the Fremont-Winema National Forest predicts that there is approximately 95,955 acres of suitable NSO NRF habitat available. Through surveys for spotted owls that have occurred on the Fremont-Winema National Forest since 1990, with the majority of recent survey efforts through demographic studies, there are approximately 56 NSO historic and current sites (pairs and/or resident singles) that have been documented to occur or are occurring on the Fremont-Winema National Forest (Fremont-Winema Forest, 2006 GIS data layer); approximately 40 NSOs are monitored annually through NSO demographic studies on Fremont-Winema National Forest.

The proposed PCGP Project affects NSO habitat (high NRF, NRF, dispersal only, and capable habitat as defined by FWS in the Conservation Framework developed for the Proposed Action; see PC Trask & Associates, 2013) on Fremont-Winema National Forest within the East Cascades physiographic province. Approximately 75 percent of NSO habitat affected from the Proposed Action on Fremont-Winema National Forest occurs within NSO home ranges (Table 4-2). Four known NSO home ranges with a radius of 1.2 miles occur within the PCGP Project area and will have NSO habitat affected, including habitat from one NSO core area. Table 4-2, below identifies the amount of NSO habitat removed by the PCGP Project in Fremont-Winema National Forest. Overall, the PCGP Project would remove approximately 40.46 acres of NRF habitat (high NRF and NRF, combined), which is approximately 0.04 percent of the 95,955 acres of NRF habitat available within Fremont-Winema National Forest. Because the PCGP Project affects less than 0.1 percent of suitable NRF habitat across the Fremont-Winema National Forest, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the northern spotted owl is expected on Fremont-Winema National Forest.

Table 4-2
Summary of NSO Habitat Removed (acres) within Fremont-Winema National Forest

NSO Habitat	Location	Construction Right-of-Way	Temporary Extra Work Space	Total Habitat Removed
High NRF	Within Home Range	10.64	1.10	11.74
	Outside Home Range	6.54	0.94	7.48
	High NRF Total	17.18	2.04	19.22
NRF	Within Home Range	15.02	1.81	16.83
	Outside Home Range	3.43	0.97	4.41
	NRF Total	18.46	2.78	21.24
Dispersal Only	Within Home Range	2.48	0.30	2.78
	Outside Home Range	5.84	1.08	6.92
	Dispersal Only Total	8.31	1.38	9.70
Capable	Within Home Range	22.74	4.14	26.88
	Outside Home Range	0.56	0.02	0.59
	Capable Total	23.30	4.17	27.47

NSO Habitat	Location	Construction Right-of-Way	Temporary Extra Work Space	Total Habitat Removed
Total NSO Habitat	Within Home Range	52.80	8.38	61.18
	Outside Home Range	16.86	3.37	20.22
	Overall NSO Habitat	69.65	11.74	81.40

4.2 Pileated Woodpecker

The pileated woodpecker is an indicator species for the Winema National Forest for old-growth and mature mixed conifer habitats. The Proposed Action will not affect any of Fremont-Winema National Forest management areas designated for pileated woodpeckers. The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for pileated woodpeckers and their habitat:

Management Area 7 (Forest Service, 1990e):

- Provide suitable mature and old-growth nesting and foraging habitat for at least 28 pairs of pileated woodpeckers.
- Habitat areas should be a minimum of 300 acres of old-growth and/or mature mixed conifer, ponderosa pine and associated species as breeding and primary foraging habitat for one pair of pileated woodpeckers; large aspen or cottonwood trees in riparian areas can also be considered. Habitat areas shall be dispersed throughout suitable habitat not more than 5 miles apart from center of one area to the center of another area.
- Habitat should be contiguous, otherwise shall be at least 50 acres in size and not more than 0.25 mile apart.
- Within each 300-acre primary breeding area, a minimum average of two hard snags per acre greater than 12 inches DBH, including: 42 suitable nesting snags (hard) greater than 20 inches DBH within 300-acre breeding area, and 558 hard snags greater than 12 inches DBH.
- Disturbing human activities within 0.25 mile of an active pileated woodpecker nest site shall be discouraged or minimized from May 1 through July 31.

Habitat. Pileated woodpeckers occur within late-seral stages of the subalpine, montane, lower montane forests including: grand fir-white-fir, interior Douglas-fir, western larch, western white pine, western redcedar-western hemlock, Engelmann spruce-subalpine fir, and Pacific silver fir-mountain hemlock. Special habitat features are snags, down logs, and large hollow trees (Wisdom et al. 2000). Fremont-Winema National Forest estimates that approximately 66,204 acres of potential reproductive pileated woodpecker habitat is available within the forest boundaries.

Pileated woodpeckers are generally associated with Montane Mixed Conifer Forest and Southwest Oregon Mixed Conifer-Hardwood Forests (Johnson and O'Neil, 2001) that coincide with the PCGP Project (Table 4-1). Since they are dependent on downed wood and snags, pileated woodpeckers would be most likely to inhabit the old growth or late successional stands (≥80 years old) of those forests included in Table 4-1. However research suggests that only a small portion of the landscape in the Southwest Oregon Mixed Conifer-Hardwood Forest, late-seral stands are likely capable of providing nesting and roosting habitat for pileated woodpecker based on snag densities on unharvested plots (see Mellen-McLean et al., 2009).

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Species' Status in the Project Area. The Fremont-Winema National Forest occurs within both BCR 5 and BCR 9. In BCR 5, the past 20-year trend indicates a significantly increasing trend within the vicinity of the PCGP Project and Fremont-Winema National Forest (see Section 2.2 and Figure 2-1). Pileated woodpeckers have been documented in BCR 9; however, there are too few BBS routes where the species was observed and not enough data to determine a trend for this species in BCR 9.

This species has not been documented within or within the vicinity of the proposed project on Fremont-Winema National Forest per queries from existing, available GIS databases.

Effects of the Proposed Project. Pileated woodpeckers could be negatively impacted during construction of the PCGP Project through the same direct and indirect effects that were discussed in Section 2.2 above, for the Umpqua National Forest. Clearing the right-of-way will modify habitat, changing the seral stage and tree species makeup of occupied forests. Construction will remove 6 acres of late successional-old growth Montane Mixed Conifer Forest and 34 acres of late successional-old growth Southwest Oregon Mixed Conifer-Hardwood Forests (Table 4-1). Additional potential long-term effects to pileated woodpeckers will be removal of 9 acres of mid-seral conifer-hardwood forest (≥40 years but ≤80 years old), thereby setting back seral development that would be expected to eventually provide suitable habitat elements for pileated woodpeckers, including downed wood and snags. No habitat within Management Area 7 would be affected. Removal of approximately 40 acres of potentially suitable pileated woodpecker habitat represents approximately 0.06 percent of the 66,204 acres of currently available habitat on Fremont-Winema National Forest; the continued viability of the species would be expected.

The amount of late successional-old growth habitat that would be removed by the project is not expected to have an impact on the local or regional population of pileated woodpeckers which have mean home ranges of 478 hectares or 1,180 acres in western Oregon (Mellen, 1987; Mellen et al., 1992). If all of the impacted late successional-old growth (40 acres) occurred within a bird's or pair's home range, less than 3 percent of one home range would be affected. More likely, the Proposed Action would span several home ranges and the overall effect to any single bird or pair would be less than 3 percent removal.

If pileated woodpecker home ranges are assumed to be circular, the diameter of a 1,180-acre home range would be 8,090 feet. Blasting at one edge of that home range would attenuate to 30 dBA at the far edge of the home range and would attenuate to ambient noise (assumed to be 40 dBA) 4,630 feet away or a distance equal to 57 percent the diameter of a home range. Noise due to construction would be a short term effect to pileated woodpeckers and would be expected to affect them within only a portion of their home ranges.

Mitigation. Prior to clearing operations and before or concurrently with timber cruising, Pacific Connector will identify and flag existing snags on the edges of the construction right-of-way and temporary extra work areas where it is feasible to save/conserve them from project clearing operations. These snags will be saved as mitigation to benefit primary and secondary cavity nesting birds, mammals, reptiles, and amphibians. Also during this process, Pacific Connector will flag other large-diameter trees on the edges of the construction right-of-way and temporary extra work areas that can be saved/protected as green recruitment or as habitat/shade trees. Some of these trees would be girdled to create snags to augment the number of snags along the right-of-way to provide habitat structures. See the Leave Tree Protection Plan (Appendix P of the POD).

Other mitigation measures that would minimize impacts to pileated woodpeckers include planting trees within the right-of-way after construction. Conifers would be planted to within 15 feet of each side of the pipeline centerline. After tree planting, there will be 21.33 acres of former forest (11.27 acres of late successional-old growth, 2.61 acres of mid-seral forest, and 7.45 acres of clear cut-regenerating forest) that will remain in an herbaceous and/or shrub state within the 30-foot maintenance corridor during the life of the project (Table 4-1).

Timber removal and construction of the proposed action could occur during the breeding season of pileated woodpeckers (March 1 through July 31) and disturb nesting pileated woodpeckers if located within 0.25 mile of the proposed action. However, disturbance would be minimized in at least 0.3 mile of the proposed action on Fremont-Winema National Forest where an NSO activity center occurs within 0.25 mile of the proposed action and construction activities would not occur during the NSO critical breeding period (March 1 through July 15). In this same area of NSO presence, timber harvest would occur outside of the entire NSO breeding season (after September 30 but before March 1). Felling trees during this time period will avoid directly impacting young birds during the nesting season. Noise from blasting, if it is required during construction, will be minimized through application of various measures. Mitigation measures commonly applied to blasting of this type include drilling small (2.5-inch) charge holes, stemming the blast holes with sand and placing inert material on top of the blast area (Michael Minor & Associates, 2008).

To mitigate for loss of cavities and snags within the construction right-of-way, Pacific Connector will create snags in large trees strategically left on the edge of the construction right-of-way by topping and or girdling trees. In addition, Pacific Connector will fund projects proposed by the Forest Service on the Fremont-Winema National Forest that include decommissioning 21.4 to 29.21 miles of roads, and stand density and fuel treatments of 113 acres to accelerate development of late successional and old growth habitat characteristic among other objectives. Those additional projects would provide benefits to pileated woodpeckers within the Fremont-Winema National Forest. During construction, potential impact to nesting pileated woodpeckers and other species by predatory corvids will be addressed by assuring that all contractors practice appropriate trash containment and removal.

Pacific Connector has also prepared a Migratory Bird Special Purpose Permit Application that identifies additional measures that would be implemented to offset potential effects to pileated woodpeckers.

Forest Plan Consistency. The Proposed Action will not affect any of Fremont-Winema National Forest's management areas designated for the species (Forest Service, 1990e). Because the PCGP Project affects less than 0.1 percent of potentially suitable pileated woodpecker habitat across the Fremont-Winema National Forest, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the pileated woodpecker is expected on Fremont-Winema National Forest.

4.3 Northern Goshawk

The northern goshawk is the largest North American accipiter and was chosen as a management indicator species due to its association with mature and late and old-growth ponderosa and mixed conifer forest structural stages for nesting. The Proposed Action will not affect any of Fremont-Winema National Forest management areas designated for the northern goshawk. The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for northern goshawks and their habitat:

Management Area 7 (Forest Service, 1990e):

- Provide suitable mature and old-growth nesting and foraging habitat for at least 87 pairs of northern goshawks.
- A minimum of 60 acres of contiguous old-growth and/or mature mixed conifer, ponderosa pine and associated species, ponderosa pine, and lodgepole pine communities shall be provided as primary breeding and foraging habitat for one pair of northern goshawks.
- Habitat areas shall be dispersed throughout suitable habitat, not more than 5 miles apart from the center of one area to the center of another area.
- Disturbing human activities within 0.25 mile of any active northern goshawk nest shall be discouraged or minimized from March 1 through August 31.

Habitat. The northern goshawk's home range encompasses about 6,000 acres and is composed of a nest core area, post-fledging area (PFA), and a foraging area. Various forest structural stages are associated with the components of the home range. Nest areas often occur on north aspects, along stream zones or other areas where a dense forest canopy and late successional / old-growth forest conditions are present. Preferred nest stands have a minimum of 40 percent canopy closure, and the nest sites within these stands have greater than 60 percent canopy closure (Reynolds et al., 1991). Goshawks often use stands of old growth forest as nesting sites (DuBois et al., 1987). PFAs usually resemble the nest area, but also include a variety of forest types and conditions where hiding cover (for the young) and prey availability is present (Reynolds et al., 1991). Foraging areas may be as closely tied to prey availability as to habitat structure and composition. These areas often contain a mixture of various forest structural stages with snags, downed logs, large trees, and small openings with an herbaceous and/or shrubby understory present. Fremont-Winema National Forest estimates that approximately 280,381 acres of potential reproductive goshawk habitat is available within the forest boundaries.

Northern goshawks are generally associated with Montane Mixed Conifer Forest and Southwest Oregon Mixed Conifer-Hardwood Forests (Johnson and O'Neil, 2001) that coincide with the PCGP Project (Table 4-1). They are dependent on old growth or late successional stands (≥80 years old) of those forests included in Table 4-1. Goshawks are closely associated with Ponderosa Pine Forest and Woodlands (Johnson and O'Neil, 2001), which would not be affected by the proposed action.

Species' Status in the Project Area. Northern goshawks have been documented at nine locations within approximately 3.5 miles (diameter of a home range) of the proposed action, including two locations within 0.5 mile of the project (Forest Service, 2006 GIS data). A breeding site was also documented in 1992 north of the proposed project in Fremont-Winema National Forest approximately 1.5 miles away (ORBIC, 2012). BBS routes in the vicinity of the Fremont-Winema National Forest and the proposed action have not detected goshawks during survey efforts.

Effects of the Proposed Project. Northern goshawks could be negatively impacted during construction of the PCGP Project. Direct mortality of young could occur if nest trees are cleared prior to young fledging. Since nesting and roosting lasts from March 1 through August 31, tree felling during those periods could directly impact young birds. While adults would be able to escape temporary disturbances, adult birds could abandon nests, leaving eggs and chicks vulnerable to predation and the elements. However, tree felling within 0.25 mile of one known

NSO activity center on Fremont-Winema National Forest will occur after the breeding period for northern spotted owls, from October 1 to the end of February and will likely avoid impacting nesting goshawks in that area, if present.

Clearing the right-of-way will modify habitat, changing the seral stage and tree species makeup of occupied forests. Construction will remove 6 acres of late successional-old growth Montane Mixed Conifer Forest and 34 acres of late successional-old growth Southwest Oregon Mixed Conifer-Hardwood Forests (Table 4-1). Additional potential long-term effects to northern goshawks will be removal of 9 acres of mid-seral conifer-hardwood forest (≥40 years but ≤80 years old), thereby setting back seral development that would be expected to eventually provide suitable habitat elements for northern goshawks. No habitat within Management Area 7 would be affected. Removal of approximately 40 acres of potentially suitable pileated woodpecker habitat represents approximately 0.01 percent of the 280,381 acres of currently available habitat on Fremont-Winema National Forest; the continued viability of the species would be expected.

The amount of late successional-old growth habitat that would be removed by the project is not expected to have an impact on the local or regional population of northern goshawks which have mean home ranges of 6,000 in western Oregon. If all of the impacted late successional-old growth (40 acres) occurred within a bird's or pair's home range, less than 0.1 percent of one home range would be affected. More likely, the Proposed Action would span several home ranges and the overall effect to any single bird or pair would be less than 0.1 percent removal.

If northern goshawk home ranges are assumed to be circular, the diameter of a 6,000-acre home range would be 3.5 miles (18,242 feet). Blasting at one edge of that home range would attenuate to 30 dBA at the far edge of the home range and would attenuate to ambient noise (assumed to be 40 dBA) 4,630 feet away or a distance equal to 25 percent the diameter of a home range. Noise due to construction would be a short term effect to northern goshawks and would be expected to affect them within only a portion of their home ranges, if nesting near the proposed action. Two nests have been documented (1992 and 1993; Forest Service, 2006 GIS data) approximately 0.5 mile from the project; if these sites are still present, it is not expected that noise associated with the proposed action would affect nesting goshawks.

Mitigation. Mitigation measures that would minimize impacts to northern goshawks include planting trees within the right-of-way after construction. Conifers would be planted to within 15 feet of each side of the pipeline centerline. After tree planting, there will be 21.33 acres of former forest (11.27 acres of late successional-old growth, 2.61 acres of mid-seral forest, and 7.45 acres of clear cut-regenerating forest) that will remain in an herbaceous and/or shrub state within the 30-foot maintenance corridor during the life of the project (Table 4-1).

Timber removal and construction of the proposed action could occur during the breeding season of northern goshawk (March 1 through August 31) and disturb nesting goshawks if located within 0.25 mile of the proposed action. However, disturbance would be minimized in at least 0.3 mile of the proposed action on Fremont-Winema National Forest where an NSO activity center occurs within 0.25 mile of the proposed action and construction activities would not occur during the NSO critical breeding period (March 1 through July 15). In this same area of NSO presence, timber harvest would occur outside of the entire NSO breeding season (after September 30 but before March 1). Felling trees during this time period will avoid directly impacting young birds during the nesting season. Noise from blasting, if it is required during construction, will be minimized through application of various measures. Mitigation measures commonly applied to blasting of this type include drilling small (2.5-inch) charge holes,

stemming the blast holes with sand and placing inert material on top of the blast area (Michael Minor & Associates, 2008).

Pacific Connector will fund projects proposed by the Forest Service on the Fremont-Winema National Forest that include decommissioning 21.4 to 29.21 miles of roads, and stand density and fuel treatments of 113 acres to accelerate development of late successional and old growth habitat characteristic among other objectives. Those projects could provide benefits to northern goshawks within the Fremont-Winema National Forest. During construction, potential impact to nesting goshawks and other species by predatory corvids will be addressed by assuring that all contractors practice appropriate trash containment and removal.

Pacific Connector has also prepared a Migratory Bird Special Purpose Permit Application that identifies additional measures that would be implemented to offset potential effects to northern goshawks.

Forest Plan Consistency. Because the PCGP Project affects less than 0.1 percent of potentially suitable goshawk habitat across the Fremont-Winema National Forest, will not occur within 0.25 mile of known nest sites, and will not affect any of Fremont-Winema National Forest's management areas designated for the species, the project will not contribute to a negative tend in viability of northern goshawk on the Fremont-Winema National Forest.

4.4 Three-Toed Woodpecker or Black-backed Woodpecker

The three-toed woodpecker is an indicator species for the Fremont-Winema National Forest; however, the Fremont-Winema National Forest is considered to be outside of the range of three-toed woodpeckers. Therefore, the black-backed woodpecker has been substituted for three-toed woodpecker as an MIS species since they have similar habitat requirements. Black-backed woodpecker is an indicator of overmature and mature lodgepole pine forests.

The Proposed Action will not affect any of Fremont-Winema National Forest management areas designated for the three-toed woodpecker [black-backed woodpecker]. The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for three-toed woodpecker and their habitat and could be assumed to be similar for the black-backed woodpecker:

Management Area 7 (Forest Service, 1990e):

- Provide suitable mature and old-growth nesting and foraging habitat for at least 215 pairs of three-toed woodpeckers
- A minimum of 75 acres of contiguous old-growth and/or mature lodgepole pine or subalpine fir shall be provided as primary breeding and foraging habitat for one pair of three-toed woodpeckers
- Habitat area shall be dispersed throughout suitable habitat, not more than 25 miles apart from the center of one area to the center of another area
- Within 75-acre primary breeding area, a minimum average of 2 hard snags per acre greater than 10 inches DBH shall be maintained including 45 suitable nesting snags (hard) greater than 12 inches DBH and 105 hard snags greater than 10 inches DBH.
- Disturbing human activities within 0.25 mile of an active three-toed woodpecker nest site shall be discouraged or minimized from April 15 through July 15 [black-backed woodpeckers nesting range from April 1 through August 15; Adamus et al., 2001].

Habitat. Black-backed woodpeckers occur in conifer forest with snags, especially recently burned or bark-beetle killed forests. They nest in live trees with heart rot or dead trees, and can use smaller trees for nest cavities. Their main diet is larvae of wood-boring beetles gathered from under bark of trees. Fremont-Winema National Forest estimates that approximately 230,749 acres of potential reproductive three-toed woodpecker and black-backed woodpecker habitat is available within the forest boundaries.

Black-backed woodpeckers are generally associated with Montane Mixed Conifer Forest and Southwest Oregon Mixed Conifer-Hardwood Forests (Johnson and O'Neil, 2001) that coincide with the PCGP Project (Table 4-1). They are dependent on old growth or late successional stands (≥80 years old) of those forests included in Table 4-1.

Species' Status in the Project Area. In Oregon, black-backed woodpeckers occur at high elevations of the west Cascades, is more widespread on the east slope of the Cascades with its center of abundance lodgepole pine forests from Bend to Klamath Falls, is uncommon in the Blue Mountains, and occasionally seen in the Siskiyou Mountains (Marshall et al., 2003). The closest documentation of black-backed woodpecker is greater than 8 miles southwest of the proposed project.

Data have been collected on 16 BBS routes in BCR 5 and 16 BBS routes in BCR 9 (Sauer et al., 2013) that are within the region of the Fremont-Winema National Forest and PCGP Project; no BBS routes within BCR 5 occur on Fremont-Winema National Forest. No three-toed woodpeckers were included in any of the BBS observations on the compiled routes. No black-backed woodpeckers were reported in BBS routes compiled in BCR 5; however, six BBS routes compiled for BCR 9 have documented black-backed woodpeckers in the past 20 years, including one route located on the Forest. During the 20-year period, an average of 3.00 black-backed woodpeckers each year were observed per BBS route (average of 4.20 routes reporting per year) in BCR 9, with more birds documented in the last 7 years than previous years. However, there is insufficient data to estimate 20-year population trends for this species within the region of the proposed project on Fremont-Winema National Forest.

Effects of the Proposed Project. Black-backed woodpeckers could be negatively impacted during construction of the PCGP Project through the same direct and indirect effects that were discussed in Section 2.2 above, for the Umpqua National Forest. Clearing the right-of-way will modify habitat, changing the seral stage and tree species makeup of occupied forests. Construction will remove 6 acres of late successional-old growth Montane Mixed Conifer Forest and 34 acres of late successional-old growth Southwest Oregon Mixed Conifer-Hardwood Forests (Table 4-1). Additional potential long-term effects to black-backed woodpeckers will be removal of 9 acres of mid-seral conifer-hardwood forest (≥40 years but ≤80 years old), thereby setting back seral development that would be expected to eventually provide suitable habitat elements for black-backed woodpeckers, including downed wood and snags. No habitat within Management Area 7 identified for three-toed woodpeckers [black-backed woodpeckers] would be affected. Removal of 40 acres of potentially suitable three-toed or black-backed woodpecker habitat represents approximately 0.02 percent of the 230,749 acres of currently available habitat on Fremont-Winema National Forest; the continued viability of the species would be expected.

The amount of late successional-old growth habitat that would be removed by the project is not expected to have an impact on the local or regional population of black-backed woodpeckers which have an average home range of 550 hectares or 1,360 acres (Johnson and O'Neil, 2001). If all of the impacted late successional-old growth (40 acres) occurred within a bird's or pair's home range, less than 3 percent of one home range would be affected. More likely, the

Proposed Action would span several home ranges and the overall effect to any single bird or pair would be less than 3 percent removal.

If black-backed woodpecker home ranges are assumed to be circular, the diameter of a 1,360-acre home range would be 8,685 feet. Blasting at one edge of that home range would attenuate to 30 dBA at the far edge of the home range and would attenuate to ambient noise (assumed to be 40 dBA) 4,630 feet away or a distance equal approximately half (53 percent) the diameter of a home range. Noise due to construction would be a short term effect to black-backed woodpeckers and would be expected to affect them within only a portion of their home ranges.

Mitigation. Prior to clearing operations and before or concurrently with timber cruising, Pacific Connector will identify and flag existing snags on the edges of the construction right-of-way and temporary extra work areas where it is feasible to save/conserve them from project clearing operations. These snags will be saved as mitigation to benefit primary and secondary cavity nesting birds, mammals, reptiles, and amphibians. Also during this process, Pacific Connector will flag other large-diameter trees on the edges of the construction right-of-way and temporary extra work areas that can be saved/protected as green recruitment or as habitat/shade trees. Some of these trees would be girdled to create snags to augment the number of snags along the right-of-way to provide habitat structures. See the Leave Tree Protection Plan (Appendix P of the POD).

Other mitigation measures that would minimize impacts to black-backed woodpeckers include planting trees within the right-of-way after construction. Conifers would be planted to within 15 feet of each side of the pipeline centerline. After tree planting, there will be 21.33 acres of former forest (11.27 acres of late successional-old growth, 2.61 acres of mid-seral forest, and 7.45 acres of clear cut-regenerating forest) that will remain in an herbaceous and/or shrub state within the 30-foot maintenance corridor during the life of the project (Table 4-1).

Timber removal and construction of the proposed action could occur during the breeding season of black-backed woodpeckers (April 1 through August 15; Adamus et al., 2001) and disturb nesting black-backed woodpeckers if located within 0.25 mile of the proposed action. However, disturbance would be minimized in at least 0.3 mile of the proposed action on Fremont-Winema National Forest where an NSO activity center occurs within 0.25 mile of the proposed action and construction activities would not occur during the NSO critical breeding period (March 1 through July 15). In this same area of NSO presence, timber harvest would occur outside of the entire NSO breeding season (after September 30 but before March 1). Felling trees during this time period will avoid directly impacting young birds during the nesting season. Noise from blasting, if it is required during construction, will be minimized through application of various measures. Mitigation measures commonly applied to blasting of this type include drilling small (2.5-inch) charge holes, stemming the blast holes with sand and placing inert material on top of the blast area (Michael Minor & Associates, 2008).

To mitigate for loss of cavities and snags within the construction right-of-way, Pacific Connector will create snags in large trees strategically left on the edge of the construction right-of-way by topping and or girdling trees. In addition, Pacific Connector will fund projects proposed by the Forest Service on the Fremont-Winema National Forest that include decommissioning 21.4 to 29.21 miles of roads, and stand density and fuel treatments of 113 acres to accelerate development of late successional and old growth habitat characteristic among other objectives. Those additional projects would provide benefits to black-backed woodpeckers within the Fremont-Winema National Forest. During construction, potential impact to nesting black-

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backed woodpeckers and other species by predatory corvids will be addressed by assuring that all contractors practice appropriate trash containment and removal.

Pacific Connector has also prepared a Migratory Bird Special Purpose Permit Application that identifies additional measures that would be implemented to offset potential effects to black-backed woodpeckers.

Forest Plan Consistency. Because the PCGP Project affects less than 0.1 percent of potentially suitable three-toed woodpeckers [black-backed woodpeckers] across the Fremont-Winema National Forest and will not affect any of Fremont-Winema National Forest's management areas designated for the species, the project will not contribute to a negative trend in viability of three-toed woodpeckers [black-backed woodpeckers] on the Fremont-Winema National Forest.

4.5 American (Pine) Marten

The pine marten was selected as an indicator species due to its close association with late successional mixed conifer and lodgepole pine forests (Forest Service, 1990f). Pine martens represent those species utilizing mature conifer forests which need mature habitat areas spaced closer than 5 to 6 miles apart. They are not generally found below 4,000 feet on the forest and do not appear to have an upper elevation restriction, which makes it an especially important indicator for those species capable of utilizing high elevation habitat or that are less mobile than either the spotted owl or pileated woodpecker (Forest Service, 1990f).

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for pine martens and their habitat:

Management Prescriptions. The monitoring objective for the pine marten is to assure that habitat that will meet or exceed the Forest share of that needed to meet viable populations of pine marten is provided and maintained. This applies to all management areas through which the project will pass, which includes 3A, 3B, and 3C (Forest Service, 1990e).

MA3A emphasizes the retention of natural-appearing foreground areas.

- Lands: For lands visible for up to 0.25 miles from selected travelways, waterbodies, or public use areas, only forms, lines, colors, and textures found in the characteristic landscape will be allowed. Natural appearing forms, colors, and textures dominate.
- Vegetation may be manipulated through enhancing large diameter trees, scattering large trees among other size classes, or creating small openings with natural appearing edges. Trees with distinctive bark and tree form characteristics, including occasional snags, are very evident. Large tree character should be maintained in the foreground retention area in all species except lodgepole pines, and should be distributed in groupings.
- Project evidence such as slash should not be noticeable one year after work completion.
- Fire suppression methods in the immediate foreground should use low-impact methods (Forest Service, 1990e).

MA3B emphasizes attractive scenery slightly altered from a natural condition as viewed in the foreground.

- Activities may repeat or introduce form, line, color, or texture common or not to the characteristics landscape, but changes in size, amount, intensity, direction, and pattern must remain visually subordinate.

- Lands: For lands visible for up to 0.25 miles from selected travelways, waterbodies, or public use areas, only forms, lines, colors, and textures found in the characteristic landscape will be allowed. Details such as individual tree shape, color, size, species mix, and related vegetation are the focus.
- The desired future condition emphasizes and maintains perpetually large tree character, except lodgepole pine, through large-diameter trees in groupings or scattering individually large trees among other tree size classes. Small openings with natural-appearing edges may be created. Trees with distinctive bark and tree form characteristics, with occasional snags, are very evident. Management activities may be noticeable.
- Project evidence such as slash should not be noticeable two to three years after work completion, and large tree character should be retained in the foreground area. Hand tools are preferred for fire suppression in the immediate foreground (Forest Service, 1990e).

MA3C emphasizes attractive scenery slightly altered from a natural condition as viewed in the middleground.

- Activities may repeat or introduce form, line, color, or texture common or not to the characteristics landscape, but changes in size, amount, intensity, direction, and pattern must remain visually subordinate.
- Lands: For lands visible for 0.25 to 5 miles from selected travelways, waterbodies, or public use areas, textures or forms are the focus, with groups or stands of trees similar as a unit compared to others that differ in size, texture, or pattern. Continuous canopy is typical, with variety provided by natural openings, rimrock, or rock outcrops.
- The desired future condition calls for masses or vegetation as evident, with a mosaic created by varying canopy levels with natural-appearing edges and forested ridgelines.
- Activities may introduce changes in form, line, color, or texture that are found infrequently or not at all in the characteristic landscape, but must remain subordinate to the visual strength of the characteristic landscape (Forest Service, 1990e).

The monitoring questions and thresholds of concern are as follows:

- is habitat in reserved sites meeting the needs of the pine marten in regard to structure, function, and size as per assumptions; the threshold of concern for this question occurs when more than 10 percent of marten habitat sites have less than 95 percent suitable habitat.
- is the distribution of pine marten habitat meeting species needs, and are areas occupied by pine martens being isolated from genetic interchange by management activities.
- the threshold of concern for all three monitoring questions occurs when more than a 10 percent reduction in the distributional area of pine martens after five years of baseline information is developed (Forest Service, 1990e).

Species Status in the Project Area. Past extensive logging and trapping for pelts led to extirpation in some areas of Oregon; however, martens have been re-introduced to Oregon. Due to the loss of mature forest habitat, pine marten populations may be declining in Oregon (Csuti et al., 2001). Pine marten populations in high-elevation habitats are probably stable, but loss of habitat due to human encroachment in low and mid-elevation areas has resulted in population declines and local extirpations (Johnson and O'Neil, 2001). No specific information for species presence is available for Fremont-Winema National Forest.

Habitat. The American marten is associated with forested habitats at any elevation, but will wander through openings and even up into alpine areas. American marten are typically

associated with late-seral coniferous forests with closed canopies, large trees, and abundant snags and down wood (Zielinski et al., 2001), but they will use openings in forests if there are sufficient downed logs to provide cover. The type of forest is less important to martens than the forest structure, although they are not found in dry woodlands (Csuti et al., 2001). Wisdom et al. (2000; Appendix 1, Table 1) list subalpine and montane forests in old multi- and single-story, and unmanaged young multi-story structural stages as providing source habitat for American marten in the Columbia Basin. Lower montane forests are not listed as source habitat (Wisdom et al., 2000). Snags and down logs are identified as special habitat features of source habitat for the marten (Appendix 1, Table 2) (Wisdom, 2000). Down logs provide habitat for prey and subnivean acess points. Raphael and Jones (1997) found that down wood and slash piles were important resting and denning structures in the eastern Cascades of central Oregon. Large slash piles and trees with branches that reach to the ground are also important to provide access through the snow during the winter (Forest Service, 1990e).

In the Cascades, marten selected sites with higher canopy closure during snow periods than during snow-free periods (Raphael and Jones, 1997). In Oregon, canopy closure at rest sites in lodgepole pine dominated stands averaged 36% in snow periods and 27% in snow-free periods (Raphael and Jones, 1997). Slauson et al. (2007) also found that larger patch sizes of habitat were important for marten occurrence. Marten used patches over 100 ha (247 acres) at higher rates than availability (Slauson et al., 2007). At the 1-km radius scale, a 10% increase in the amount of logged area was associated with a 23% decrease in marten occurrence (Slauson et al., 2007). Martens were not detected at any sample unit with more than 50% of the area logged in the 1-km radius circle (Slauson et al., 2007). Habitat is abundant within the lodgepole pine and mixed conifer habitats in Fremont-Winema National Forest, especially along riparian areas. Fremont-Winema National Forest estimates that approximately 110,071 acres of potential reproductive marten habitat is available within the forest boundaries.

Pine martens are primarily carnivorous (Csuti et al., 2001) and diet on a variety of mammalian species. They feed on rodents and opportunistically on other small mammals and birds. Winter food sources are critical to marten survival as they carry very little fat reserves on their bodies. (Forest Service, 1990e). Martens will forage underground, on the ground, and on shrub or understory vegetation (Johnson and O'Neil, 2001).

The dens of pine martens are located in trees or underground. They often have multiple dens which they move between during the rearing season (Forest Service, 1990e). Denning takes place in coarse woody debris, slash, snags, and live trees. Parturition takes place in March and April, and mating occurs in June through early August.

Pine martens are associated with the following habitat types that occur within the Fremont-Winema National Forest and which will be affected by construction of the PCGP Project: they are closely associated with Montane Mixed Conifer Forest and occurrence is uncertain in Southwest Oregon Mixed Conifer-Hardwood Forest (Johnson and O'Neil, 2001). They may be present in Eastside Riparian Wetlands at high elevations (Johnson and O'Neil, 2001). Presence of pine martens would depend on appropriate structural conditions including snags, down logs, and rock outcrops (Johnson and O'Neil, 2001).

Forest Management Activities. Fire can negatively affect marten habitat by destroying ground and overhead cover and consuming dead and down material. Recreation activity within the Fremont-Winema National Forest was not considered to be heavy enough to influence this species now or in the foreseeable future, at the time of the Forest Plan completion. Trapping of these fur bearing animals over the last 20 years has been light and localized to small areas.

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Broad wildlife coordination guidelines which address leaving snags, down material, unit size, shape, and spatial distribution, apply to timber sales and result in the maintenance of habitat.

Effects of the Proposed Action. Within Montane Mixed Conifer Forest and Southwest Oregon Mixed Conifer-Hardwood Forest, pine martens may be present within suitable structural conditions including small tree, medium tree, large tree, and giant tree conditions, singly and multi-story and open moderate and closed canopies, but only if snags, down logs, and/or rock outcrops are present for denning (Johnson and O'Neil, 2001). Removal of 27.07 acres of Montane Mixed Conifer Forest (6.33 acres of late successional-old growth forest, 2.73 acres of mid-seral forest, and 19.01 acres of clearcut-regenerating forest) and 50.28 acres of Southwest Oregon Mixed Conifer-Hardwood Forest (34.13 acres of late successional-old growth forest, 6.7 acres of mid-seral forest, and 9.45 acres of clearcut-regenerating forest) would affect less habitat than the equivalent of one-half of a female home range (160 acres – see discussion above under the Rogue River-Siskiyou National Forest). However, given the lack of association between pine martens and the forested types affected on the Fremont-Winema National Forest, effects to the species could occur but are not likely.

Mitigation. Mitigation measures that would minimize impacts to pine martens include planting trees within the right-of-way after construction. Conifers would be planted to within 15 feet of each side of the pipeline centerline. After tree planting, there will be 7.36 acres of former Montane Mixed Conifer and 13.97 acres of former Southwest Oregon Mixed Conifer-Hardwood Forest that will remain in an herbaceous state – the maintenance corridor - during the life of the project (Table 4-1).

To mitigate for loss of downed wood and snags within the construction right-of-way, Pacific Connector fund the Forest Service to treat approximately 113 acres by thinning forest and creating small openings adjacent to pipeline corridor along Clover Creek corridor and Dead Indian Road crossing. The projects would include fuel treatments and have been incorporated into the CMP. The treatments would accelerate the development of late successional habitat characteristics of structure. Those projects would provide benefits to pine martens within the Fremont-Winema National Forest if they occur.

Forest Plan Consistency. Implementation of the mitigation measures is expected to provide forest structure and function for pine martens in areas that would otherwise be subject to intensive timber harvest. Because the PCGP Project affects less than 0.1 percent of potentially suitable marten habitat across the Fremont-Winema National Forest, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the American marten is expected on Fremont-Winema National Forest.

4.6 Bald Eagle

The bald eagle was chosen as a management indicator species for the Forest because it was classified as a threatened species under the ESA (Forest Service, 1990f). However, the species is no longer listed under the Act and was moved to the Region 6 Sensitive Species List as required by the USDA. (see discussion under Section 2.8, above, Umpqua National Forest). The bald eagle generally nests within the canopy of trees, or less frequently on cliffs, typically within one mile of appropriate foraging habitat that includes rivers and large lakes and reservoirs.

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The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for bald eagles and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines. The monitoring objective for the bald eagle is to assure that recovery plan objectives are being met (Forest Service, 1990e). The following are monitoring questions and thresholds of concern for the bald eagle:

- is the bald eagle population approaching recovery objectives? The threshold of concern for this question occurring when more than a 10 percent decline of the bald eagle population in the Klamath Basin.
- are all known and identified potential nest sites protected in accordance with the Recovery Plan and has a site plan for each next been written? The threshold of concern for this question occurs when any site is not protected, and/or when there are more than 10 percent of sites with unfinished site plans two years after implementation.
- For both of these first two questions, concern would occur when an active nest site is unoccupied two years in succession; if this happens, the causes must be determined and the situation corrected, if possible.
- Other monitoring questions include: are nest sites producing young; is the winter roost receiving use, with concern if the decrease of winter roost use is greater than 20 percent over the previous two years average; is management of bald eagle replacement habitat producing stand conditions that meet objectives for large trees, with concern if silviculturally treated replacement areas are not releasing or achieving growth rates as anticipated five years after implementation; and is replacement area habitat receiving use by the bald eagle, with concern if there is no use of the replacement area within ten years of implementation (Forest Service, 1990e).

Management Prescriptions. All management areas through which the project will pass are to be monitored for the bald eagle, which includes 3A, 3B, and 3C. See description for Pine Marten, above. The nesting and roosting season is January 1 through August 31, and the required protection zone is 440 yards (Forest Service, 1990e).

Species Status in the Project Area. There are two bald eagle nests within the Fremont-Winema National Forest (Fish Lake 543 and Fish Lake 1227) in the vicinity of the pipeline but each is farther than one mile away. One nest was recently used in 2006 and the other, an alternate nest site, was used in 2003. There are no Midwinter Bald Eagle Survey locations near the Forest (Steenhof et al., 2008) but there are nine count routes in the vicinity of the Klamath River and Upper Klamath Lake from 1996 to 2005 that are from 7 to 11 miles of the pipeline route through the Fremont-Winema National Forest. Results of midwinter bald eagle counts from the nine routes indicate that wintering bald eagles were significantly increasing ($P<0.10$) in the region during the 10 years from 1996 to 2005 (Figure 4-1). Wintering bald eagles have likewise been significantly increasing along the Pacific and within the Great Basin (see Steenhof et al., 2008). Bald eagles are fairly common breeders at Upper Klamath Lake. An Audubon CBC circle count from Klamath Falls, but not located on Fremont-Winema National Forest, shows a recent and significant decline in winter bald eagles from 2008 through 2012 (Figure 4-2).

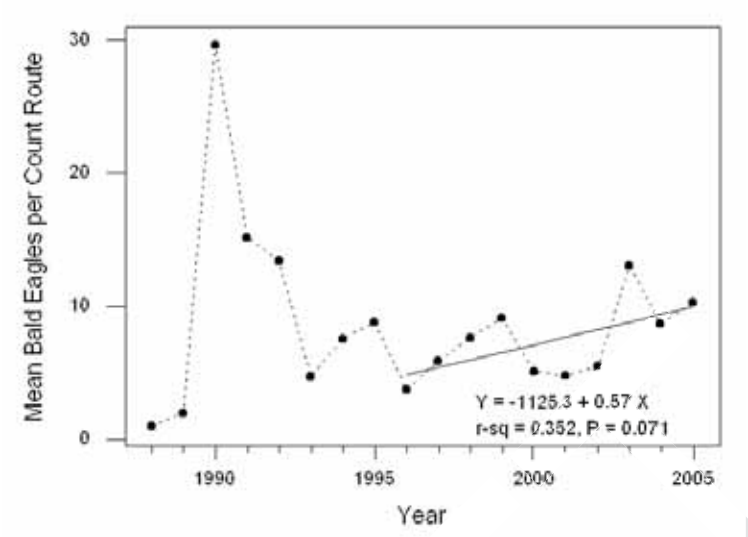


Figure 4-1
Mean Bald Eagles per Count Route Counted During Midwinter Surveys on 9 Count Routes, 1988-2005, in the Vicinity of the Klamath River and Upper Klamath Lake, Oregon.

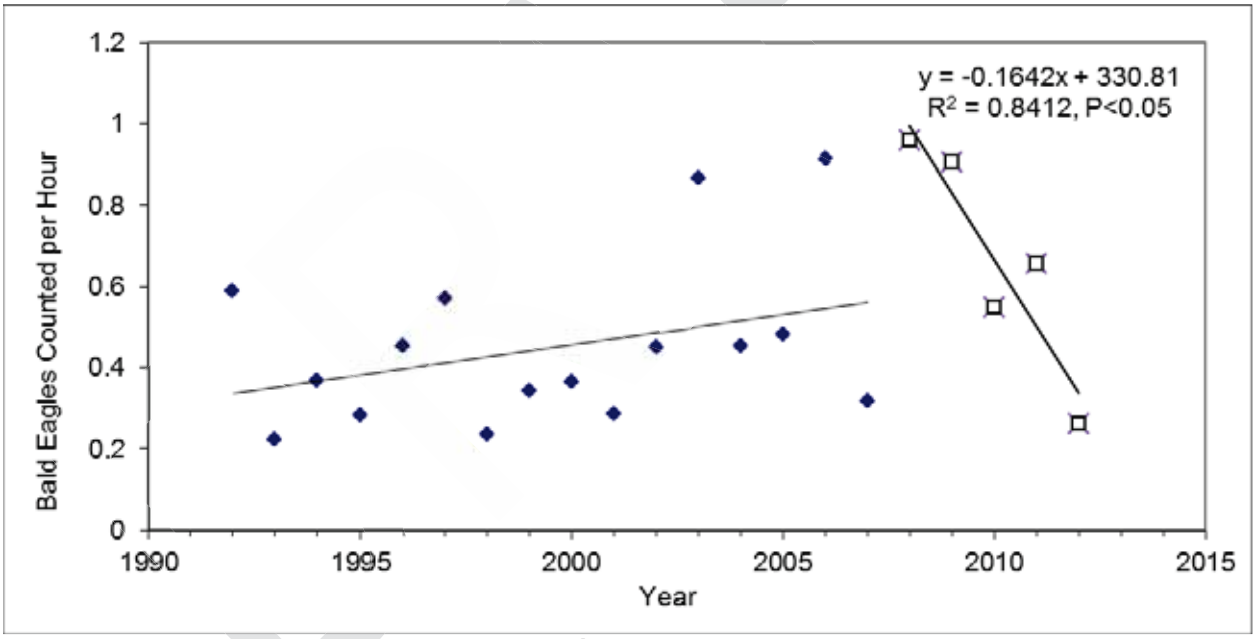


Figure 4-2
Bald Eagles Counted Per Hour During the Audubon CBC Klamath Falls Count Circle, 1992-2012, in the Vicinity of the Klamath River and Upper Klamath Lake, Oregon

Habitat. The bald eagle is a year-round resident when food is available. Essential habitat elements of the bald eagle are nest sites, communal night roosts, foraging areas, and perch sites. Nests consist of bulky stick platforms built in the super-canopy of trees, or less frequently on cliffs. They are typically constructed within one mile of appropriate foraging habitat, which includes rivers and large (typically 90 surface acres or greater) lakes and reservoirs. All nests observed in Oregon have been in trees, primarily Sitka spruce and Douglas-fir west of the Cascades, and ponderosa pine, Douglas-fir, and sugar pine in eastern Oregon. Nests are

usually built in live trees, but they will reuse the nest after the tree dies (Marshall, et al., 2006). Large snags, dead-topped trees, and live open-limbed trees within the nest stand is important for providing perch sites for the adults and landing sites for the fledglings. Bald eagles are sit-and-wait predators, which predominantly capture prey from perches over water; ideal perches are large trees and snags within 330 feet (100 meters) of water (Anthony et al., 1995). When they are not breeding, they may congregate where food is abundant, even away from water.

Bald eagles are associated most habitats within the Fremont-Winema National Forest in proximity to waterbodies, including Southwest Oregon Mixed Conifer-Hardwood Forest and Montane Mixed Conifer Forest.

Effects of the Proposed Action. Potential effects to bald eagles by the Proposed Action within the Fremont-Winema National Forest are expected to be the same as described above for effects on the Umpqua National Forest. Habitat destruction through logging, road construction, and recreational development has in the past had the most affect on this species throughout its range. Recent public awareness and concerns have reduced this kind of detriment, at least on public lands. Unintentional harassment or malicious destruction of nests and shooting eagles does occur, although it has not been a problem on this Forest. Public awareness has benefited this species. The current management for this species requires, as a minimum, preparing a site-specific management plan for each bald eagle site. Plans will be coordinated and reviewed with the FWS (Forest Service, 1990f). One bald eagle nests on the Fremont-Winema National Forest just beyond one mile from the proposed project. However, because the nesting pair is beyond 1 mile of the proposed project, no effects to the nesting bald eagle pair is expected.

Mitigation. No mitigation specifically targeting impact to bald eagles is proposed on the Fremont-Winema National Forest.

Forest Plan Consistency. The Proposed Action will be consistent with Forest Plan Standards and Guidelines to meet the requirements of the Endangered Species Act of 1973, related to management of bald eagles. The PCGP Project will not remove known bald eagle nests or impact its habitat. Therefore, the PCGP Project will not contribute to a negative trend in bald eagle viability on the Fremont-Winema National Forest.

4.7 Mule Deer

The mule deer is listed as an indicator species because of its economic importance (Forest Service, 1990e). Summer and winter range habitat are both important to the mule deer since their survival depends on the condition and presence of winter range, and on early successional vegetation stages or non-forest habitat for forage in summer range (Forest Service, 1990f). Deer summer range capability indices are useful indicators for species needing non-forested habitat for survival (Forest Service, 1990f).

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for mule deer and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines. Mule deer habitat is supposed to be managed, taking into account all factors such as roads, cover, forage, water distribution, and livestock competition, so that habitat capability to support deer is maintained or improved. On limited site-specific instances, short-term decreases (less than 10 years) are acceptable to achieve long-term benefits. Effects will usually be calculated for projects on areas ranging from 8,000 to 60,000 acres. Habitat suitability models, such as the Interagency Technical Advisory

Committee Mule Deer Model, 1985 as amended, may be used in some projects; for example, with timber sales, grazing plans, road construction and water development (Forest Service, 1990e).

The Forest is supposed to provide a minimum of 30 percent of its area as cover for deer; generally, 15 percent of the area will be hiding cover, 10 percent will be thermal cover, and 5 percent will be cover for fawning. All cover also will be hiding cover, whenever possible. A short-term reduction of cover to 15 percent of an area may be justified on a project-specific basis if reduction below 30 percent cover will provide long-term (greater than 10 years) benefits for deer. To provide adequate diversity of forage structure for deer, activities shall be planned to achieve multiple age classes in the brush vegetative component. Wildlife forage will be allocated to meet the needs of big game first, and then to meet the needs of other animals. (Forest Service, 1990e).

The monitoring objectives for the mule deer are to assure that habitat objectives are met, and to validate habitat assumptions. The monitoring questions and thresholds of concern are:

- what is the relationship between habitat and population, and what is the habitat variable that most limits the population of mule deer, with a decline exceeding 10 percent of 1990 populations of mule deer on any management unit influenced by the Forest being of concern, as well as a cumulative decrease of habitat suitability greater than 5 percent over five years and/or a cumulative decrease of habitat suitability index factors greater than 5 percent over five years being of concern.
- what are the cumulative effects of open roads, alterations in cover, alterations of forage, livestock competition, water developments, and cover/forage distribution on deer habitat suitability, and what is the primary cause of the decline of herds in the area, with the thresholds of concern the same as mentioned previously.
- what is the longevity of mule deer habitat structural and nonstructural improvements, with concern shown when the functional or structural failure rate of structural or nonstructural habitat improvements exceeding 10 percent over five years and/or failure to maintain 95 percent of structural improvements over five years, with minor maintenance expected and not considered a failure (Forest Service, 1990e).

Management Prescriptions. This affects all management areas through which the project will pass, which includes 3A, 3B, and 3C (Forest Service, 1990e). See management descriptions for Pine Marten, above.

Species Status in the Project Area. Long-term, systematically collected data are available for this species, collected annually by the ODFW. Data are collected on population trends, sex ratios, winter mortality, and harvest. Within Fremont-Winema National Forest, seven ODFW Management Units occur: Fort Rock, Silver Lake, Sprague, Klamath Falls, Interstate, Rogue, and Keno. ODFW's Keno Hunt Management Unit 31 coincides with the portion of the Fremont-Winema National Forest within which the Proposed Action is located (MPs 168.85-199.57). ODFW (2012) has compiled harvest data on mule deer within Wildlife Management Unit 31 for the 2011 season and prior harvest seasons beginning in 2003 (ODFW, 2012). Total mule deer harvest appears to be cyclic and has increased within the WMU from 2003 through 2007 and again from 2008 through 2011. During the same period of time, the same cyclic pattern has been observed where percent hunter success has increased and the number of days per mule deer harvested has decreased, although no significant trends were observed (Table 4-3).

Table 4-3

Harvest Statistics for Mule Deer within the Keno Wildlife Management Unit 31, 2003-2011

Year	Total Hunters	Total Hunter Days	Harvest			Days per Harvest	Percent Hunter Success
			Total Males (antlered)	Total Non-Males (non-antlered)	Total		
2011	1153	7095	495	0	495	14	43
2010	1181	7861	259	0	259	30	22
2009	1139	7138	270	0	270	26	24
2008	1007	6468	218	0	218	30	22
2007	1241	7951	472	0	472	17	38
2006	1146	6216	373	0	373	17	33
2005	1208	7528	366	0	366	21	30
2004	1101	7432	292	0	292	25	27
2003	1185	6343	223	0	223	28	19

Harvest data for Keno WMU 31 suggests that the mule deer population could be cyclic and as it increases, hunter success increases with decreased levels of effort. Annual reports for each WMU provided by ODFW include 1) a population index - ODFW's Trend Count for animals in the WMU, conducted along a fixed route each year, usually at the end of winter, 2) productivity (young per female from ODFW's Composition Count data reported in December), and 3) an estimate of the maximum overwinter juvenile survival rate (derived from composition count data in December and composition count data the following March). There is no significant trend in fawns per doe (young per adult female) nor is there any significant trend in ODFW's Trend Count in Table 4-4. Estimated young overwinter survival relative to adult overwinter survival indicates that juvenile mule deer in the Keno Wildlife Management Unit 30 have had moderate to high overwinter survival rates relative to adult deer since estimates ranged from 0.52 to 1.44 (Table 4-4).

Table 4-4
Population Trends, Annual Productivity, and Estimated Overwinter Survival for Juvenile Mule Deer within the Keno Wildlife Management Unit 31, 2000-2012

Year	Population Index [1]	Young per Adult Female [2]	Young per Adult – Fall (Ratio A) [3]	Young per Adult – Spring (Ratio B) [4]	Maximum Overwinter Juvenile Survival Rate [5]
2012	5.1	0.69	0.58	0.33	0.65
2011	-	0.64	0.51	-	-
2010	1.5	0.68	0.60	0.41	0.74
2009	4.1	0.66	0.56	0.53	1.44
2008	5.6	0.42	0.37	-	-
2007	6.0	0.63	0.53	0.38	0.80
2006	-	0.58	0.48	0.30	0.54
2005	2.0	0.64	0.55	0.50	0.98
2004	5.0	0.60	0.51	0.33	0.92
2003	5.5	0.48	0.36	0.32	0.52
2002	5.6	0.75	0.61	0.35	-
2001	5.6	-	-	0.33	0.76
2000	4.9	0.53	0.44	0.33	0.63
1999	3.9	0.61	0.53	0.50	0.90
1998	3.7	0.63	0.56	0.47	-

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[1] **Population Index** is ODFW's Trend Count for the Hunt Area which is conducted along a fixed route each year, usually at the end of winter (ODFW, 2012).
[2] **Productivity** data is young per female from ODFW's Composition Count data reported as Young per 100 Females counted in December (ODFW, 2012).
[3] **Ratio A** (White et al., 1996) is the ratio of Young per Adult, derived from Composition Count data (Males per 100 Females and Young per 100 Females) counted in December (ODFW, 2012).
[4] **Ratio B** (White et al., 1996) is the ratio of Young per Adult (Young per 100 Adults) counted in March (ODFW, 2012).
[5] **Maximum Overwinter Juvenile Survival** is related to ratios ***A*** and ***B*** and to the following relationship of adult over-winter survival rate ($\hat{S}_a$) and juvenile over-winter survival rate ($\hat{S}_j$) by the formula (see equation 9 in Paulik and Robson, 1969): $\hat{S}_j / \hat{S}_a = \boldsymbol{B}/\boldsymbol{A}$ or $\hat{S}_j = \hat{S}_a\,(\boldsymbol{B}/\boldsymbol{A})$. Since many of the estimates of maximum juvenile survival rates are greater than 1, they indicate survival of adults was less than juveniles over winter which is highly unlikely.

Habitat. Optimal mule deer habitat is generally described as a mix of hiding, thermal, and fawning cover, and foraging habitat. They are found throughout Oregon, east of Cascades and ranges into Cascades in summer. They spend summer at higher elevations and move back to lower elevations during winter though not all populations exhibit marked movements (Johnson, and O'Neil, 2001). Mule deer in Central Oregon are a migratory group of animals that roam a vast mountainous summer range and crowd into relatively small winter ranges (Dealy, 1971). Currently, they are confined mainly to open woods or isolated mountain ranges. (Csuti et al., 2001).

Mule deer are browsers and grazers. Bitterbrush is an important component of summer range habitat; Gay (1998) found that bitterbrush along with other non-sprouting shrubs dominate summer deer diets in pumice influenced zones. Bitterbrush is a very valuable browse species for the diets of mule deer because the twigs and leaves contain high levels of protein (Clark and Britton, unk.). Grasses and forbs compose the bulk of spring diets.

Summer thermal cover minimizes metabolic and time costs associated with heat dissipation (Demarchi and Bunnel, 1993). Thermal cover can be provided by shrubs, juniper woodlands, or physical objects such as boulders and ledges (Peek et al., 1999). Hiding cover habitat is used for escape and protection from predators and humans (Peek et al., 1999). Optimal hiding cover is defined as that which is within 600 feet (183m) of cover (cover being defined as a stand that is at least 60 percent cover), and can hide 90 percent of a deer at 200 feet, which omits less dense vegetation types that deer also recognize as cover (Gay, 1998).

Mule deer are generally associated with most of the habitats crossed by the Proposed Action within Fremont-Winema National Forest including Montane Mixed Conifer Forest, Southwest Oregon Mixed Conifer-Hardwood Forest, Eastside (Interior) Riparian-Wetlands where structural conditions provide for cover, and Eastside (Interior) Grasslands generally used for feeding (Johnson, and O'Neil, 2001). No mule deer wintering ranges would be crossed within the Fremont-Winema National Forest.

Effects of the Proposed Action. Project effects to mule deer on the Fremont-Winema National Forest are expected to be similar to effects to Columbian black-tailed deer described above for the Umpqua National Forest. Direct mortality of mule deer due to the Proposed Action is possible if vehicles collide with animals traveling to and from construction sites (see discussion under Umpqua National Forest, Section 2.6, above). Mule deer would be expected to avoid noise from vehicles and/or increased road traffic, blasting, and aerial fly-overs. Following reclamation of the pipeline corridor, mule deer may utilize the corridor for travel and for foraging, depending on vegetation species planted and rapidity of successful revegetation. After

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construction of the PCGP Project, there will possibly be a secondary impact (Comer, 1982) on harvest rates with upgraded access to previously inaccessible areas; hunters are expected to achieve greater success, at least temporarily, with increased access. In addition, increased access could increase poaching of game animals and nongame wildlife on a local level (see discussions under Umpqua National Forest, Section 2.6, above). The Proposed Action will remove 77.35 acres of Montane Mixed Conifer Forest and Southwest Oregon Mixed Conifer-Hardwood Forest, 0.26 acres of Forested Wetlands, 0.15 acre of Non-Forested Wetland, and 0.91 acre of Eastside Grasslands (Table 4-1). Removal of approximately 78 acres of potential mule deer habitat on Fremont-Winema represents such a small percent of expected available deer habitat on the Forest, since Fremont-Winema usually calculates acreage effects for projects that range in size from 8,000 to 60,000 acres (Forest Service, 1990e); the continued viability of the species would be expected.

Mitigation. The PCGP Project right-of-way provides an opportunity for developing high quality feeding areas (Lees, 1989) for deer species, especially if noxious weeds are controlled and high quality native forage is seeded. As required by FERC's Upland Plan, Pacific Connector consulted with the NRCS, the BLM, and the Forest Service regarding specific seeding dates and recommended seed mixtures for the project area, including an important winter forage species, wedgeleaf ceanothus, in riparian areas and areas outside of the 30-foot maintenance corridor on National Forest lands. The ECRP describes the procedures that will be implemented to minimize erosion and enhance revegetation success for the entire project. The ECRP describes the procedures that will be utilized to minimize the spread of noxious weeds as a result of project construction. The ECRP describes the silvicultural prescriptions that will be implemented in areas that are outside the permanent easement. Seeding mixtures and inhibition of noxious weeds will enhance forage production.

Vegetation management over the long-term will benefit winter range browse and forage for mule deer. Vegetation within the 30-foot maintenance corridor will be periodically maintained by mowing, cutting, and trimming (either by mechanical or hand methods). In upland areas, the 30-foot maintenance corridor will be maintained in a condition where trees or shrubs greater than 6 feet tall will be controlled (cut or trimmed) within 15 feet either side of the centerline (for a total of 30 cleared feet). Maintenance activities are expected to occur approximately every 3-5 years depending on the growth rate of vegetation. During maintenance, vegetation will be cut/trimmed in 4 to 6-foot lengths and scattered across the permanent easement to naturally decompose and to discourage OHV traffic, benefit wildlife habitat, and to decompose naturally.

Open trenches during PCGP Project construction have the potential to entrap deer. Within delineated big-game winter and summer range, Pacific Connector will leave trench segments (>5 feet wide) of the proposed pipeline alignment untrenched and herbaceously vegetated (every 0.5 mile and at visible wildlife game trails) to serve as a route (i.e., green bridge or landscape connector) for big game across the construction right-of-way until pipe is ready to be installed (Forman et al., 2003). Alternatively, Pacific Connector will install soft plugs (backfilled trench materials) in the trench after excavation at these distances to provide wildlife passage. Additionally, 20-foot gaps will be left in spoil and topsoil stockpiles at all hard or soft plug locations and a corresponding gap in the welded pipe string will be left in these locations. Suitable ramps will be installed from the bottom of the trench to the top to prevent potential wildlife entrapment within the trench.

In addition, Pacific Connector proposes to erect 6 miles of let-down fence along Clover Creek Road and install 3 cattle guards within the Forest which is included in the CMP. Fencing will protect wetland and riparian areas from livestock within the Spencer Creek Watershed. Pacific

Connector will also fund the Forest Service to treat approximately 113 acres by thinning forest and creating small openings adjacent to pipeline corridor along Clover Creek corridor and Dead Indian Road crossing. The projects would include fuel treatments and have been incorporated into the CMP. The treatments would accelerate the development of late successional habitat characteristics of structure while reducing risks of stand-replacing wildfires.

Forest Plan Consistency. The Proposed Action will result in forest removal but revegetation within the right-of-way following construction will create early seral forest that will eventually provide forage, thermal and hiding cover and the 30-wide maintenance corridor will provide for travel and forage for the life of the project. The Proposed Action and Compensatory Mitigation Projects proposed within the Fremont-Winema National Forest will be consistent with the Forest Plan. Because the PCGP Project likely affects a small percentage of deer thermal cover / hiding cover across the Fremont-Winema National Forest, and will increase the amount of available forage for deer within the maintained 30-foot pipeline corridor, the overall effects will result in a small negative trend of habitat. The loss of habitat will be insignificant at the scale of the Forest; therefore, the continued viability of the mule deer is expected on Fremont-Winema National Forest.

4.8 Resident Trout

Resident trout are indicator species for riparian and aquatic ecosystems. All trout species on the Fremont-Winema National Forest that are desirable are considered as MIS. This includes native redband trout, native bull trout, and the introduced game fish; rainbow trout, brook trout, brown trout, and lake trout. Trout habitat requirements are narrow enough to represent nearly all other fish species. Trout as a group are moderately reliable in representing favorable habitat for other fish species and the presence, or potential of, other species.

The following Standards and Guidelines and Management Prescriptions were identified in the Forest Plan to conserve and manage for resident trout and their habitat:

Applicable Forest Plan Forestwide Standards and Guidelines. The monitoring element is for fish habitat generally, and is not specified for resident trout. Monitoring questions and thresholds of concern include:

- is fish habitat capability increasing to the 80 percent level, and is the fish population changing in terms of numbers, species composition, or age structure, with the threshold of concern being any decline over three years or more of fish numbers or numbers of fish species.
- what are the effects of fish habitat improvement structures on stream channel configuration, large woody material, and fish populations, with concern with any decline in pool volume, area, or average maximum depth of Class I or Class II streams.
- what is the longevity of stream habitat structures, with concern when functional or structural failure rate of habitat improvement structures exceeding 20 percent over five years, with minor maintenance expected and not considered failure.
- what are the cumulative effects of activities on fish habitat capability and the aquatic ecosystem, with concern when a one scale-class reduction in the community tolerance quotient for macroinvertebrates as measured at established critical reach stations by basin.

Management Prescriptions. *MA 18-Fish and Aquatic Habitat and* all Management Areas through which the project will pass, which includes 3A, 3B, and 3C. See Pine Marten.

Streams shall be managed to maintain or to improve the present level of native fish habitat capability (Forest Service, 1990e).

Habitat. Within the Fremont-Winema National Forest, the pipeline route crosses one perennial stream (Spencer Creek supports resident trout) and four intermittent tributary streams (fish presence is unknown for three and assumed for the fourth) within the Spencer Creek Fifth Field Watershed. Riparian zones associated with Spencer Creek and the tributaries that will be crossed are forested with late successional-old growth forest, mid-seral forest, and regenerating forest (Table 4-5).

Table 4-5
Summary of Habitats Removed by the Proposed Action from Riparian Zones Extending One-Site Potential Tree Height From Stream Banks and Riparian Reserves, Extending up to Two Site-Potential Tree Heights From Stream Banks on the Fremont-Winema National Forest

Fifth Field Watershed (Hydrologic Unit Code) and Riparian Zone	Forested Habitat [1]					Other Habitat [1]						Total Riparian Zone Impact(acres)
	Late Successional - Old Growth	Mid-Seral Forest	Regenerating Forest	Clearcut Forest	Total	Forested Wetland	Non-Forested Wetland	Unaltered Non-Forested Habitat	Agriculture	Altered Habitat	Total	
Spencer Creek (HU 1710030206)												
One Site Potential Tree Height (187 feet)	2.69	0.57	2.23	0	**5.49**	0.26	0.15	0.17	0	0.34	0.92	**6.41**
Riparian Reserve	2.69	0.57	2.23	0	**5.49**	0.26	0.15	0.17	0	0.34	0.92	**6.41**

Species Status in the Project Area. Oregon Department of Fish and Wildlife (ODFW) has conducted stream surveys and population surveys, downstream of the project area, and have identified Spencer Creek as a critical spawning area for Klamath River Redband trout (BLM, 2008). However, ODFW (2012b) determined that the distribution of redband trout in Spencer Creek does not extend upstream from Buck Lake, including the reach that will be crossed by the Proposed Action.

Effects of the Proposed Action. Construction of the Proposed Action will remove a total of 5.49 acres of forested vegetation within one site-potential tree height of all riparian zones crossed and within Riparian Reserves crossed on the Fremont-Winema National Forest (Table 4-5). Effects to salmonids, to instream habitats, and to riparian zones during pipeline construction and operation were analyzed and discussed in detail in the Biological Assessment and summarized above in Section 2.9 for the Umpqua National Forest. The same effects are expected for stream crossed within the Fremont-Winema National Forest.

Effects of the Proposed Action on a population of Oregon spotted frogs inhabiting Buck Lake were included in the Biological Assessment. Effects due to crossing Spencer Creek included potential impacts by acoustic shock from blasting, turbidity generated during instream construction, introduction of nonnative species and pathogens, accidental release of petroleum products, and application of herbicides. None of the potential impacts was found to adversely affect Oregon spotted frogs in Buck Lake. The same conclusion would apply to redband trout. Pacific Connector would follow the ODFW recommended in-water construction window for Spencer Creek and other fish-bearing waterbodies in this area (July 1 through September 30; ODFW, 2008), which would minimize effects to redband trout.

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Mitigation. Conservation measures to mitigate effects to salmonids within streams impacted by construction of the pipeline have been provided and discussed in the Draft Biological Assessment for the Proposed Action and summarized in Section 2.8 for the Umpqua National Forest. The mitigation measure would be implemented within the Fremont-Winema National Forest.

In addition to these measures, Pacific Connector has developed a CMP to mitigate for unavoidable and/or unmitigated effects of the project. On the Fremont-Winema National Forest, Pacific Connector proposes to erect 6 miles of let-down fence along Clover Creek Road and install 3 cattle guards within the Forest which is included in the CMP. Fencing will protect wetland and riparian areas from livestock within the Spencer Creek Watershed. Pacific Connector will also fund the Forest Service to treat 500 acres by thinning forest and creating small openings adjacent to pipeline corridor along Clover Creek corridor and Dead Indian Road crossing. The projects would include fuel treatments and have been incorporated into the CMP Funding will also be used to restore stream contours, improve riparian vegetation, and replace culvert, if needed, at one site. The projects would include fuel treatments and have been incorporated into the CMP. The treatments would accelerate the development of late successional habitat characteristics of structure while reducing risks of stand-replacing wildfires.

Forest Plan Consistency. The Proposed Action and measures included in the CMP will maintain or to improve the present level of native fish habitat capability and be consistent with the Forest Plan. The PCGP Project will not contribute to a negative trend in resident trout viability on the Fremont-Winema National Forest.

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APPENDIX N

Water Resources and Wetlands

N-1a. **Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)**
N-1b. **Summary of Wetland Impacts by Fifth Field/HUC10 Watershed**
N-2. **High Value Wetlands Affected by the Pacific Connector Pipeline Project**
N-3. **Waterbodies Crossed by the Pacific Connector Pipeline Project**
N-4. **Shallow Groundwater Areas Crossed by the Pacific Connector Pipeline Project**

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c] (or fill) (acres)	Wetland Description [d]	Regulated by the COE	Regulated by the ODSL
Coast Range Ecoregion, Coos Sub-basin (HUC 17100304), Coos Bay-Frontal Pacific Ocean (HUC 1710030403) Fifth field Watershed [e], Coos County, Oregon															
J	1.62	Private	PEM	Slope/Flats	0.96	51.92	107.69	0.13	1.44	0.00	1.57	0.00	Delineated Jurisdictional Wetland	Likely	Likely
L	1.67	Private	PEM	Slope/Flats	N/A	0.00	0.00	0.00	0.11	0.00	0.11	0.00	Permanently Impacted Wetland	Likely	Likely
K	1.71	Private	PFOC	Slope/Flats	N/A	0.00	0.00	0.00	0.54	0.00	0.54	0.00	Delineated Jurisdictional Wetland	Likely	Likely
NE026 Coos Bay	2.92R	State	E1UBL E2USP E2USN E2ABM E2EMN	Estuarine	118.93	12207.71 15.09 384.33 257.02 87.19	24954.28 31.03 797.13 533.08 180.84	69.69 0.20 2.15 1.24 0.60	0.20 0.00 0.56 0.00 1.64	0.00	69.89 0.20 2.71 1.24 2.24	0.00	Coos Bay	Likely	Likely
GSI026	4.89R	Private	R4	Riverine F/T	0.05	5.74	11.91	0.01	0.00	0.00	0.01	0.00	Snowmelt, ephemeral drainage	Unlikely	Unlikely
GW027 (EE004 and EE004A) Trib to Kentuck Slough	6.23R	Private	PEM	Slope	4.80	520.55	1079.66	1.16	2.31	0.00	3.47	0.00	Large wet pasture adjacent to Kentuck Slough – includes wetland ditched drainage swale –Trib to Kentuck Slough(EE004)	Likely	Likely
GSP028 (EE005) Kentuck Slough	6.28R	State	R2	Riverine F/T	0.57	61.74	128.05	0.14	0.00	0.00	0.14	0.00	Kentuck Slough – approximately 60' wide	Likely	Likely
NW-117 (EE006A) &Trib to Coos Bay (EE06)	6.35R	Private	PEM	Flats	4.64	553.39	1147.78	1.18	1.84	0,00	3.02	0.00	Off-site determination south of Kentuck Slough. Slough sedge and reed canary grass dominate – includes ditched drainage – Tribto Coos Bay	Likely	Likely
Denied Access 01 Trib to Willanch Slough	7.99R	Private	R4SB	Riverine F/T	0.03	3.00	6.22	0.01	0.00	0.00	0.01	0.00	Denied access small headwater drainage interpreted with available data	Likely	Likely
Willanch Slough (EE007)	8.34R	Private	R2	Riverine F/T	0.11	14.07	29.19	0.03	0.00	0.00	0.03	0.00	Access denied – interpreted with available data.	Likely	Likely
GDX029 (EE008) Trib to Willanch Slough	8.43R	Private	R4	N/A	0.06	0.00	0.00	0.00	0.01	0.00	0.01	0.00	Roadside tributary to Willanch Slough. 2' wide, 3' deep with silt/gravel substrate	Likely	Likely
GDX030	8.48R	Private	R4	N/A	0.14	12.84	26.63	0.03	0.02	0,00	0.05	0.00	Incised tributary to Willanch Slough	Likely	Likely
GSI-31	8.49R	Private	R4	Riverine F/T	0.38	49.89	103.47	0.18	0.16	0.00	0.34	0.00	Intermittent stream in steep valley bottom. Flows into GDX030	Likely	Likely
GW34 Trib. to Coos River	9.55R	Private	R4	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Intermittent stream	Likely	Likely
SS-100-002 Tributary to Cooston Channel	10.22R	Private	R4	Riverine F/T	N/A	79.88	165.68	0.17	0.00	0.00	0.17	0.00	Coos River Crossing Brumschmidt - Canal/ditch – intermittent	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
SS-100-003 Trib to Coos River	10.79R	Private	R4	Riverine F/T	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Coos River Crossing Brumschmidt – intermittent stream	Likely	Likely
WW-100-001	11.01R	Private	PEM	Slope/Flats	N/A	665.10	1379.47	1.39	0.87	0.00	2.26	0.00	Freshwater Emergent Wetland	Likely	Likely
BSP119 Coos River	11.13R	State	R2OWN	Riverine F/T	9.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Coos River, ~650' wide	Likely	Likely
SS-100-004 Vogel Creek	11.53R	Private	R2UBHx	Riverine F/T	N/A	34.52	71.60	0.08	0.00	0.00	0.08	0.00	perennial stream	Likely	Likely
SS-100-005 Vogel Creek	11.58R	Private	R2UBHx	Riverine F/T	N/A	0.00	0.00	0.00	0.03	0.00	0.03	0.00	Coos River Crossing Brumschmidt –perennial stream	Likely	Likely
WW-100-002	11.77R	Private	PEM/ R2UBHx	Slope/Flats	N/A	5708.01	11838.84	12.36	11.17	0.00	23.53	0.00	Freshwater Emergent Wetland	Likely	Likely
SS-100-006 Tributary to Coos River	11.77R	Private	R2UBHx	Riverine F/T	N/A	8.78	18.21	0.02	0.02	0.00	0.04	0.00	Coos River Crossing Brumschmidt –perennial stream	Likely	Likely
SS-100-007 Tributary to Lillian Creek	11.91R	Private	R2UBHx	Riverine F/T	N/A	8.38	17.38	0.02	0.01	0.00	0.03	0.00	Coos River Crossing Brumschmidt –perennial stream	Likely	Likely
SS-100-002a Lillian Creek	12.07R	Private	R2UBHx	Riverine F/T	N/A	86.00	178.37	0.19	0.00	0.00	0.19	0.00	Coos River Crossing Brumschmidt –perennial stream	Likely	Likely
SS-100-008 Tributary to Coos River	12.22R	Private	R2UBHx	Riverine F/T	N/A	18.16	37.67	0.04	0.02	0.00	0.06	0.00	Coos River Crossing Brumschmidt – intermittent stream	Likely	Likely
Station equation added with the incorporation of WC-1A-2A (i.e., MP 12.39R = MP 8.59)															
BDX113	8.28	Private	R4UB3Cx	N/A	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	>10' wide ditch	Likely	Likely
BW111	8.51	Private	PEMC	Slope/Flats	7.14	759.73	1575.74	1.77	0.82	0.00	2.59	0.00	Agricultural field wetland	Likely	Likely
BDX109	8.51	Private	R4UB3Cx	N/A	0.10	5.72	11.86	0.01	0.00	0.00	0.01	0.00	25' drainage ditch associated with BW110	Likely	Likely
BDX 109A	8.73	Private	R4UB3Cx	N/A	0.03	4.45	9.22	0.01	0.00	0.00	0.01	0.00	Headwater wetland overflow that is ditched upstream and downstream of Wetland BW110	Likely	Likely
BW110	8.75	Private	PFOC	Slope/Flats	2.39	405.26	840.54	0.85	0.00	0.00	0.85	0.28	Forested alder/willow wetland	Likely	Likely
BSP104 Trib. to Catching Slough	9.02	Private	R2UB3H	Riverine F/T	0.02	2.33	4.83	0.01	0.00	0.00	0.01	0.00	2' wide, V-shaped ditch dominated by blackberry	Likely	Likely
BW106	9.18	Private	PFOC	Slope/Flats	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sedge-dominated wetland with alder overstory	Likely	Likely
BSP105 Trib. to Catching Slough	9.19	Private	R2UB3H	Riverine F/T	0.02	2.83	5.86	0.01	0.00	0.00	0.01	0.00	2-3' wide, forested, trapezoidal channel	Likely	Likely
BW108	9.20	Private	PFOC	Slope/Flats	0.26	0.00	0.00	<0.01	0.00	0.00	<0.01	0.00	Alder-forested wetland	Likely	Likely
DSI003 Trib. to Catching Slough	9.33	Private	R4UB3C	Riverine F/T	0.09	11.72	24.31	0.02	0.00	0.00	0.02	0.00	12-25' wide at TOB; 8-20' deep	Likely	Likely
DW001	9.45	Private	PFO/PSS/PEMC	Slope/Flats	0.18	20.14	41.77	0.04	0.00	0.00	0.04	0.01	Swale feature with alder and thimbleberry	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [i/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
DSP002 Trib. to Catching Slough	9.51	Private	R3SB1H	Riverine F/T	0.05	4.20	8.72	0.01	0.00	0.00	0.01	0.00	Deep draw, small perennial stream	Likely	Likely
Denied Access 03X Drainage Ditched to Monkey Ranch Gulch	10.05	Private	R4SBx	N/A	N/A	5.19	10.76	0.01	0.03	0.00	0.04	0.00	3-4' wide trapezoidal ditched to Monkey Ranch Gulch	Likely	Likely
Denied Access 02NW016A	10.13	Private	PEM	Slope/Flats	N/A	755.25	1566.45	1.59	0.26	0.00	1.85	0.00	Emergent Pasture connected to NW016through culvert	Likely	Likely
Denied Access 04X Drainage Ditched to Monkey Ranch Gulch	10.19	Private	R4SBx	N/A	N/A	7.29	15.11	0.02	0.00	0.00	0.02	0.00	3-4' wide trapezoidal ditched to Monkey Ranch Gulch	Likely	Likely
BW091	10.15	Private	PFOC	Slope/Flats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Willow and red alder-dominated wetland	Likely	Likely
BW089	10.15	Private	PEMC	Slope/Flats	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Grazed pasture wetland	Likely	Likely
Denied Access 05X Monkey Gulch	10.20	Private	R2UBHx	N/A	N/A	9.68	20.08	0.02	0.00	0.00	0.02	0.00	5-6' wide trapezoidal ditch channel Monkey Ranch Gulch	Likely	Likely
NW016	10.22	Private	PEMC	Slope/Flats	4.86	604.21	1253.18	1.29	0.31	0.00	1.60	0.00	Connected to BW89 and BW86	Likely	Likely
BW086	10.23	Private	PEMC	Slope/Flats	5.75	716.72	1486.53	1.51	0.89	0.00	2.40	0.00	Pasture wetland	Likely	Likely
BSP088 Stock Slough	10.32	Private	R2UBHx	Riverine F/T	0.17	15.67	32.51	0.03	0.00	0.00	0.03	0.00	Bermed perennial stream, 10-30' wide	BSP088StockSlough	10.32
BDX087	10.34	Private	R4UB3Cx	N/A	0.06	11.30	23.44	0.02	0.00	0.00	0.02	0.00	2-3' wide trapezoidal, excavated, unvegetated ditch	Likely	Likely
BL084 Pasture Pond	10.40	Private	PUBYx	N/A	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2-3' deep excavated pasture pond	Likely	Likely
BW085	10.95	Private	PEMC	Slope/Flats	56.61	706.97	1466.31	1.57	1.74	0.00	3.31	0.00	Agricultural field wetland, active pasture	Likely	Likely
BDX83	10.98	Private	R4UB1Cx	N/A	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	V-shaped seasonal ditch	Likely	Likely
BDX081	10.98	Private	R4UB1Cx	N/A	0.08	14.95	31.01	0.04	0.00	0.00	0.04	0.00	V-shaped seasonal ditch	Likely	Likely
BDX082	10.98	Private	R4UB1Cx	N/A	0.01	2.11	4.37	0.00	0.00	0.00	0.00	0.00	V-shaped seasonal ditch	Likely	Likely
BDX080	11.03	Private	R4UB1Cx	N/A	0.01	1.48	3.07	0.00	0.00	0.00	0.00	0.00	1' wide, 1' deep, V-shaped ditch	Likely	Likely
BSP079 Catching Slough	11.11	Private	R2OWN	Riverine F/T	2.39	256.83	532.68	0.55	0.00	0.00	0.55	0.00	Catching Slough, 200'wide	Likely	Likely
BW117	11.15	Private	PEMC	Slope/Flats	12.48	1331.34	2761.30	2.92	1.85	0.00	4.77	0.00	Grazed agricultural wetland	Likely	Likely
BDX118	11.29	Private	R4UB1Cx	N/A	0.09	9.24	19.17	0.02	0.00	0.00	0.02	0.00	30-40' wide trapezoidal ditch; drains agricultural field	Likely	Likely
BDX116	11.39	Private	R4UB1Cx	N/A	0.18	18.41	38.19	0.04	0.00	0.00	0.04	0.00	15' wide ditch at toe of slope drains agricultural field	Likely	Likely
BW115	11.45	Private	PFOC	Slope/Flats	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Red alder dominated wetland	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
BSP114 Trib. to Catching Slough	11.47	Private	R3UB3H	Riverine F/T	0.01	2.02	4.18	0.00	0.00	0.00	0.00	0.00	2' wide, V-shaped channel; upper portion intermittent	Likely	Likely
BSP103 Trib. to Catching Slough	11.78	Private	R2UB3H	Riverine F/T	0.03	3.07	6.37	0.01	0.00	0.00	0.01	0.00	2-4' wide forested, trapezoidal channel	Likely	Likely
BSP101 Trib. to Catching Slough	11.84	Private	R2UB3H	Riverine F/T	0.01	1.22	2.53	0.00	0.00	0.00	0.00	0.00	1' wide trapezoidal perennial stream	Likely	Likely
BW102	11.85	Private	PFOC	Slope/Flats	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Forested wetland connected to BSP101and BSP103	Likely	Likely
BSP100 Trib. to Catching Slough	11.87	Private	R2UB3H	Riverine F/T	0.04	4.76	9.87	0.01	0.00	0.00	0.01	0.00	Forested, U-shaped perennial stream	Likely	Likely
NSI041 Trib. to Catching Slough	12.05	Private	R4SBC	Riverine F/T	0.02	1.64	3.40	0.00	0.00	0.00	0.00	0.00	Forested stream	Likely	Likely
NSI092 Trib. to Catching Slough	12.27	Private	R4SBC	Riverine F/T	0.04	4.99	10.35	0.01	0.00	0.00	0.07	0.00	Hillside stream	Likely	Likely
NSI093 Trib. to Catching Slough	12.31	Private	R4SBC	Riverine F/T	0.04	4.00	8.30	0.01	0.00	0.00	0.01	0.00	Hillside stream	Likely	Likely
NSI094 Trib. to Catching Slough	12.39	Private	R4SBC	Riverine F/T	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Hillside stream	Likely	Likely
NSI095 Trib. to Catching Slough	12.39	Private	R4SBC	Riverine F/T	0.06	66.76	138.47	0.02	0.00	0.00	0.02	0.00	Hillside stream	Likely	Likely
NSI096 Trib. to Catching Slough	12.41	Private	R4SBC	Riverine F/T	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Hillside stream	Likely	Likely
NSI097 Trib. to Catching Slough	12.45	Private	R4SBC	Riverine F/T	0.05	5.54	11.49	0.01	0.00	0.00	0.01	0.00	Hillside stream	Likely	Likely
NSI098 Trib. to Catching Slough	12.52	Private	R4SBC	Riverine F/T	0.04	6.14	12.73	0.01	0.00	0.00	0.01	0.00	Hillside stream nearBSP220	Likely	Likely
BSP220 Trib. to Catching Slough	12.58	Private	R4SBC	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Trap-shaped channel; 4' wide	Likely	Likely
BW221	12.66	Private	PEMC	Slope/Flats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Herb Wetland/Pasture	Likely	Likely
BSP120 Trib. to Ross Slough	12.66	Private	R2SB3C	Riverine F/T	0.08	0.00	0.00	0.02	0.00	0.00	0.02	0.00	Spring-fed stream similar to BSP121	Likely	Likely
BSP121 Trib. to Ross Slough	12.68	Private	R2SB3C	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2' wide, V-shaped seep fed stream; 3% gradient	Likely	Likely
BW223	12.75	Private	PEMB	Slope/Flats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Herb Wetland	Likely	Likely
BW224	12.76	Private	PEMB	Slope/Flats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Herb Wetland	Likely	Likely
BW225	12.77	Private	PEMB	Slope/Flats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Herb Wetland	Likely	Likely
BSP122 Trib. to Ross Slough	12.83	Private	R2SB3C	Riverine F/T	0.06	1.23	2.55	0.01	0.00	0.00	0.01	0.00	Spring-fed stream, flowing water	Likely	Likely
BSP124 Trib. to Ross Slough	12.82	Private	R2SB3C	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Similar to BSP123	Likely	Likely
BSP123 Trib. to Ross Slough	12.83	Private	R2SB3C	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-15' wide, trapezoidal channel; 3% gradient	Likely	Likely
BSP125 Trib. to Ross Slough	12.90	Private	R2SB3C	Riverine F/T	0.05	5.82	12.06	0.02	0.00	0.00	0.02	0.00	Spring-fed perennial drainage similar toBSP123	Likely	Likely
CSP031 Trib. to Ross Slough	12.97	Private	R3UB1F	Riverine F/T	0.04	4.21	8.74	0.01	0.00	0.00	0.01	0.00	4' wide, 2-3" deep flow,2-5% gradient	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f/] (or fill) (acres)	Wetland Description [g/]	Regulated by the COE	Regulated by the ODSL
CSP030 Trib. to Ross Slough	13.01	Private	R3UB1F	Riverine F/T	0.03	3.01	6.24	0.01	0.00	0.00	0.01	0.00	3' wide, 1-2" deep; 2-5%gradient	Likely	Likely
CSP029 Trib. to Ross Slough	13.11	Private	R3UB1F	Riverine F/T	0.04	4.19	8.70	0.01	0.00	0.00	0.01	0.00	4' wide, 2-3" deep; 2-5%gradient	Likely	Likely
CSP028 Ross Slough	13.55	Private	R3UB1F	Riverine F/T	0.04	3.83	7.95	0.01	0.00	0.00	0.01	0.00	4' wide, 2-3" deep, 2-5%gradient	Likely	Likely
CSP027 Trib. to Ross Slough	13.61	Private	R3UB1F	Riverine F/T	0.02	2.18	4.52	0.00	0.00	0.00	0.00	0.00	5' wide, 2-3" deep slow water; 2-5% gradient	Likely	Likely
CSP026 Trib. to Ross Slough	13.70	Private	R3UB1F	Riverine F/T	0.02	4.31	8.94	0.01	0.00	0.00	0.01	0.00	2' wide, 2-3" deep; 5-10% gradient	Likely	Likely
EDX078 Boone Creek	15.71	Private	R3SBH	Riverine F/T	0.03	4.64	9.63	0.01	0.01	0.00	0.02	0.00	Boone Creek	Likely	Likely
EW079	15.74	Private	PEMC	Slope/Flats	2.99	276.12	572.70	0.54	0.64	0.00	1.18	0.00	Agricultural wetland adjacent to Boone Creek	Likely	Likely
EDX080 Trib. to Boone Creek	15.77	Private	R3WBH	Riverine F/T	0.05	4.10	8.51	0.01	0.00	0.00	0.01	0.00	Drainage ditch to Boone Creek	Likely	Likely
CSI038	16.13	Private	R4SB3C	Riverine F/T	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1' wide, <1" water depth	Likely	Likely
CSI037 Trib. to Boone Creek	16.36	Private	R4SB3C	Slope/Flats	0.01	1.14	2.37	0.00	0.00	0.00	0.00	0.00	1' wide, 1" water depth	Likely	Likely
CSP036 Trib. to Boone Creek	16.36	Private	R3UB1F	Riverine F/T	0.04	4.23	8.77	0.01	0.00	0.00	0.01	0.00	4' wide, 2-3" deep	Likely	Likely
CSI035 Trib. to Boone Creek	16.39	Private	R4SB3C	Slope/Flats	0.01	1.02	2.12	0.00	0.00	0.00	0.00	0.00	1' wide, V-shaped channel, <1" water depth	Likely	Likely
CW025	16.53	Private	PEMC	Slope/Flats	0.07	24.44	50.69	0.03	0.00	0.00	0.03	0.00	Small seep/spring wetland within Douglas fir forest	Likely	Likely
CSP024 Trib. to Catching Creek	16.56	Private	R3UB1F	Riverine F/T	0.02	1.53	3.17	0.00	0.00	0.00	0.00	0.00	1.5' wide at OHWM, <2"deep; channel within ravine	Likely	Likely
CSP023 Trib. to Catching Creek	16.62	Private	R3UB1F	Riverine F/T	0.03	3.08	6.39	0.01	0.00	0.00	0.01	0.00	3' wide at OHWM, <2"deep, slow water	Likely	Likely
CSP022 Trib. to Catching Creek	16.71	Private	R3UB1F	Riverine F/T	0.02	2.34	0.86	0.00	0.00	0.00	0.00	0.00	2' wide, <1" deep	Likely	Likely
CSP021 Trib. to Catching Creek	16.73	Private	R3UB1F	Riverine F/T	0.05	5.01	10.39	0.01	0.00	0.00	0.01	0.00	Ave.5' wide at OHWM,<2" deep; within ravine	Likely	Likely
CSP020 Trib. to Catching Creek	16.78	Private	R3UB1F	Riverine F/T	0.04	5.81	12.05	0.01	0.00	0.00	0.01	0.00	Tributary to CSP18	Likely	Likely
CSP019 Trib. to Catching Creek	16.82	Private	R3UB1F	Riverine F/T	0.03	3.00	6.22	0.01	0.00	0.00	0.01	0.00	3' wide at OHWM, U-shaped channel, <2" water depth	Likely	Likely
CSP018 Trib. to Catching Creek	16.85	Private	R3UB1F	Riverine F/T	0.05	8.46	17.66	0.02	0.00	0.00	0.02	0.00	5' wide at OHWM, U-shaped channel, 0.5'water depth	Likely	Likely
Trib to Catching Creek (BLM 17.42)	17.42	BLM – Coos Bay District	R4SB	Riverine F/T	0.02	4.05	8.39	0.00	0.00	0.00	0.00	0.00	1' wide V-shaped intermittent stream fed by road drainage	Likely	Likely
CSP033 Catching Creek	17.47	Private	R3UB1F	Riverine F/T	0.23	4.25	8.82	0.01	0.00	0.00	0.01	0.00	1' wide, 2-5% gradient; spring-fed stream	Likely	Likely
					Total	**26,988.47**	**5,8627.32**	**104.23**	**27.50**	**0.00**	**131.73**	**0.29**			

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c] (or fill) (acres)	Wetland Description [d]	Regulated by the COE	Regulated by the ODSL
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), Coquille River (HUC 1710030505) Fifth field Watershed [e], Coos County, Oregon															
CSP032 Trib. to Cunningham Creek	17.87	Private	R3UB1F	Riverine F/T	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1' wide, 2-5% gradient; spring-fed stream	Likely	Likely
BSP092 Trib. to Cunningham Creek	18.20	Private	R3UB1H	Riverine F/T	0.02	2.32	4.82	0.00	0.00	0.00	0.00	0.00	2' wide perennial stream	Likely	Likely
BSP093 Trib. to Cunningham Creek	18.28	Private	R2UB3H	Riverine F/T	0.02	1.34	2.78	0.00	0.00	0.00	0.00	0.00	1' wide stream	Likely	Likely
BSI094 Trib. to Cunningham Creek	18.28	Private	R2UB3H	Riverine F/T	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1' wide intermittent stream	Likely	Likely
BSP095 Trib. to Cunningham Creek	18.33	Private	R2UB3H	Riverine F/T	0.01	1.38	2.87	0.00	0.00	0.00	0.00	0.00	Forested, V-shaped perennial stream	Likely	Likely
BSI096 Trib. to Cunningham Creek	18.48	Private	R4SB3C	Riverine F/T	0.01	1.08	2.24	0.00	0.00	0.00	0.00	0.00	Broad V-Shaped, disturbed channel	Likely	Likely
NSP042 Cunningham Creek	18.93	Private	R3SB1H	Riverine F/T	0.27	37.68	78.16	0.06	0.00	0.00	0.06	0.00	Cunningham Creek	Likely	Likely
NSP043 Trib. to Cunningham Creek	19.06	Private	R3SB1H	Riverine F/T	0.26	24.58	50.99	0.06	0.00	0.00	0.06	0.00	Tributary to Cunningham Creek	Likely	Likely
					Total	**68.38**	**141.86**	**0.12**	**0.00**	**0.00**	**0.12**	**0.00**			
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), North Fork Coquille River (HUC 1710030504) Fifth field Watershed [e], Coos County, Oregon															
ESI028 Trib. to Steele Creek	20.34	BLM – Coos Bay District	R3SB1H	Riverine F/T	0.05	6.57	13.63	0.01	0.00	0.00	0.01	0.00	2-3' wide v-shaped channel, 6' deep, in 30year old PSME forest, tributary to Steele Creek	Likely	Likely
ESI028 Trib. to Steele Creek	20.59	BLM – Coos Bay District	R3SB1H	Riverine F/T	0.14	3.14	6.50	0.01	0.00	0.00	0.01	0.00	2-3' wide v-shaped channel, 6' deep, in 30year old PSME forest, tributary to Steele Creek	Likely	Likely
Denied Access 06 Trib. to Steele Creek	20.72	Private	R4SB	Riverine F/T	N/A	3.01	6.24	0.01	0.00	0.00	0.01	0.00	Small 1-3' wide headwater Stream Assumed	Likely	Likely
Denied Access 07Trib. to Steele Creek	20.79	Private	R4SB	Riverine F/T	N/A	1.51	3.12	0.00	0.00	0.00	0.00	0.00	Small 1-3' wide headwater Stream Assumed	Likely	Likely
Denied Access 08 Trib. to Steele Creek	20.94	Private	R4SB	Riverine F/T	N/A	1.64	3.41	0.01	0.00	0.00	0.01	0.00	Small 1-3' wide headwater Stream Assumed	Likely	Likely
NSP015 Steele Creek	21.10	Private	R3SB1H	Riverine F/T	0.26	12.10	25.09	0.03	0.00	0.00	0.03	0.00	Steele Creek, within forested area	Likely	Likely
Denied Access 09 Trib. to Steele Creek	21.13	Private	R4SB	Riverine F/T	N/A	1.50	3.11	0.00	0.00	0.00	0.00	0.00	Small 1-3' wide headwater Stream Assumed		
ESI029 Trib. to Steele Creek	21.36	BLM – Coos Bay District	R3SB1H	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3' wide incised intermittent stream in30-40 year old PSME forest, tributary to Steele Creek.	Likely	Likely
Denied Access 10X	22.72	Private	R4SBx	N/A	N/A	1.63	3.39	0.00	0.00	0.00	0.00	0.00	3* wide ditch; drains agricultural field	Likely	Likely
NW040	22.80	Private	PEMC	Slope/Flats	0.18	22.59	46.85	0.05	0.00	0.00	0.05	0.00	Wetland	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b])	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c] (or fill) (acres)	Wetland Description [a]	Regulated by the COE	Regulated by the ODSL
BSP207 North Fork Coquille River	23.06	Private	R2UBH	Riverine F/T	0.20	20.66	42.84	0.04	0.00	0.00	0.04	0.00	N. Fork Coquille River, only flagged north bank, no access; 20' wide	Likely	Likely
CW010	23.38	BLM – Coos Bay District	PFOC	Slope/Flats	0.62	173.67	360.20	0.38	0.08	0.00	0.46	0.12	Red alder dominated low area	Likely	Likely
CW011	23.53	BLM – Coos Bay District	PFOC	N/A	0.07	0.00	0.00	0.07	0.00	0.00	0.07	0.00	Subtle depression, similar to CW10	Likely	Likely
BSI137 Trib. to Middle Creek	27.01	BLM – Coos Bay District	R4SB3C	Riverine F/T	0.01	12.70	26.33	0.01	0.00	0.00	0.01	0.00	3-7' wide, parallel to BSI136, ~10% gradient at top	Likely	Likely
BSI136 Trib. to Middle Creek	27.02	BLM – Coos Bay District	R4SB3C	Riverine F/T	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	2-4' wide intermittent drain; joins BSI 135near Middle Creek	Likely	Likely
BW134	27.02	BLM – Coos Bay District	PEMC	Slope/Flats	0.18	0.00	0.00	0.01	0.00	0.00	0.01	0.00	Flat area; intermittent stream outfalls from wetland	Likely	Likely
BSP133 Middle Creek	27.04	BLM – Coos Bay District	R2SB4H	Riverine F/T	0.46	64.99	134.79	0.13	0.00	0.00	0.13	0.00	Middle Creek-steep banks, 30-60' wide,<2% gradient	Likely	Likely
BSI135 Trib. to Middle Creek	27.04	BLM – Coos Bay District	R4SB3C	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Narrow intermittent drainage that starts atBW134, steep at top	Likely	Likely
					Total	**325.71**	**675.50**	**0.77**	**0.08**	**0.00**	**0.85**	**0.12**			
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), East Fork Coquille River (HUC 1710030503) Fifth field Watershed [d], Coos County, Oregon															
BSP077 Trib. to E. Fork Coquille	28.86	Private	R3SB1F	Riverine F/T	0.11	12.48	25.89	0.03	0.00	0.00	0.03	0.00	Forested 1-8' wide stream; 30-40% gradient	Likely	Likely
BSI078 Trib. to E. Fork Coquille	28.86	Private	R4UB1C	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<1' wide runoff channel connects to BSP77; 30-40% grade	Likely	Likely
NSI099 Trib. to E. Fork Coquille	29.18	Private	R4UBC	Riverine F/T	0.06	6.23	12.93	0.01	0.00	0.00	0.01	0.00	Connects (extension of) BSI073	Likely	Likely
BSP074 Trib. to E. Fork Coquille	29.28	Private	R4UBC	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3-6' wide, 5-10%gradient, recently logged area	Likely	Likely
BSI075 Trib. to E. Fork Coquille	29.36	Private	R4UBC	Riverine F/T	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Ephemeral <1' wide stream; 10-30%gradient	Likely	Likely
BSI073 Trib. to E. Fork Coquille	29.49	Private	R3SB1H	Riverine F/T	0.08	10.26	21.29	0.02	0.00	0.00	0.02	0.00	1-5' wide intermittent feeder stream to BSP074.	Likely	Likely
BW072	29.52	Private	PEMC	Slope/Flats	0.85	32.78	67.99	0.23	0.00	0.00	0.23	0.00	Pasture wetland fed by hillside seeps	Likely	Likely
BSI076 Trib. to E. Fork Coquille	29.53	Private	R4SB1C	N/A	0.08	5.48	11.37	0.01	0.00	0.00	0.01	0.00	Intermittent stream connected to BSP74 outside corridor	Likely	Likely
BSP071 East Fork Coquille River	29.88	Private	R3OWH	Riverine F/T	0.60	61.91	128.42	0.15	0.00	0.00	0.15	0.00	East Fork Coquille River	Likely	Likely
BW250	29.91	Private	PSS1D	Slope/Flats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Riparian wetland	Likely	Likely
Denied Access 11 Trib. To East Fork Coquille River	30.21	Private	R4SB	Riverine F/T	N/A	1.50	3.12	0.00	0.00	0.00	0.00	0.00	3* wide ditch; drains agricultural field	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c/] (or fill) (acres)	Wetland Description [d/]	Regulated by the COE	Regulated by the ODSL
Denied Access 12 Trib. To East Fork Coquille River	30.27	Private	R4SB	Riverine F/T	N/A	1.51	3.13	0.00	0.00	0.00	0.00	0.00	3* wide ditch; drains agricultural field	Likely	Likely
NSI115 Trib. to E. Fork Coquille	31.26	Private	R4UBC	Riverine F/T	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Tributary to East Fork Coquille River	Likely	Likely
BSI070 Trib. to E. Fork Coquille	31.64	BLM – Coos Bay District	R4UB1C	Riverine F/T	0.01	1.16	2.41	0.00	0.00	0.00	0.00	0.00	1' wide, flows subsurface in areas	Likely	Likely
BSI069 Trib. to E. Fork Coquille	31.76	BLM – Coos Bay District	R4UB1C	Riverine F/T	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2' wide, 10-20%gradient	Likely	Likely
BSI068 Trib. to E. Fork Coquille	31.87	BLM – Coos Bay District	R4UB1C	Riverine F/T	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2' wide, 10-20%gradient	Likely	Likely
BSI059 Trib. to E. Fork Coquille	32.34	BLM - Coos Bay District/Private	R4UB4C	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Continues upslope from BSI58 beyond culvert under road	Likely	Likely
BSI058 Trib. to E. Fork Coquille	32.34	Private	R4UB4C	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1-2' wide, 20-40%gradient	Likely	Likely
BSP057 Elk Creek	32.40	Private	R3RB2H	Riverine F/T	0.09	7.67	15.91	0.01	0.00	0.00	0.01	0.00	3-10' wide, 1-5%gradient stream at base of canyon	Likely	Likely
BSP055 Trib. to Elk Creek	32.44	Private	R3SB1H	Riverine F/T	0.04	3.50	7.26	0.01	0.00	0.00	0.01	0.00	Elk Creek; 1-5%gradient; 1-5' wide	Likely	Likely
BW056 Trib. to Elk Creek	32.45	Private	PEMC	Slope/Flats	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Wet depression at confluence of BSP55and BSI53	Likely	Likely
BSI053 Trib. to Elk Creek	32.47	Private	R4SB1C	Riverine F/T	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Seep/runoff fed stream;1-5' wide; 5-20%gradient	Likely	Likely
BSI054 Trib. to Elk Creek	32.52	Private	R4SB1C	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2' side seep/runoff stream; 5-20% gradient; joins BSI53	Likely	Likely
BSI052 Trib. to Elk Creek	32.70	Private	R4SB1C	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Seep/runoff fed stream;1-10' wide; riffle/pool; 3-5% grade	Likely	Likely
BSI051 Trib. to Elk Creek	32.72	Private	R4SB1C	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Forested ephemeral stream, joins BSI51; 3-5% gradient	Likely	Likely
BSP049 Trib. to Elk Creek	32.99	Private	R3SB1C	Riverine F/T	0.08	9.79	20.30	0.02	0.00	0.00	0.02	0.00	10' average width; 2-3%gradient	Likely	Likely
BSP050 Trib. to Elk Creek	33.02	Private	R3SB1C	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2' average width; 2%gradient, trapezoidal channel, seep	Likely	Likely
CW006	34.44	Private	PEMC	Slope/Flats	0.01	7.63	15.83	0.01	0.00	0.00	0.01	0.00	Similar to CW4,adjacent to Elk Creek	Likely	Likely
CSP005 S. Fork Elk Creek	34.46	Private	R3SB1H	Riverine F/T	0.15	49.40	102.45	0.04	0.00	0.00	0.04	0.00	Elk Creek; 10-15' wetted width; <2%gradient	Likely	Likely
CW004	34.46	Private	PEMC	Slope/Flats	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Fringe wetland associated with Elk Creek	Likely	Likely
BSI251 Trib. to S. Fork Elk Creek	35.51	BLM – Coos Bay District	R4UB1J	Riverine F/T	0.04	4.12	8.55	0.01	0.00	0.00	0.01	0.00	Intermittent stream	Likely	Likely
					Total	**215.42**	**446.85**	**0.55**	**0.00**	**0.00**	**0.55**	**0.00**			

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f] (or fill) (acres)	Wetland Description [g]	Regulated by the COE	Regulated by the ODSL
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501) Fifth field Watershed [d], Coos County, Oregon															
BLM 35.9 Trib. to Big Creek	35.87	BLM – Coos Bay District	R4SB	Riverine F/T	0.02	1.50	3.11	0.00	0.00	0.00	0.00	0.00	3* wide ditch; drains agricultural field	Likely	Likely
BLM 36.48 Trib. to Big Creek	36.48	BLM – Coos Bay District	R4SB	Riverine F/T	0.02	2.26	4.68	0.00	0.00	0.00	0.00	0.00	3* wide ditch; drains agricultural field	Likely	Likely
GSI025/BSI253	36.54	BLM – Coos Bay District	R4UB1J	Riverine F/T	0.06	6.00	12.44	0.01	0.00	0.00	0.01	0.00	Intermittent stream, 4' average width	Likely	Likely
BLM 36.85 Trib. to Big Creek	36.85	BLM – Coos Bay District	R4SB	Riverine F/T	0.01	1.50	3.11	0.00	0.00	0.00	0.00	0.00	3* wide ditch; drains agricultural field	Likely	Likely
BSI252 Trib. to Big Creek	36.92	BLM – Coos Bay District	R4UB1J	Riverine F/T	0.03	3.00	6.22	0.01	0.00	0.00	0.01	0.00	Intermittent stream, 3' average width	Likely	Likely
ESI019 Trib. to Big Creek	37.33	BLM – Coos Bay District	R4UB1J	Riverine F/T	0.03	2.75	5.70	0.01	0.00	0.00	0.01	0.00	Narrow creek	Likely	Likely
ESP020 Trib. to Big Creek	37.35	BLM – Coos Bay District	R3UB1H	Riverine F/T	0.20	14.93	30.97	0.05	0.00	0.00	0.05	0.00	10-15' wide broad U-shaped channel with cobble/silt substrate	Likely	Likely
CW001	43.62	Private	PEM/R4UB1Cx	N/A	0.01	0.61	1.27	0.00	0.00	0.00	0.00	0.00	Small wet ditch west of logging road; wetland vegetation	Likely	Likely
BSP041 Upper Rock Creek	44.21	Private	R3UB1C	Riverine F/T	0.30	16.04	33.26	0.03	0.00	0.00	0.03	0.00	Unnamed perennial stream	Likely	Likely
CSI008	44.21	Private	R4SB3C	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Intermittent stream/seep	Likely	Likely
CW007	44.27	Private	PEMC	Slope/Flat	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Depressional area east of Rock Creek	Likely	Likely
					Total	**48.59**	**100.76**	**0.11**	**0.00**	**0.00**	**0.11**	**0.00**			
Klamath Mountains Ecoregion, Coquille Sub-basin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501) Fifth field Watershed [c], Douglas County, Oregon															
BW038	46.49	Private	PFO1	Riverine Imp.	0.45	44.78	92.88	0.08	0.00	0.00	0.08	0.03	Riverine impounding wetland adjacent to road, in clear cut	Likely	Likely
BSP257 Deep Creek	48.27	BLM – Roseburg District	R3UB1H	Riverine F/T	0.79	80.89	167.77	0.16	0.00	0.00	0.16	0.00	Perennial stream	Likely	Likely
BSI033 Trib to Wildcat Creek	49.39	Private	R4UB1C	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2' wide, 4-6' deep ditch that flows into BSP34;0-1% grade	Likely	Likely
BW037	49.36	Private	PEM	Slope/Flat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Small emergent wetland adjacent to BW036 on bench 8-10' higher than BSP34	Likely	Likely
BW036	49.37	Private	PEM	Slope/Flat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Small emergent wetland adjacent to BW035	Likely	Likely
BW035	49.38	Private	PEM	Slope/Flat	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Small emergent wetland with narrow, steep channel into BSP034	Likely	Likely
BSP34 Wildcat Creek	49.38	Private	R3RB2C	Riverine F/T	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Wildcat Creek	Likely	Likely
BDX032	49.94	Private	R4UB1Cx	N/A	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1-5' wide U-shaped drainage ditch perpendicular to BDX31	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f] (or fill) (acres)	Wetland Description [g]	Regulated by the COE	Regulated by the ODSL
BDX031	50.02	Private	R4UB1Cx	N/A	0.03	3.50	7.26	0.01	0.00	0.00	0.01	0.00	3-5' wide trapezoidal drainage ditch along farm fence line	Likely	Likely
BSP030 Middle Fork Coquille River	50.28	Private	R2OWH	Riverine F/T	0.38	45.14	93.63	0.08	0.00	0.00	0.08	0.00	Middle Fork Coquille River; 1-3% gradient,15-25' wide	Likely	Likely
GDX36BSI066/067 Trib. to Middle Fork Coquille	50.45	Private	R4UB3C	Riverine F/T	0.07	2.63	5.46	0.01	0.00	0.00	0.01	0.00	BSI066 Up to 1' wide. BSI067 continues to the rerouted alignment. 2-3'wide channel with upland forest species.	Likely	Likely
GSI037/BSP061 Trib. to Middle Fork Coquille	50.74	Private	R4UB1	Riverine F/T	0.06	5.60	11.61	0.01	0.00	0.00	0.01	0.00	3-10' wide stream in forest. Gravel substrate with 2-6" deep water	Likely	Likely
GSI038 Trib to Middle Fork Coquille	51.02	BLM - Roseburg District	R4	Riverine F/T	0.06	4.39	9.10	0.01	0.00	0.00	0.01	0.00	Ephemeral drainage, no defined channel with vine maple and lady fern	Unlikely	Unlikely
GW-39	52.05	Private	PEM	Depressional	0.15	0.00	0.00	0.00	0.01	0.00	0.01	0.00	Small pond in borrow pit, likely man-made and isolated. Contains bentgrass, soft rush, and pennyroyal with some willows	Unlikely	Unlikely
					Total	**186.93**	**387.71**	**0.36**	**0.01**	**0.00**	**0.37**	**0.03**			
Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), Olalla Creek-Lookingglass Cr (HUC 1710030212) Fifth field Watershed [c], Douglas County, Oregon															
BSI202 Trib. to Shields Creek	55.90	Private	R4SB3C	Riverine F/T	0.36	55.38	114.87	0.14	0.00	0.00	0.14	0.00	Small ephemeral drainage in heavily grazed pasture	Likely	Likely
BSI203 Trib. to Shields Creek	55.94	Private	R4SB3C	Riverine F/T	0.10	8.03	16.65	0.02	0.00	0.00	0.02	0.00	Intermittent stream, portions of which are grazed	Likely	Likely
BW164	55.98	Private	PEMC	Slope/Flats	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Depressional swale dominated by pennyroyal	Likely	Likely
Access Denied 13 Trib to Shields Creek	56.28	Private	R4SB	Riverine F/T	N/A	1.50	3.11	0.00	0.00	0.00	0.00	0.00	Access denied – Waterbody assumed PNW Hydrography (1235757430747) & high resolution aerial photo	Likely	Likely
Access Denied 14 Trib to Shields Creek	56.34	Private	R4SB	Riverine F/T	N/A	1.55	3.20	0.00	0.00	0.00	0.00	0.00	Access denied – Waterbody assumed PNW Hydrography (1235785 430811) & high resolution aerial photo	Likely	Likely
BSP152	56.35	Private	R2	Riverine F/T	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Perennial stream		
Denied Access 15 Trib to Shields Creek	56.71	Private	PFO	Slope/Flats	N/A	420.83	872.84	0.72	0.24	0.00	0.96	0.29	Access denied - Ash dominated wetland	Likely	Likely
BW160	56.75	Private	PFOC	Slope/Flats	0.28	86.55	179.52	0.14	0.13	0.00	0.27	0.06	Adjacent to BW161, separated by a gravel road	Likely	Likely
BW161	56.78	Private	PFOC	Slope/Flats	0.57	71.16	147.60	0.09	0.10	0.00	0.19	0.05	Ash dominated wetland	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
BW162	56.83	Private	PFO/PEMC	Slope/Flats	0.42	98.88	205.09	0.24	0.00	0.00	0.24	0.07	Spring-fed wetland with forested and emergent portions	Likely	Likely
BW163	56.97	Private	PFO/PEMC	Slope/Flats	2.73	573.75	1190.01	1.20	0.13	0.00	1.33	0.40	Continuation of BW162 on east side of driveway	Likely	Likely
BSI139	57.02	Private	R4SB1C	Riverine F/T	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Narrow int drain that joins BSI 138; < 2%gradient	Likely	Likely
BSI140 Trib. Olalla Creek	57.11	Private	R4SB1C	Riverine F/T	0.04	4.52	9.38	0.01	0.00	0.00	0.01	0.00	Narrow intermittent drain that joins BSI 138;<2% gradient	Likely	Likely
BSI140 Trib. Olalla Creek	57.14	Private	R4SB1C	Riverine F/T	0.03	2.01	4.16	0.00	0.00	0.00	0.00	0.00	Narrow intermittent drain that joins BSI 138;<2% gradient	Likely	Likely
BW142	57.18	Private	PEMC	Slope/Flats	0.34	143.57	297.77	0.24	0.02	0.00	0.26	0.00	Seep-fed wetland on gentle slope aboveBW141	Likely	Likely
BW141	57.25	Private	PEMC	Slope/Flats	1.10	0.00	0.00	0.05	0.02	0.00	0.07	0.00	Depressional area infield, compacted soils	Likely	Likely
BSI138 Trib. to Olalla Creek	57.31	Private	R4SB1C	Riverine F/T	0.15	5.03	10.43	0.01	0.00	0.00	0.01	0.00	2-10' wide, <2%gradient, incised channel	Likely	Likely
BDX143	57.35	Private	R4UB1Cx	N/a	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Roadside ditch, <1'wide; <2% gradient	Likely	Likely
BW144	57.46	Private	PEMC	Slope/Flats	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Slight depressional feature in agricultural field	Likely	Likely
BW145	57.46	Private	PEMC	Slope/Flats	0.04	0.00	0.00	0.03	0.00	0.00	0.03	0.00	Very small swale, connected to BW146	Likely	Likely
BW146	57.48	Private	PEMC	Slope/Flats	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Adjacent to ash swale, low corner of field	Likely	Likely
BSI147/EE012 Trib. to Olalla Creek	57.84	Private	R4SB3C	Riverine F/T	0.04	4.26	8.84	0.01	0.00	0.00	0.01	0.00	3-12' (average 4') wide, incised. Banks to 5' high. Cobble/gravel	Likely	Likely
BDX148	57.96	Private	R4UB3Cx	N/A	0.01	1.20	2.49	0.00	0.00	0.00	0.00	0.00	1' wide irrigation canal	Likely	Likely
BW150	58.07	Private	PEMC	Slope/Flats	1.19	87.57	181.64	0.26	0.03	0.00	0.29	0.00	Along edge of corridor, connects to BSI151	Likely	Likely
BSI151 Trib. to Olalla Creek	58.20	Private	R4SB3C	Riverine F/T	0.03	3.06	6.36	0.01	0.00	0.00	0.01	0.00	2-3' wide, <5% gradient, U-shaped channel	Likely	Likely
BSP152 Olalla Creek	58.35	Private	R2SB3H	Riverine F/T	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Olalla Creek	Likely	Likely
BW158	58.42	Private	PEMC	Slope/Flats	1.08	176.61	366.29	0.37	0.04	0.00	0.41	0.00	Low area receives hydrology from irrigation	Likely	Likely
BDX157	58.49	Private	R4UB3Cx	N/A	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigation ditch, dissipates in an saturated upland area	Likely	Likely
BW156	58.49	Private	PEMC	Slope/Flats	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Bowl-shaped depression adjacent to Olalla Creek	Likely	Likely
BSP159 Trib. to Olalla Creek	58.55	Private	R2SB1H	Riverine F/T	0.19	10.60	21.99	0.03	0.00	0.00	0.03	0.00	Overflow channel of Olalla Creek, ends abruptly in a pool	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b])	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c] (or fill) (acres)	Wetland Description [d]	Regulated by the COE	Regulated by the ODSL
BSP155 Olalla Creek	58.77	Private	R2SB1H	Riverine F/T	1.82	77.90	161.58	0.17	0.00	0.00	0.17	0.00	Olalla Creek; <5%gradient, 50' wide at TOB	Likely	Likely
BW154	58.98	Private	PEMC	Slope/Flats	1.43	222.59	461.68	0.51	0.05	0.00	0.56	0.00	100' west of BDX153, similar to BW146	Likely	Likely
BDX153	59.02	Private	R4UB1Cx	N/A	0.04	3.49	7.25	0.01	0.00	0.00	0.01	0.00	2-4' wide, 2-3' deep ditch	Likely	Likely
BSI132 Trib. to Olalla Creek	59.29	Private	R4SB3C	Riverine F/T	0.09	8.65	17.94	0.02	0.00	0.00	0.02	0.00	Mostly <2% gradient, deeply incised, 2-8'wide	Likely	Likely
BW131	59.53	Private	PEMC	Slope/Flats	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Hillside wetland fed by culvert under log road	Likely	Likely
BW130	59.55	Private	PEMC	Slope/Flats	0.04	0.00	0.00	0.04	0.00	0.00	0.04	0.00	Small seep wetland at farm road cut and below	Likely	Likely
BSI129 Trib. to Olalla Creek	59.65	Private	R4SB3C	Riverine F/T	0.15	18.72	38.83	0.03	0.00	0.00	0.03	0.00	< 2% gradient, cobble/gravel, 6-12'wide, mostly dry	Likely	Likely
BW128	59.85	Private	PEMC	Slope/Flats	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Seep wetland within swale/bowl-shaped depression	Likely	Likely
BW127	59.93	Private	PEMC	Slope/Flats	1.06	120.18	249.26	0.25	0.03	0.00	0.28	0.00	Seep-fed subtle swale, connects to BW126; heavily grazed	Likely	Likely
BW126	60.00	Private	PEMC	Slope/Flats	0.06	7.04	14.60	0.01	0.00	0.00	0.01	0.00	Swale-like wetland dominated by pennyroyal	Likely	Likely
NSP014 Trib. to McNabb Creek	60.13	Private	R3SB1H	Riverine F/T	0.06	6.01	12.46	0.01	0.00	0.00	0.01	0.00	Forested tributary to McNabb Creek	Likely	Likely
NSP013 McNabb Creek	60.49	Private	R3SB1H	Riverine F/T	0.13	10.96	22.73	0.03	0.00	0.00	0.03	0.00	McNabb Creek	Likely	Likely
					Total	**2,231.6**	**4,628.57**	**4.65**	**0.79**	**0.00**	**5.44**	**0.87**			
Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), Clark Branch-South Umpqua River (HUC 1710030211) Fifth field Watershed [e], Douglas County, Oregon															
BSI241 Trib. to Kent Creek	63.95	Private	R4UB1J	Riverine F/T	0.03	0.00	0.00	0.01	0.00	0.00	0.01	0.00	Tributary to Kent Creek	Likely	Likely
BSP240 Kent Creek	63.95	Private	R2UB1H	Riverine F/T	0.45	61.66	127.88	0.12	0.00	0.00	0.12	0.00	Kent Creek	Likely	Likely
BSP227 Rice Creek	65.76	Private	R3SB1H	Riverine F/T	0.50	132.94	275.72	0.14	0.00	0.00	0.14	0.00	Rice Creek	Likely	Likely
BW229	65.83	Private	PEMC	Slope/Flats	0.01	17.51	36.362	0.01	0.00	0.00	0.01	0.00	Small, emergent wetland near road	Likely	Likely
BSI 228 Trib to Rice Creek	65.83	Private	R4SB1J	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1' wide tributary to Rice Creek	Likely	Likely
BSI230 Trib. to Willis Creek	66.87	Private	R4SB1J	Riverine F/T	0.06	0.00	0.00	0.03	0.01	0.00	0.04	0.00	2' wide intermittent tributary to BSP-168	Likely	Likely
BSP168 Willis Creek	66.95	Private	R3SB1C	Riverine F/T	0.67	46.79	97.05	0.12	0.00	0.00	0.12	0.00	Willis Creek, 30-50' wide	Likely	Likely
BSI169 Trib. to Willis Creek	67.00	Private	R4SB3J	Riverine F/T	0.04	22.61	46.28	0.02	0.00	0.00	0.02	0.00	Intermittent tributary to Willis Creek, confluence at MP 65.45	Likely	Likely
SS-100-011 Trib. to S. Umpqua	69.10	Private	R4	Riverine F/T	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Intermittent stream	Likely	Likely
SS-100-012 Trib. to S. Umpqua	69.28	Private	R4	Riverine F/T	0.05	23.45	48.64	0.05	0.00	0.00	0.05	0.00	Perennial stream	Likely	Likely
SS-100-013 Trib. to S. Umpqua	69.35	Private	R4	Riverine F/T	0.04	20.10	41.69	0.04	0.00	0.00	0.04	0.00	Perennial stream	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b])	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f] (or fill) (acres)	Wetland Description [g]	Regulated by the COE	Regulated by the ODSL
SS-100-014 Trib. to S. Umpqua	69.57	Private	R4	Riverine F/T	0.01	3.46	7.17	0.01	0.01	0.00	0.02	0.00	Intermittent stream	Likely	Likely
SS-100-015 Trib. to S. Umpqua	71.11	Private	R4	Riverine F/T	0.27	62.06	128.71	0.15	0.12	0.00	0.27	0.00	Intermittent stream	Likely	Likely
BSP026 South Umpqua River	71.30	Private	R3OWH	Riverine F/T	34.83	0.00	0.00	0.00	0.00	0.00	0.00[3]	0.00	South Umpqua River	Likely	Likely
WW-100-004	71.37	Private	PSS1C	Slope/Flats	N/A	0.00	0.00	0.00	0.21	0.00	0.21	0.00	Wetland	Likely	Likely
SS-100-016 Trib. to S. Umpqua	71.37	Private	R4	Riverine F/T	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Intermittent stream	Likely	Likely
SS-100-017 Trib. to S. Umpqua	71.69	Private	R4	Riverine F/T	N/A	0.00	0.00	0.01	0.00	0.00	0.01	0.00	Intermittent stream	Likely	Likely
SS-100-018 Trib. to S. Umpqua	72.82	Private	R4	Riverine F/T	N/A	3.17	6.57	0.01	0.00	0.00	0.01	0.00	Intermittent stream	Likely	Likely
SS-100-019 Trib. to S. Umpqua	72.96	Private	R4	Riverine F/T	N/A	3.55	7.37	0.01	0.00	0.00	0.01	0.00	Intermittent stream	Likely	Likely
SS-100-021 Trib. to S. Umpqua	73.21	Private	R4SBA	Riverine F/T	N/A	20.99	43.53	0.05	0.00	0.00	0.05	0.00	Intermittent stream	Likely	Likely
SS-100-020 Trib. to S. Umpqua	73.41	Private	R4UB3Cx	Riverine F/T	N/A	3.10	6.42	0.01	0.00	0.00	0.01	0.00	Intermittent stream	Likely	Likely
WW-100-005	74.03	Private	PEM	Slope/Flats	N/A	110.70	229.60	0.15	0.00	0.00	0.15	0.00	Wetland	Likely	Likely
SS-100-022 Trib. to Richardson Creek	74.03	Private	R4	Riverine F/T	N/A	1.58	3.27	0.00	0.00	0.00	0.00	0.00	Intermittent stream	Likely	Likely
WW-100-006	74.16	Private	PEM1A	Slope/Flats	N/A	300.99	624.28	0.65	0.00	0.00	0.65	0.00	Wetland	Likely	Likely
					Total	**834.66**	**1,730.54**	**1.59**	**0.35**	**0.00**	**1.94**	**0.00**			
Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), Myrtle Creek (HUC 1710030210) Fifth field Watershed [e], Douglas County, Oregon															
BSP001 Bilger Creek	76.38	Private	PFO1A	Riverine F/T	0.06	6.30	13.06	0.01	0.00	0.00	0.01	<0.01	Bilger Creek	Likely	Likely
BW002	76.69	Private	PEMC	Slope/Flats	0.13	36.47	75.64	0.08	0.03	0.00	0.11	0.00	Wet meadow	Likely	Likely
BW258	77.62	Private	PEMC	Slope/Flats	0.48	48.83	101.29	0.08	0.00	0.00	0.08	0.00	Seep/spring fed wetland	Likely	Likely
BW004	77.64	Private	PEMC	Slope/Flats	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Seep/spring fed wetland	Likely	Likely
BW005	77.66	Private	PEMC	Slope/Flats	0.05	49.67	103.02	0.05	0.00	0.00	0.05	0.00	Seep/spring fed wetland	Likely	Likely
BSP006 Little Lick	77.71	Private	PSS1C	Riverine F/T	0.24	7.20	14.94	0.06	0.00	0.00	0.06	<0.01	Little Lick Creek, heavily vegetated	Likely	Likely
BW007	77.86	Private	PEMC	Slope/Flats	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Adjacent to Little Lick Creek	Likely	Likely
BSI008 Trib. to Little Lick Creek	77.93	Private	R3SB1H	Riverine F/T	0.06	12.59	26.11	0.03	0.01	0.00	0.04	0.00	Tributary to Little Lick Creek	Likely	Likely
BL009	77.94	Private	PUB3C	Depressional	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Pond in tributary to Little Lick Creek	Likely	Likely
BSI010 Trib. to Little Lick Creek	78.02	Private	R4SB3C	Riverine F/T	0.02	2.01	4.17	0.00	0.02	0.00	0.02	0.00	Tributary to Little Lick Creek	Likely	Likely
BW011	78.05	Private	PEMC	Slope/Flats	0.04	13.59	28.19	0.04	0.00	0.00	0.04	0.00	Seep/spring fed wetland	Likely	Likely
BSI012	78.29	Private	R4SB3C	Riverine F/T	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Tributary to Little Lick Creek (same as BSI010)	Likely	Likely
NSP037 North Myrtle Creek	79.12	Private	R3SB1H	Riverine F/T	0.31	47.99	99.54	0.08	0.00	0.00	0.08	0.00	Myrtle Creek	Likely	Likely
NSP038 Trib. to North Myrtle Creek	79.15	Private	R3SB1H	Riverine F/T	0.08	8.00	16.59	0.02	0.02	0.00	0.04	0.00	Tributary to NSP37 (Myrtle Creek)	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b])	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f] (or fill) (acres)	Wetland Description [g]	Regulated by the COE	Regulated by the ODSL
BSP172 South Myrtle Creek	81.19	Private	R3OWH	Riverine F/T	0.58	68.77	142.63	0.13	0.00	0.00	0.13	0.00	South Myrtle Creek	Likely	Likely
BW173	81.40	Private	PEMC	Slope/Flats	0.05	0.00	0.00	0.02	0.00	0.00	0.02	0.00	Seasonal emergent wetland	Likely	Likely
BSP259 Trib. to S. Myrtle Creek	81.40	Private	R4SB3J	Riverine F/T	0.02	1.71	3.55	0.00	0.00	0.00	0.00	0.00	Trib. to S. Myrtle Creek	Likely	Likely
SS-100-023 Trib. to S. Myrtle Creek	81.45	Private	R4SBA	Riverine F/T	N/A	0.00	0.00	0.00	0.11 [f]	0.00	0.11	0.00	Intermittent stream	Likely	Likely
SS-100-024 Trib. to S. Myrtle Creek	81.78	Private	R4	Riverine F/T	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Intermittent stream	Likely	Likely
					Total	**303.13**	**628.73**	**0.60**	**0.19**	**0.00**	**0.79**	**0.00**			
Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), Days Creek-South Umpqua River (HUC 1710030205) Fifth field Watershed [c, d], Douglas County, Oregon															
BSP226 Wood Creek	84.18	Private	R3SBH	Riverine F/T	0.08	8.22	17.05	0.02	0.00	0.00	0.02	0.00	Wood Creek	Likely	Likely
EW024	84.23	Private	PEMC	Slope/Flats	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Small wetland at base of slope between slope and roadbed	Likely	Likely
EW025	84.23	Private	PEMC	Slope/Flats	0.16	0.00	0.00	0.00	0.03	0.00	0.03	0.00	Unnamed tributary to Woods Creek with PEM features	Likely	Likely
EW026	84.23	Private	PEMC	Slope/Flats	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	Small, slightly depressional wetland at base of slope.	Likely	Likely
BSI236 Trib. to Fate Creek	88.20	Private	R4SB1J	Riverine F/T	0.03	6.07	12.59	0.02	0.01	0.00	0.03	0.00	Intermittent stream, flows into BW237	Likely	Likely
BW239	88.22	Private	PEMC	Slope/Flats	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Emergent wetland associated with BSI238	Likely	Likely
BW237	88.24	Private	PEMC/PSSC	Slope/Flats	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Emergent/scrub-shrub wetland associated with BSI238	Likely	Likely
BSI238 Trib. to Fate Creek	88.24	Private	R4SB1J	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Forested drainage along roadside	Likely	Likely
BSP232 Fate Creek	88.48	Private	R3SB1H	Riverine F/T	0.19	12.11	25.12	0.03	0.00	0.00	0.03	0.00	Fate Creek, flows into Days Creek	Likely	Likely
BSP233 Days Creek	88.60	Private	R3SB1H	Riverine F/T	1.00	58.99	122.36	0.10	0.00	0.01	0.11	0.00	Days Creek	Likely	Likely
					Total	**85.39**	**177.12**	**0.17**	**0.05**	**0.01**	**0.23**	**0.00**			
Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), Days Creek-South Umpqua River (HUC 1710030205) Fifth field Watershed [c, d], Douglas County, Oregon															
ASP303 Saint John Creek	92.62	Private	R3RB2H	Riverine F/T	0.34	39.98	82.92	0.09	0.00	0.00	0.09	0.00	St. John's Creek	Likely	Likely
AW197	94.51	Private	PEMC	Slope/Flats	1.06	233.72	484.75	0.31	0.03	0.00	0.34	0.00	Pennyroyal dominated seasonal wetland	Likely	Likely
AW201	94.62	Private	PEMC	Slope/Flats	0.71	139.18	288.66	0.29	0.49	0.00	0.78	0.00	Grass dominated seasonal wetland	Likely	Likely
ASP196 South Umpqua River	94.73	Private	R2OWH	Riverine F/T	1.86	204.92	425.02	0.45	0.88	0.00	1.33	0.00	S. Umpqua River, ~160'wide, 1% gradient	Likely	Likely
ASI193 Trib. to S. Umpqua River	94.85	Private	R4SB3C	Riverine F/T	0.18	15.28	31.70	0.03	0.00	0.00	0.03	0.00	Tributary to S. Umpqua River, 5-10' wide, 5%gradient	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [i/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
AW195	94.88	Private	PEMC	Slope/Flats	0.13	98.50	204.30	0.11	0.01	0.00	0.12	0.00	Adjacent and similar to AW194, connects to ASI193	Likely	Likely
AW194	94.91	Private	PEMC	Slope/Flats	0.46	2.65	5.50	0.06	0.03	0.00	0.09	0.00	Adjacent to ASI193	Likely	Likely
ASI193 Trib. to S. Umpqua River	95.03	Private	R4SB3C	Riverine F/T	0.10	10.34	21.44	0.02	0.00	0.00	0.02	0.00	Tributary to S. Umpqua River, 5-10' wide, 5% gradient		
ASI190 Trib. to S. Umpqua River	98.46	BLM –Roseburg District	R4SB1	Riverine F/T	0.08	8.65	17.93	0.02	0.00	0.00	0.02	0.00	v-shaped ditch, 2-4' wide, 25-70% gradient	Likely	Likely
CW057	102.18	BLM – Roseburg District	PEMA	Slope/Flats	0.19	58.39	121.11	0.13	0.00	0.00	0.13	0.00	Small wetland within a clearing in Douglas fir forest	Likely	Likely
CW056	102.24	BLM – Roseburg District	PEMC	Slope/Flats	0.84	84.54	175.35	0.15	0.00	0.00	0.15	0.00	Slope/seep wetland	Likely	Likely
Total						**896.15**	**1,858.68**	**1.66**	**1.44**	**0.00**	**3.10**	**0.00**			
Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), Upper Cow Creek (HUC 1710030206) Fifth field Watershed [c/] Douglas County, Oregon															
CW055	103.90	Private	PEMC	Slope/Flats	0.98	93.95	194.85	0.21	0.00	0.00	0.21	0.00	Swale-like depression south of centerline	Likely	Likely
CDX050	105.39	Forest Service-Umpqua NF	R4UB3Cx	N/A	0.06	10.34	21.45	0.02	0.01	0.00	0.03	0.00	1-4' wide roadside ditch, 20% gradient; extends off-site	Likely	Likely
CDX049	106.77	Forest Service-Umpqua NF	R4UB3Cx	N/A	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1-2' wide, 2-5' bankfull;5-10% gradient	Likely	Likely
CDX047	108.08	Forest Service-Umpqua NF	R4UB3Cx	N/A	0.04	3.19	6.61	0.01	0.00	0.00	0.01	0.00	2' wide roadside ditch, 5-10% gradient; dissipates in forest	Likely	Likely
CDX048	108.40	Forest Service-Umpqua NF	R4UB3Cx	N/A	0.02	7.12	14.76	0.01	0.00	0.00	0.01	0.00	2' wide roadside ditch;10% gradient	Likely	Likely
GDX 015	109.15	Forest Service-Umpqua NF	R4	N/A	0.08	8.27	17.15	0.02	0.01	0.00	0.03	0.00	Connects to GW014. 2' wide ditch – GW014 adjacent to ROW	Likely	Likely
GW014/FS-HF-C Trib to East Fork Cow Creek	109.17	Forest Service-Umpqua NF	PSS	Slope	0.33	12.01	24.91	0.04	0.05	0.00	0.09	<0.01	Seep wetland with shrubs, crosses road and continues on. USFS considers this wetland as a perennial stream.	Likely	Likely
FS-HF-D	109.24	Forest Service-Umpqua NF	R4	Riverine F/T	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Intermittent stream on FS land	Likely	Likely
FS-HF-E	109.29	Forest Service-Umpqua NF	PEM	Slope	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Skunk cabbage seep wetland on FS land	Likely	Likely
GW017	109.32	Forest Service-Umpqua NF	PFO	Slope	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Forested wetland seep	Likely	Likely
GSI016/FS-HF-G Trib. to East Fork Cow Creek	109.33	Forest Service-Umpqua NF	R4	Riverine F/T	0.07	7.54	15.64	0.01	0.00	0.00	0.01	0.00	3' wide intermittent	Likely	Likely
GW018	109.43	Forest Service-Umpqua NF	PEM	Slope	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Wetland Seep	Likely	Likely
GW021	109.47	Forest Service-Umpqua NF	PEM	Slope	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Emergent wetland seep, connects to GSP019	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b])	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c] (or fill) (acres)	Wetland Description [a]	Regulated by the COE	Regulated by the ODSL
GSP019/FS-HF-G East Fork Cow Creek	109.47	Forest Service-Umpqua NF	R3UB1	Riverine F/T	0.26	26.31	54.57	0.06	0.00	0.00	0.06	0.00	Cow Creek – 28' wide, broad, cobbles, boulders, 2' wide	Likely	Likely
GW020	109.49	Forest Service-Umpqua NF	PEM	Slope	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Emergent wetland seep	Likely	Likely
GSP022/FS-HF-G/ ASP297 Trib. to East Fork Cow Creek	109.69	Forest Service-Umpqua NF	R2	Riverine F/T	0.04	0.00	0.00	0.02	0.00	0.00	0.02	0.00	Same as previous feature ASP297. Cow Creek - 20' wide	Likely	Likely
AW298/ FS-HF-J Trib. to East Fork Cow Creek	109.69	Forest Service-Umpqua NF	R4	Riverine F/T	0.07	10.27	21.31	0.00	0.01	0.00	0.01	0.00	Intermittent stream on FS land, extension of AW298 - Willow dominated wetland	Likely	Likely
FS-HF-K/AW299 Trib. to East Fork Cow Creek	109.69	Forest Service-Umpqua NF	R4	Riverine F/T	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Intermittent stream on FS land	Likely	Likely
GSP019/ FS-HF-K Trib. to East Fork Cow Creek	109.78	Forest Service-Umpqua NF	R4	Riverine F/T	0.09	5.16	10.69	0.01	0.00	0.00	0.01	0.00	Intermittent stream on FS land, extension of AW299 – Willow dominated wetland	Likely	Likely
					Total	**184.16**	**381.94**	**0.41**	**0.08**	**0.00**	**0.49**	**0.00**			
Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), Upper Cow Creek (HUC 1710030206) Fifth field Watershed [d], Jackson County, Oregon															
ESI068/FS-HF-N Trib. to East Fork Cow Creek	110.98	Forest Service-Umpqua NF	R4SB1H	Riverine F/T	0.07	16.41	34.04	0.03	0.00	0.00	0.03	0.00	Ephemeral drainage, U-shaped, cobble 1-2' wide	Unlikely	Unlikely
					Total	**16.41**	**34.04**	**0.03**	**0.00**	**0.00**	**0.03**	**0.00**			
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Trail Creek (HUC 1710030706) Fifth field Watershed [d], Jackson County, Oregon															
ESI068 Trib. to W. Fork Trail Creek	110.76	Forest Service-Umpqua NF	R4SB1H	Riverine F/T	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	Ephemeral drainage from snowmelt, broad u-shaped cobble 1-2’ wide.	Unlikely	Unlikely
EW069 Trib to W. Fork Trail Creek	110.76	Forest Service-Umpqua NF	PUB3C	Slope/Flats	0.07	0.00	0.00	0.00	0.07	0.00	0.07	0.00	1-2’ deep pond in borrow pit.	Likely	Likely
ASP202 West Fork Trail Creek	118.89	Private	R2SB1H	Riverine F/T	0.07	24.29	50.38	0.04	0.00	0.00	0.04	0.00	Trail Creek; 30-40’ wide, 2-3% gradient	Likely	Likely
RS019 Trib. to Trail Creek	119.83	Private/BLM – Medford District	R4SB1H	Riverine F/T	0.05	25.48	52.85	0.04	0.00	0.00	0.04	0.00	1-2’ wide intermittent drainage	Likely	Likely
Denied Access 16 Trib to Trail Creek	119.90	Private	R4SB	R4SB1H	N/A	1.84	3.81	0.00	0.00	0.00	0.00	0.00	Access denied – Waterbody assumed PNW Hydrography (1228364426705) And Lidar Contours	Likely	Likely
NSP011 Canyon Creek	120.45	BLM – Medford District	R4SB1H	Riverine F/T	0.05	6.61	13.70	0.02	0.00	0.00	0.02	0.00	Canyon Creek	Likely	Likely
AW204	120.83	Private	PEMC	Slope/Flats	0.35	27.89	57.85	0.05	0.00	0.00	0.05	0.00	Spikerush dominated emergent wetland near Canyon Creek	Likely	Likely
AL203	120.88	Private	PUBYx	Depressional	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Spring fed stock pond adjacent to Canyon Creek	Likely	Likely
ASI205 Trib. to Trail Creek	120.92	Private	R4UBC	Riverine F/T	0.09	6.39	13.25	0.01	0.00	0.00	0.01	0.00	4-6’ wide, U-shaped channel; 4-5% gradient	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f/] (or fill) (acres)	Wetland Description [g/]	Regulated by the COE	Regulated by the ODSL
ASI206 Trib. to Trail Creek	121.58	Private	R4UBC	Riverine F/T	0.15	13.81	28.63	0.03	0.00	0.00	0.03	0.00	4-20' wide (average 8'), U-shaped channel; 3% gradient	Likely	Likely
					Total	**106.31**	**220.47**	**0.19**	**0.08**	**0.00**	**0.27**	**0.00**			
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Shady Cove-Rogue River (HUC 1710030707) Fifth field Watershed [c/], Jackson County, Oregon															
ESI071 Trib. to Cricket Creek	121.87	Private	R4SB1C	Riverine F/T	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	1' wide ephemeral tributary to Cricket Creek	Likely	Likely
ESI070 Trib. to Cricket Creek	121.89	Private	R4SB1C	Riverine F/T	0.07	0.00	0.00	0.00	0.41	0.00	0.41	0.00	Cricket Creek – average 7' wide, cobble/gravels substrate	Likely	Likely
ESI072 Trib. to Cricket Creek	121.93	Private	R4SB1C	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2' wide ephemeral tributary to Cricket Creek	Likely	Likely
ESI073 Trib. to Cricket Creek	121.94	Private	R4SB1C	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2' wide ephemeral tributary to Cricket Creek	Likely	Likely
ESI074 Trib. to Cricket Creek	122.09	Private	R4SB1C	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1-2' wide ephemeral tributary to Cricket Creek	Likely	Likely
ASP235 Rogue River	122.65	Private	R3UBH	Riverine F/T	2.31	244.59	507.31	0.03	0.05	0.00	0.08	0.00	Rogue River; ~50' wide,<2% gradient; cobble, gravel, sand; with bank	Likely	Likely
ASI223 Trib. to Indian Creek	125.91	Private	R4UB1C	Riverine F/T	0.05	4.87	10.10	0.01	0.00	0.00	0.01	0.00	Seasonal Creek, U-shaped channel, 2-4' wide.	Likely	Likely
ASI222 Trib. to Indian Creek	125.98	Private	R4UB1C	Riverine F/T	0.05	5.43	11.27	0.01	0.00	0.00	0.01	0.00	Seasonal Creek, U-shaped channel	Likely	Likely
RS004 Trib. to Indian Creek	126.50	BLM – Medford District	R4UB1C	Riverine F/T	0.01	1.18	2.44	0.00	0.00	0.00	0.00	0.00	1-2' wide intermittent drainage – BLM designated	Likely	Likely
ASI220 Trib. to Indian Creek	126.52	BLM – Medford District	R4UB1C	Riverine F/T	0.03	4.08	8.46	0.01	0.00	0.00	0.01	0.00	Seasonal Creek, U-shaped channel, 1-2' wide; 15% gradient	Likely	Likely
ASI221 Trib. to Indian Creek	126.59	BLM – Medford District	R4UB1C	Riverine F/T	0.03	5.65	11.71	0.01	0.00	0.00	0.01	0.00	Seasonal Creek, U-shaped channel, 4' wide, 6-10% gradient	Likely	Likely
RS003 Trib. to Indian Creek	126.59	BLM – Medford District	R4UB1C	Riverine F/T	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1-2' wide intermittent drainage	Likely	Likely
RS002 Trib. to Indian Creek	126.59	BLM – Medford District	R4UB1C	Riverine F/T	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1' wide intermittent drainage – BLM designated	Likely	Likely
RS001 Trib. to Indian Creek	126.59	BLM – Medford District	R4UB1C	Riverine F/T	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1' wide intermittent drainage – BLM designated	Likely	Likely
ASI311 Trib. to Indian Creek	126.65	Private	R4UB1C	Riverine F/T	0.01	3.29	6.81	0.00	0.00	0.00	0.00	0.00	0.5-1.0' wide seasonal stream	Likely	Likely
ADX287	127.29	Private	R4UB3Cx	N/A	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Trap-shaped	Likely	Likely
ADX 286	127.29	Private	R4UB3Cx	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Trap-shaped	Likely	Likely
AL284	127.29	Private	L2UB3Hx	Depressional	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Stock pond	Likely	Likely
ADX285	127.35	Private	R4UB3Cx	Riverine F/T	0.05	6.10	12.66	0.01	0.01	0.00	0.02	0.00	Trap-shaped	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c] (or fill) (acres)	Wetland Description [d]	Regulated by the COE	Regulated by the ODSL
RS005	127.61	BLM – Medford District	Riverine F/T	R4UB1C	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1' wide intermittent drainage – BLM designated	Likely	Likely
ASP307 Deer Creek	128.49	Private	R3SB1H	Riverine F/T	0.33	28.52	59.15	0.07	0.00	0.00	0.07	0.00	40-50' wide perennial stream	Likely	Likely
ADX279	128.55	Private	R4UB3Cx	N/A	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Trap-shaped	Likely	Likely
AW278 Indian Creek	128.63	Private	PEMC/R3UB3	Slope/Flats	2.30	139.85	290.05	0.30	0.04	0.00	0.34	0.00	Herb wetland/perennial stream; continues as AW-308	Likely	Likely
ASP310 Trib. to Indian Creek	128.70	Private	R3SB1H	Riverine F/T	0.05	5.22	10.83	0.01	0.00	0.01	0.02	0.00	At eastern edge of AW309	Likely	Likely
AW309 Trib. to Indian Creek	128.89	BLM – Medford District	PFOC	Slope/Flats	0.27	30.00	62.22	0.07	0.00	0.00	0.07	0.02	Forested wetland/stream	Likely	Likely
ASI400 Trib. to Indian Creek	129.13	BLM – Medford District	R4	Riverine F/T	0.01	1.42	2.94	0.00	0.00	0.00	0.00	0.00	Intermittent Stream	Likely	Likely
ASI306 Trib. to Indian Creek	129.21	BLM – Medford District	R4	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Intermittent Stream	Likely	Likely
ASI277 Trib. to Indian Creek	129.48	Private	R4UB1C	Riverine F/T	0.02	4.04	8.38	0.00	0.00	0.00	0.00	0.00	Intermittent Stream	Likely	Likely
					Total	**484.24**	**1,004.33**	**0.53**	**0.52**	**0.01**	**1.06**	**0.02**			
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Big Butte Creek (HUC 1710030704) Fifth field Watershed [e], Jackson County, Oregon															
AW245	130.84	Private	PSSC/R4SB1C	Riverine F/T	0.03	0.00	0.00	0.00	0.03	0.00	0.03	0.00	Separated from wetland AW244 by culvert	Likely	Likely
AW244	130.85	Private	PSSC/R4SB1C	Riverine F/T	0.38	131.84	273.45	0.24	0.01	0.00	0.25	0.03	Wetland with small stream running through middle	Likely	Likely
ASI246 Trib. to Neil Creek	130.89	Private	PEMC	Slope/Flats	0.02	2.02	4.18	0.01	0.00	0.00	0.01	0.00	Swale feature, - culvert. Continues off site	Likely	Likely
AW247	131.12	Private	PUBYx	Depressional	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Spring fed stock pond. Appears man made; 1' deep	Likely	Likely
AW248	131.26	Private	PEMC	Slope/Flats	0.17	69.65	144.46	0.09	0.00	0.00	0.09	0.00	Spring fed wetland on hillside. Slope 3-5%.	Likely	Likely
ASI250 Trib. to Neil Creek	131.55	BLM – Medford District	R4UB1C	Riverine F/T	0.03	4.79	9.94	0.01	0.00	0.00	0.01	0.00	1-3' wide, U-shaped channel; >10% gradient, tributary to ASI249	Likely	Likely
RS015	131.62	BLM – Medford District	Riverine F/T	R4UB1C	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1' wide intermittent drainage – BLM designated	Likely	Likely
ASI251 Trib. to Neil Creek	131.72	BLM – Medford District	R4UB1C	Riverine F/T	0.37	3.95	8.20	0.07	0.13	0.00	0.20	0.00	1-3' wide, U-shaped channel; >10% gradient, tributary to ASI249	Likely	Likely
ADX253	131.89	Private	R4UB3x	N/A	0.20	22.49	46.65	0.05	0.00	0.00	0.05	0.00	Irrigation ditch, U-shaped with two shallow deeper ditches running parallel	Likely	Likely
ASP252 Neil Creek	132.00	Private	R4SB1C	Riverine F/T	0.54	39.41	81.74	0.08	0.00	0.00	0.08	0.00	Incised perennial stream used for irrigation. OHWM 3-5' wide, 1' deep.	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [i/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
EDX075	132.07	Private	R4UB3x	N/A	0.12	6.02	12.48	0.01	0.00	0.00	0.01	0.00	3' wide, silt/mud substrate, drainage swale with wetland characteristics	Likely	Likely
AW243	132.33	Private	PEMC	Slope/Flats	15.16	1747.70	3624.85	3.63	0.38	0.00	4.01	0.00	Bisected by two ditches, connected to AW242 across road	Likely	Likely
AW242	132.48	Private	PEMC	Slope/Flats	4.45	664.65	1378.53	1.05	0.12	0.00	1.17	0.00	Grazed wet meadow connected to ASP241	Likely	Likely
ASI265/NSI010 Quartz Creek	132.75	Private	R4SB1C	Riverine F/T	0.01	2.36	4.90	0.00	0.00	0.00	0.00	0.00	Tributary to stream in AW264; U-shaped channel, ~1' wide; Quartz Creek	Likely	Likely
AW264 Trib. to Quartz Creek	132.77	Private	PFO/R4SB1C	Riverine F/T	0.50	40.44	83.88	0.09	0.00	0.00	0.09	0.03	Wetland with perennial stream running through it	Likely	Likely
AW263	133.13	Private	PEMC	Slope/Flats	4.74	497.68	1032.23	1.00	0.00	0.00	1.00	0.00	Large, spring fed, slope wetland; continues offsite	Likely	Likely
ASP241 Trib. to Quartz Creek	133.35	BLM – Medford District	R3UB3H	Riverine F/T	0.69	44.80	92.93	0.12	0.10	0.00	0.22	0.00	Braided channels; at edge of corridor	Likely	Likely
ASP240 Medford Aqueduct (Ditch 3)	133.38	BLM – Medford District	R3UB3x	Riverine F/T	0.34	29.36	60.89	0.06	0.00	0.00	0.06	0.00	Medford Aqueduct	Likely	Likely
AW239	133.92	Private	PSSC	Slope/Flats	0.24	159.25	330.29	0.18	0.00	0.00	0.18	0.04	Scrub-shrub wetland dominated by spiraea and rose.	Likely	Likely
					Total	**3,466.41**	**7,189.60**	**6.69**	**0.77**	**0.00**	**7.46**	**0.10**			
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Little Butte Creek (HUC 1710030708) Fifth field Watershed [a/], Jackson County, Oregon															
AW276	137.26	Private	PEMC	Slope/Flats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Flood irrigated agricultural wetland (a typical situation)	Likely	Likely
ASI207 Whiskey Creek	137.48	Private	R4UB3C	Riverine F/T	0.10	10.37	21.50	0.02	0.00	0.00	0.02	0.00	Whiskey Creek; 4-6% gradient; 2' deep, U-Shaped channel	Likely	Likely
ASI208 Trib. to Lick Creek	138.26	Private	R4UB3C	Riverine F/T	0.10	10.37	21.50	0.02	0.01	0.00	0.03	0.00	10-12' wide, V-shaped channel; 6-8% gradient	Likely	Likely
ASI210 Trib. to Lick Creek	138.45	Private	R4UB1C	Riverine F/T	0.04	1.72	3.56	0.00	0.00	0.00	0.00	0.00	6-10' wide, U-shaped channel; >10% gradient	Likely	Likely
AW209	138.49	Private	PEMC	Slope/Flats	0.25	63.32	131.33	0.13	0.00	0.00	0.13	0.00	Connected to ASI210; narrow, linear heavily vegetated swale	Likely	Likely
ASI211 Trib. to Lick Creek	138.71	Private	R4UB1C	Riverine F/T	0.07	7.22	14.97	0.02	0.00	0.00	0.02	0.00	12-15' wide, U-shaped channel; 4-6% gradient	Likely	Likely
AW212	138.72	Private	PEMC	Slope/Flats	0.25	12.93	26.82	0.05	0.00	0.00	0.05	0.00	Linear feature, similar to AW209; adjacent to ASI211	Likely	Likely
AW213	139.07	Private	PEMC	Slope/Flats	0.27	27.33	56.68	0.05	0.00	0.00	0.05	0.00	Similar to AW212	Likely	Likely
ASI214 Trib. to Lick Creek	139.15	Private	R4UB1C	Riverine F/T	0.08	6.99	14.50	0.02	0.00	0.00	0.02	0.00	4-6' wide, U-shaped channel; 6-7% gradient	Likely	Likely
AL215 Stock Pond	139.17	Private	PUBYx	Depressional	0.06	54.30	112.62	0.06	0.00	0.00	0.06	0.00	Small stock pond ~ 1' deep.	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c/] (or fill) (acres)	Wetland Description [d/]	Regulated by the COE	Regulated by the ODSL
ASI216 Trib. to Lick Creek	139.19	Private	R4SB1C	Riverine F/T	0.06	10.31	21.37	0.02	0.00	0.00	0.02	0.00	6-8' wide, U-shaped channel; 6-8% gradient	Likely	Likely
ASI216 Trib. to Lick Creek	139.21	Private	R4SB1C	Riverine F/T	0.08	13.05	27.06	0.02	0.00	0.00	0.02	0.00	10' wide, U-shaped channel; 5% gradient	Likely	Likely
ASI217 Trib. to Lick Creek	139.39	Private	R4SB1C	Riverine F/T	0.09	15.84	32.85	0.03	0.00	0.00	0.03	0.00	10' wide, U-shaped channel; 5% gradient	Likely	Likely
AW218	139.45	Private	PEMC	Slope/Flats	0.19	0.00	0.00	0.05	0.00	0.00	0.05	0.00	Low area between two hill slopes	Likely	Likely
AW225	139.56	Private	PEMC	Slope/Flats	1.74	128.13	265.75	0.19	0.00	0.00	0.19	0.00	Linear swale fed by seeps/streams	Likely	Likely
ASI226 Trib. to Lick Creek	139.59	Private	R4SB1C	Riverine F/T	0.04	6.59	13.66	0.01	0.00	0.00	0.01	0.00	Meandering creek, 1-2'wide, U-shaped channel; flows into AW225	Likely	Likely
AW219	139.63	Private	PUBYx	Depressional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Impounded stock pond adjacent to AW225	Likely	Likely
ASI227 Trib. to Lick Creek	139.63	Private	R4SB1C	Riverine F/T	0.06	10.91	22.62	0.02	0.00	0.00	0.02	0.00	Meandering creek, 1-2'wide, U-shaped channel; flows into AW225	Likely	Likely
ASI228 Trib. to Lick Creek	139.68	Private	R4EMC	Riverine F/T	0.19	31.75	65.85	0.08	0.00	0.00	0.08	0.00	<0.5' deep, 1-2' wide poorly defined channel	Likely	Likely
ASI229 Trib. to Lick Creek	139.72	Private	R4EMC	Riverine F/T	0.12	0.00	0.00	0.03	0.00	0.00	0.03	0.00	1' deep, 1.5' wide poorly defined channel	Likely	Likely
AW230	139.75	Private	PEMC	Slope/Flats	0.06	9.62	19.95	0.02	0.00	0.00	0.02	0.00	Swale feature, partially channelized	Likely	Likely
AW231	139.78	Private	PEMC	Slope/Flats	0.76	0.00	0.00	0.09	0.00	0.00	0.09	0.00	Emergent wetland with some blackberry, extends off-site	Likely	Likely
ASI232 Trib. to Lick Creek	139.83	Private	R4SB1C	Riverine F/T	0.01	1.20	2.50	0.00	0.00	0.00	0.00	0.00	1-1.5' wide dry channel	Likely	Likely
ASI233 Lick Creek	140.26	BLM – Medford District	R4SB1C	Riverine F/T	0.12	12.33	25.58	0.03	0.00	0.00	0.03	0.00	Lick Creek, 10-20' wide, U-shaped channel	Likely	Likely
ADX234	140.31	BLM – Medford District	R4SB1C	Riverine F/T	0.03	3.66	7.60	0.01	0.00	0.00	0.01	0.00	3' wide at OHWM, V-shaped channel	Likely	Likely
ASI189 Trib. to Lick Creek	140.58	Private	R4SB1	Riverine F/T	0.02	2.62	5.44	0.01	0.00	0.00	0.01	0.00	1-2' wide intermittent stream	Likely	Likely
ADX186	140.91	BLM – Medford District	R4SB1	Riverine F/T	0.04	3.34	6.93	0.01	0.00	0.00	0.01	0.00	Rocky, intermittent stream	Likely	Likely
EW077	141.01	Private	PEMC	Slope/Flats	0.13	0.00	0.00	0.00	0.13	0.00	0.13	0.00	Herbaceous wetland at base of Star Lake Reservoir	Likely	Likely
EW078 (EW082)	141.01	Private	PEMC	Slope/Flats	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Herbaceous wetland at base of Star Lake Reservoir.	Likely	Likely
EW076	141.01	Private	PEMC	Slope/Flats	0.11	0.00	0.00	0.00	0.10	0.00	0.10	0.00	Herbaceous wetland at base of Star Lake Reservoir	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [i/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
ASI187 Trib. to Salt Creek	141.17	BLM – Medford District	R4SB1	Riverine F/T	0.03	2.51	5.21	0.01	0.00	0.00	0.01	0.00	1-2' wide intermittent stream with little vegetation	Likely	Likely
ASI188 Trib. to Salt Creek	141.44	BLM – Medford District	R4SB1	Riverine F/T	0.10	43.20	89.60	0.04	0.00	0.00	0.04	0.00	3-4' average width, U-Shaped channel, 8% gradient	Likely	Likely
RS017 Trib. to Salt Creek	141.49	BLM – Medford District	R4SB3C	Riverine F/T	0.03	4.45	9.24	0.01	0.00	0.00	0.01	0.00	1-2' wide intermittent drainage	Likely	Likely
ESI030 Trib. to Salt Creek	141.95	Private	R4SB1	Riverine F/T	0.06	6.25	12.97	0.01	0.00	0.00	0.01	0.00	3' wide intermittent stream, trap-shaped, cobble substrate; QUsp, TODI, CAQU	Likely	Likely
EDX032 Trib. to Salt Creek	142.28	Private	R4SB3Cx	Riverine F/T	0.03	3.02	6.27	0.01	0.00	0.00	0.01	0.00	Pasture stream, likely excavated	Likely	Likely
ESI031 Trib. to Salt Creek	142.36	Private	R4SB3Cx	Riverine F/T	0.21	13.44	27.88	0.03	0.00	0.00	0.03	0.00	3' wide, trap-shaped, intermittent stream; cobble substrate, JUEF	Likely	Likely
EW033	142.45	Private	PEMC	Slope/Flats	9.93	764.76	1586.16	2.16	0.67	0.00	2.83	0.00	Large PEM complex, associated with floodplain of Salt Creek	Likely	Likely
EW035	142.45	Private	PEMC	Slope/Flats	3.67	408.16	846.54	0.90	0.34	0.00	1.24	0.00	Large PEM complex, associated with floodplain of Salt Creek	Likely	Likely
ESP034 Salt Creek	142.57	Private	R3SB3H	Riverine F/T	0.39	41.32	85.69	0.07	0.00	0.00	0.07	0.00	Salt Creek, flows through NW3	Likely	Likely
EDX036	142.67	Private	R4SB3Cx	N/A	0.01	1.05	2.18	0.00	0.00	0.00	0.00	0.00	Pasture Ditch	Likely	Likely
ESI037 Trib. to Salt Creek	143.10	Private	R4SB3C	Riverine F/T	0.18	4.84	10.05	0.01	0.01	0.00	0.02	0.00	4' wide, U-shaped, cobble substrate; QUsp, Ceanothus sp, upland grasses	Likely	Likely
ESI038 Trib. to Long Branch Creek	143.47	Private	R4SB3C	Riverine F/T	0.03	2.21	4.59	0.00	0.00	0.00	0.00	0.00	2' wide, V-shaped, cobble/silt substrate, no veg in channel	Likely	Likely
ESI039 Trib. to Long Branch Creek	143.71	Private	R4SB3C	Riverine F/T	0.03	3.26	6.76	0.01	0.00	0.00	0.01	0.00	Tributary/irrigation ditch	Likely	Likely
EL041	143.73	Private	PEMKx	Slope/Flats	0.04	0.00	0.00	0.00	0.04	0.00	0.04	0.00	Stock pond.	Unlikely	Unlikely
ESI038 Trib. to Long Branch Creek	143.73	Private	R4SB3C	Riverine F/T	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2' wide, V-shaped, cobble/silt substrate, no veg in channel		
ESI040 Trib. to Long Branch Creek	143.74	Private	R4SB3C	Riverine F/T	0.02	5.05	10.48	0.01	0.00	0.00	0.01	0.00	Tributary/irrigation ditch to stock pond	Likely	Likely
ESI038 Long Branch Creek	144.11	Private	R4SB3C	Riverine F/T	0.02	2.04	4.23	0.00	0.00	0.00	0.00	0.00	2' wide, V-shaped, cobble/silt substrate, no veg in channel	Likely	Likely
EDX042	144.14	Private	R4UBx	N/A	0.08	8.20	17.01	0.02	0.00	0.00	0.02	0.00	Irrigation ditch	Likely	Unlikely
GSP005/ESP048 Trib. to S. Fork Long Branch	144.70	Private	R4	Riverine F/T	0.12	7.09	14.70	0.02	0.04	0.00	0.06	0.00	3' wide extension of ESI048 Intermittent drainage	Likely	Likely
GSI006/ESP059 South Fork Long Branch	145.27	Private	R4SBC	Riverine F/T	0.07	7.12	14.76	0.02	0.00	0.00	0.02	0.00	3' wide extension of ESI048	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f] (or fill) (acres)	Wetland Description [a]	Regulated by the COE	Regulated by the ODSL
EDX060	145.28	Private	R4UBx	N/A	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2-4' wide ditch	Likely	Unlikely
NDX107	145.32	Private	R4UBx	N/A	0.02	3.65	7.58	0.01	0.00	0.00	0.01	0.00	Near possible vernal pool complex	Likely	Unlikely
EW062	145.50	Private	PEMC	Slope/Flats	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Pasture wetland associated with ESI061	Likely	Likely
ESI061 Trib. to S. Fork Long Branch	145.54	Private	R4SBC	Riverine F/T	0.10	13.66	28.34	0.03	0.04	0.00	0.07	0.00	1' wide, U-shaped, cobble substrate; RUDI, FRLA, pasture veg	Likely	Likely
EW063	145.55	Private	PEMC/PSSC	Slope/Flats	0.05	1.68	3.49	0.01	0.04	0.00	0.05	<0.01	emergent wetland associated with ESI061	Likely	Likely
EDX064	145.57	Private	R4UBx	N/A	0.01	2.04	4.22	0.00	0.00	0.00	0.00	0.00	Linear, 2' wide ditch along Highway 140, V-shaped; CANE, DIFU	Unlikely	Unlikely
EW067	145.63	Private	PEMC	Slope/Flats	1.82	266.36	552.45	0.62	0.63	0.00	1.25	0.00	Emergent wetland, associated with surround ditches and ESP-66	Likely	Likely
ESP066 North Fork Little Butte Creek	145.69	Private	R3SB3H	Riverine F/T	0.55	48.77	101.16	0.10	0.00	0.00	0.10	0.00	North Fork Little Butte Creek	Likely	Likely
EDX057	145.91	Private	R4UBx	N/A	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Roadside ditch, 2' wide, 2' deep, associated with Little Butte Cr	Likely	Likely
ESI056 Trib. to N. Fork Little Butte	146.05	Private	R4SBC	Riverine F/T	0.16	17.49	36.28	0.03	0.00	0.00	0.03	0.00	4' wide, U-shaped, cobble substrate; QUsp, water control structure	Likely	Likely
ESI055 Trib. to N. Fork Little Butte	146.38	Private	R4SBC	Riverine F/T	0.03	3.36	6.96	0.01	0.00	0.00	0.01	0.00	Connected to EW054; 2'wide, U-shaped, cobble substrate; RUDI, TODI, QUGA	Likely	Likely
EW054	146.40	Private	PEMC	Slope/Flats	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Connected to ESI055	Likely	Likely
EW053	146.69	Private	PEMC	Slope/Flats	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Connected to ESI052	Likely	Likely
ESI052 Trib. to N. Fork Little Butte	146.75	Private	R4SBC	Riverine F/T	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3' wide, U-shaped channel; QUGA, RUDI, TODI, PIPO adjacent	Likely	Likely
EDX051	146.81	Private	R4UBx	N/A	0.06	9.38	19.46	0.02	0.00	0.00	0.02	0.00	6' wide irrigation canal along road	Likely	Unlikely
AW185	152.19	BLM – Medford District	PFOC	Slope/Flats	0.50	0.00	0.00	0.01	0.00	0.00	0.01	0.00	Forested stream bank with wetland characteristics	Likely	Likely
AL169 Stock Pond	152.33	BLM – Medford District	PUBFx	Depressional	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3' deep stock pond w/wetland species; 6' max depth	Unlikely	Unlikely
					Total	**2,138.26**	**4,434.90**	**5.16**	**2.05**	**0.00**	**7.21**	**0.00**			
Eastern Slopes Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Little Butte Creek (HUC 1710030708) Fifth field Watershed [c, d] Jackson County, Oregon															
ASP165 South Fork Little Butte Creek	162.45	Forest Service-Rogue River-Shady Cove NF	R3SB1H	Riverine F/T	0.56	19.62	40.68	0.04	0.00	0.00	0.04	0.00	2-30' wide, U-shaped,1% gradient, braided channels	Likely	Likely
EW075	164.11	Forest Service-Rogue River-Shady Cove NF	PEMC	Slope/Flats	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Emergent wetland in forest clearing	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f] (or fill) (acres)	Wetland Description [a]	Regulated by the COE	Regulated by the ODSL
ASI164	164.96	Forest Service–Rogue River-Shady Cove NF	R4UB1C	Riverine F/T	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2-30' wide w/ braided channels, wetland/upland islands	Likely	Likely
ESI076 (ESI084) Daley Creek	166.21	Forest Service-Rogue River-Shady Cove NF	R4UBC	Riverine F/T	0.36	25.51	52.90	0.10	0.00	0.00	0.10	0.00	30-40' wide braided channel, coble/gravel substrate, trib. to Daley Creek.	Likely	Likely
					Total	**45.13**	**93.58**	**0.14**	**0.00**	**0.00**	**0.14**	**0.00**			
Eastern Slopes Ecoregion, Upper Klamath R. Sub-basin (HUC 18010206), Spencer Creek (HUC 1801020601) Fifth field Watershed [c, g], Klamath County, Oregon															
ASI161	168.31	Forest Service–Rogue River-Shady Cove NF	R4SB2C	Riverine F/T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3-6'wide, U-shaped, 2-4% gradient, some braided channels	Likely	Likely
Spencer Creek EW085	171.07	Forest Service-Fremont-Winema NF	PEMC	Slope/Flats	1.51	150.80	312.76	0.27	0.00	0.00	0.27	0.00	Wetland swale, culverted under road	Likely	Likely
AW184	171.23	Forest Service-Fremont-Winema NF	PEM/PSSC	Slope/Flats	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Large wetland complex south of Clover Creek Rd.	Likely	Likely
Trib. to Spencer Creek GSP007	171.57	Forest Service-Fremont-Winema NF/ Private	R2	Riverine F/T	0.13	4.05	8.40	0.01	0.00	0.00	0.01	0.00	2' wide stream that fans out into a wetland/stream complex	Likely	Likely
GW008	172.03	Forest Service-Fremont-Winema NF	PSS	Slope	<0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Spiraea wetland	Likely	Likely
Trib. to Spencer Creek EW107	172.48	Forest Service-Fremont-Winema NF	PEMC	Slope/Flats	0.51	72.32	150	0.15	0.00	0.00	0.15	0.00	Wetland/Stream	Likely	Likely
EW105	172.48	Forest Service–Fremont-Winema NF	PEM/PFOC	Slope/Flats	0.03	4.34	9.01	0.01	0.00	0.00	0.01	<0.01	Adjacent to EW107	Likely	Likely
ESI106a Trib. to Spencer Creek	173.74	Forest Service-Fremont-Winema NF	R4SB2	Riverine F/T	0.40	8.17	16.95	0.02	0.00	0.00	0.02	0.00	4' wide, snowmelt ephemeral stream	Likely	Likely
ESI106b Trib. to Spencer Creek	174.00	Forest Service-Fremont-Winema NF	R4SB2	Riverine F/T	0.40	3.02	6.27	<0.00	0.00	0.00	0.00	<0.00	4' wide, snowmelt ephemeral stream	Likely	Likely
ESI069/GSI010 Trib. to Spencer Creek	176.55	BLM – Lakeview District	R4SB2	Riverine F/T	0.02	2.02	4.18	0.01	0.00	0.00	0.01	0.00	1' wide intermittent, shrubbed stream Extension of ESI06 9' - wide, 2' deep	Likely	Likely
Clover Creek EW103/GSI011	177.76	Private	R4SB2/PEMC/PSSC	Riverine F/T	2.40	181.79	377.04	0.35	0.00	0.00	0.35	0.05	2' wide stream with associated wetland. Extension of EW103	Likely	Likely
EL102	179.32	Private	PUBFx	Depressional	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Stock pond, Willow	Unlikely	Unlikely
GW012	179.50	Private	PEM	Slope	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Seasonal snowmelt wetland	Likely	Likely
					Total	**426.51**	**884.61**	**0.82**	**0.00**	**0.00**	**0.82**	**0.05**			
Eastern Slopes Ecoregion, Upper Klamath R. Sub-basin (HUC 18010206), John C Boyle Reservoir-Klamath River (HUC 1801020602) Fifth field Watershed [c], Klamath County, Oregon															
EW093	184.54	Private	PEMC	Slope/Flats	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Emergent wetland	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f] (or fill) (acres)	Wetland Description [g]	Regulated by the COE	Regulated by the ODSL
EL094	184.90	Private	PUBFx	Depressional	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Stock pond	Unlikely	Unlikely
EW095	184.90	Private	PEMC	Slope/Flats	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Wetland around stock pond	Likely	Likely
GW013	186.05	Private	PEM	Slope	0.01	0.90	1.87	0.00	0.00	0.00	0.00	0.00	Seasonal snowmelt wetland	Likely	Likely
ESI097 Trib. to Klamath River	186.61	Private	R4SB2C	Riverine F/T	0.03	7.17	14.88	0.02	0.00	0.00	0.02	0.00	Boulders, cobbles 2-5' wide, <1' deep	Likely	Likely
EW101	186.64	Private	PEMC	Slope/Flats	8.82	1307.60	2712.06	2.30	0.00	0.00	2.30	0.00	Emergent wetland associated with pond	Likely	Likely
EL096	186.64	Private	PUBx	N/A	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Stock pond adjacent to EW101. Salix and sprirea dominate	Unlikely	Likely
ESI099 Trib. to Klamath River	186.65	Private	R4SB2C	Riverine F/T	0.02	2.64	5.48	0.01	0.00	0.00	0.01	0.00	Small intermittent stream 3? wide, feeds pond	Likely	Likely
ESI100 Trib. to Klamath River	186.74	Private	R4SB2C	Riverine F/T	0.06	10.66	22.12	0.04	0.00	0.00	0.04	0.00	Small intermittent stream 2' wide, feeds pond	Likely	Likely
					Total	**1,328.97**	**2,756.41**	**2.37**	**0.00**	**0.00**	**2.37**	**0.00**			
Eastern Slopes Ecoregion, Lost River Sub-basin (HUC 18010204), Lake Ewauna-Klamath River (HUC 1801020412) Fifth field Watershed [c], Klamath County, Oregon															
ASI013/SS-100-025 Trib. to Klamath River	188.90	Private	R4EM2	Riverine F/T	0.01	3.16	6.55	0.01	0.00	0.00	0.01	0.00	Main channel (ave 4' wide) & side channel (ave 3')	Likely	Likely
AW270	191.99	Private	PEMC	Slope/Flats	0.25	93.80	194.55	0.19	0.01	0.00	0.20	0.00	Agricultural wetland near juniper woodlands and residences	Likely	Likely
ADX271	192.12	Private	R4UB3Cx	N/A	0.16	18.43	38.23	0.04	0.00	0.00	0.04	0.00	Canal dominated by cattail	Likely	Likely
AW272	192.35	Private	PEMC	Slope/Flats	8.62	1016.34	2107.96	2.09	1.50	0.00	3.59	0.00	Agricultural wetland; artificially irrigated	Likely	Likely
ADX273	192.46	Private	R4UB3Cx	N/A	0.23	25.13	25.12	0.05	0.04	0.00	0.09	0.00	Agricultural ditch flowing (no established veg), continues as ADX-56	Likely	Unlikely
ADX056	192.46	Private	R4UB3x	N/A	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15' average width, trapezoidal ditch; <1% gradient	Likely	Likely
AW057	192.58	Private	PEMC	Slope/Flats	17.86	2497.28	2179.55	5.43	4.98	0.00	10.41	0.00	Irrigated pasture wetland, continues off-site to the north	Likely	Likely
NW067	192.59	Private	PEMC	Slope/Flats	0.10	0.00	0.00	0.00	0.26	0.00	0.26	0.00	Irrigated pasture wetland, continues off-site to the south	Likely	Likely
NDX066	192.75	Private	R4UB3x	N/A	3.86	0.00	0.00	0.00	0.39	0.00	0.39	0.00	Large irrigation ditch along road	Likely	Likely
ADX062	192.94	Private	R4UB3Cx	N/A	0.05	8.43	17.49	0.02	0.01	0.00	0.03	0.00	20' wide, <1% gradient pasture ditch, small excavated pools	Likely	Likely
ADX061	192.94	Private	R4UB3Cx	N/A	0.04	6.39	13.26	0.01	0.00	0.00	0.01	0.00	20' wide, <1% gradient pasture ditch	Likely	Likely
AW060	192.96	Private	PEMC	Slope/Flats	9.07	2338.19	4849.57	4.69	3.84	0.00	8.53	0.00	Wetland pasture near irrigation canal	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
NW068	193.05	Private	PEMC	Slope/Flats	0.51	0.00	0.00	0.00	0.49	0.00	0.49	0.00	Irrigated pasture wetland, continues off-site to the south	Likely	Likely
NDX070	193.19	Private	R4UB3x	N/A	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigation ditch, continues off-site to the south	Likely	Unlikely
AW064	193.41	Private	PEMC	Slope/Flats	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigated pasture wetland	Likely	Likely
NDX069	193.42	Private	R4UB3x	N/A	0.18	0.00	0.00	0.00	0.04	0.00	0.04	0.00	Irrigation ditch, continues off-site to the east and south	Likely	Likely
ADX063	193.42	Private	R4UB3Cx	N/A	0.16	16.86	34.96	0.06	0.02	0.00	0.08	0.00	<1% gradient irrigation ditch, fingerlings present	Likely	Unlikely
AW065	193.43	Private	PEMC	Slope/Flats	0.82	239.73	497.22	0.45	0.37	0.00	0.82	0.00	Irrigated pasture wetland	Likely	Likely
AW066	193.50	Private	PEMC	Slope/Flats	4.84	506.56	1056.86	1.20	0.86	0.00	2.06	0.00	Irrigated pasture wetland	Likely	Likely
NW071	193.64	Private	PEMC	Slope/Flats	1.02	0.00	0.00	0.00	0.25	0.00	0.25	0.00	Irrigated pasture wetland, continues off-site to the south	Likely	Likely
ADX067	193.74	Private	R4UB3x	N/A	0.33	18.74	38.87	0.04	0.23	0.00	0.27	0.00	12' average width, <1% gradient, u-shaped ditch	Likely	Likely
AW068	193.75	Private	PEMC	Slope/Flats	2.17	366.19	759.50	0.79	0.49	0.00	1.28	0.00	Pasture wetland within harvested hayfield	Likely	Likely
ADX069	193.82	Private	R4UB3x	N/A	0.14	20.59	42.70	0.04	0.04	0.00	0.08	0.00	12' average width, <1% gradient, trapezoidal ditch	Likely	Likely
AW071	193.92	Private	PEMC	Slope/Flats	0.30	162.46	336.95	0.28	0.02	0.00	0.30	0.00	Slight depression in alfalfa field, similar to AW70	Likely	Likely
NW072	193.95	Private	PEMC	Slope/Flats	0.87	0.00	0.00	0.00	0.51	0.00	0.51	0.00	Irrigated pasture wetland, continues off-site to the south	Likely	Likely
AW070	193.96	Private	PEMC	Slope/Flats	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	Pasture wetland within harvested hayfield	Likely	Likely
ADX072	193.99	Private	R4UB3x	N/A	0.20	0.00	0.00	0.00	0.20	0.00	0.20	0.00	10' average width, <1% gradient, u-shaped ditch	Likely	Likely
NDX073	194.14	Private	R4UB3x	N/A	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigation ditch, continues off-site to the south	Likely	Unlikely
NW074	194.29	Private	PEMC	Slope/Flats	0.62	0.00	0.00	0.00	0.26	0.00	0.26	0.00	Irrigated pasture wetland, continues off-site to the south	Likely	Likely
ADX073	194.29	Private	R4UB3x	N/A	0.20	0.00	0.00	0.00	0.20	0.00	0.20	0.00	10' average width, <1% gradient, u-shaped ditch	Likely	Likely
AW074	194.40	Private	PEMC	Slope/Flats	2.99	539.51	1118.99	1.19	0.87	0.00	2.06	0.00	Pasture wetland within harvested hayfield	Likely	Likely
NDX075	194.51	Private	R4UB3x	N/A	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigation ditch	Likely	Unlikely
ADX075	194.51	Private	R4UB3x	N/A	0.13	10.80	22.41	0.02	0.08	0.00	0.10	0.00	<1% gradient, u-shaped ditch	Likely	Likely
AW076	194.52	Private	PEMC	Slope/Flats	2.16	490.57	1017.47	1.02	1.15	0.00	2.17	0.00	Pasture wetland adjacent to canal	Likely	Likely
NDX077	194.57	Private	R4UB3x	N/A	0.20	0.00	0.00	0.00	0.03	0.00	0.03	0.00	Irrigation ditch	Likely	Unlikely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
NW076	194.57	Private	PEMC	Slope/Flats	0.72	0.00	0.00	0.00	0.30	0.00	0.30	0.00	Irrigated pasture wetland, continues off-site to the south	Likely	Likely
ADX077	194.57	Private	R4UB3x	N/A	0.13	0.00	0.00	0.00	0.05	0.00	0.05	0.00	<1% gradient, u-shaped ditch	Likely	Unlikely
ADX078	194.64	Private	R4UB3x	N/A	0.99	102.37	212.32	0.29	0.29	0.00	0.58	0.00	Trapezoidal, <1% gradient irrigation ditch	Likely	Unlikely
AW079	194.67	Private	PEMC	Slope/Flats	0.14	0.00	0.00	0.02	0.12	0.00	0.14	0.00	Adjacent to drainage ditch (ADX78)	Likely	Likely
NDX078	194.69	Private	R4UB3x	N/A	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigation ditch	Likely	Unlikely
NDX080	194.69	Private	R4UB3x	N/A	0.57	0.00	0.00	0.00	0.06	0.00	0.06	0.00	Irrigation ditch	Likely	Unlikely
NW079	194.69	Private	PEMC	Slope/Flats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigated pasture wetland, continues off-site to the south	Likely	Likely
ADX080	194.69	Private	R4UB3x	N/A	0.06	0.00	0.00	0.00	0.03	0.00	0.03	0.00	<1% gradient, u-shaped drainage ditch	Likely	Unlikely
AW082	194.90	Private	PEMC	Slope/Flats	1.94	357.89	742.28	0.76	0.47	0.00	1.23	0.00	Large wetland swale within hayfield	Likely	Likely
ADX081	194.92	Private	R4UB3x	N/A	0.10	0.00	0.00	0.00	0.10	0.00	0.10	0.00	<1% gradient, u-shaped drainage ditch	Likely	Unlikely
NDX081	194.92	Private	R4UB3x	N/A	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigation ditch, connected to NDX80; continues off-site to the south	Likely	Unlikely
ADX083	195.12	Private	R4UB3x	N/A	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	8' average width, u-shaped ditch, <1% gradient	Likely	Unlikely
AW085	195.14	Private	PEMC	Slope/Flats	0.04	0.00	0.00	0.00	0.04	0.00	0.04	0.00	Wetland in hayfield, associated with adjacent ditch	Likely	Likely
ADX084	195.18	Private	R4UB3x	N/A	0.06	0.00	0.00	0.00	0.06	0.00	0.06	0.00	<1% gradient, u-shaped ditch	Likely	Unlikely
AW088	195.21	Private	PEMC	Slope/Flats	7.68	1286.37	2668.03	2.86	1.71	0.00	4.57	0.00	Wetland within hayfield	Likely	Likely
ADX086	195.24	Private	R4UB3x	N/A	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	<1% gradient, u-shaped ditch	Likely	Likely
NDX085	195.24	Private	R4UB3x	N/A	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Roadside irrigation ditch	Likely	Unlikely
NDX082	195.32	Private	R4UB3x	N/A	0.42	0.00	0.00	0.00	0.02	0.00	0.02	0.00	Irrigation ditch, connected to NDX80	Likely	Unlikely
ADX087	195.32	Private	R4UB3x	N/A	0.13	0.00	0.00	0.00	0.13	0.00	0.13	0.00	<1% gradient, trapezoidal drainage ditch	Likely	Unlikely
AW021	195.44	Private	PEM/R4UB2x	Slope/Flats	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	Hydric portion of ditch dug through hydric soils	Likely	Likely
ADX019	195.46	Private	R4UB2x	N/A	0.11	29.83	61.87	0.05	0.02	0.00	0.07	0.00	8' wide, 3' deep ditch	Likely	Unlikely
NDX083	195.46	Private	R4UB3x	N/A	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigation ditch, continues off-site to the south	Likely	Unlikely
ADX020	195.47	Private	R4UB2x	N/A	0.06	0.00	0.00	0.00	0.04	0.00	0.04	0.00	Wet ditch	Likely	Likely
ADX022	195.51	Private	R4UB2x		0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Connected to AW21	Likely	Likely
NDX084	195.63	Private	R4UB3x	N/A	0.04	0.00	0.00						Roadside irrigation ditch	Likely	Unlikely
GDX004	195.67	Private	R4	N/A	0.06	25.95	53.82	0.05	0.01	0.00	0.06	0.00	5' wide ditch with pasture grasses	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a] (Waterbody [b]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c] (or fill) (acres)	Wetland Description [a]	Regulated by the COE	Regulated by the ODSL
GDX003	195.71	Private	R4	N/A	1.07	49.51	102.70	0.18	0.03	0.00	0.21	0.00	Connected to GDX001	Likely	Likely
GDX001	195.80	Private	R4	N/A	0.50	45.98	95.37	0.10	0.10	0.00	0.20	0.00	7-8' wide ditch with pasture grass	Likely	Likely
GDX002	195.91	Private	R4	N/A	0.24	6.45	13.37	0.01	0.03	0.00	0.04	0.00	3-10' wide irrigation ditch	Likely	Likely
AW026	196.06	Private	PEM/R4UB2x	Slope/Flats	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Complex of vegetated ditch segments & wetland swale	Likely	Likely
AW028	196.13	Private	R4UB2x	Slope/Flats	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	AW26 & 28 are connected (same feature)	Likely	Likely
NW089	196.23	Private	PEMC	Slope/Flats	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigated wetland pasture	Likely	Likely
NW090	196.37	Private	PEMC	Slope/Flats	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigated wetland pasture	Likely	Likely
ADX029	196.37	Private	R4UB2x	N/A	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Drainage ditch	Likely	Unlikely
ADX030	196.41	Private	R4UB2x	N/A	0.07	8.97	18.60	0.02	0.01	0.00	0.03	0.00	Irrigation ditch	Likely	Likely
ADX031	196.45	Private	R4UB2x	N/A	0.19			0.00	0.05	0.00	0.05	0.00	Drainage ditch	Likely	Unlikely
ADX032	196.65	Private	R4UB2x	N/A	0.26	27.63	57.30	0.06	0.00	0.00	0.06	0.00	Large irrigation channel	Likely	Likely
ADX033	196.73	Private	R4UB2x	N/A	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigation ditch, 4-10' wide; unvegetated	Likely	Unlikely
AW035	196.73	Private	PEMAx	Slope/Flats	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Wet ditch similar to AW37	Likely	Likely
ADX036	196.76	Private	R4UB2x	N/A	0.04	8.68	18.00	0.02	0.01	0.00	0.03	0.00	Narrow irrigation ditch	Likely	Unlikely
AL034 Weyerhaeuser Pond	196.77	Private	PUBKx	N/A	0.22	0.00	0.00	0.00	0.76	0.00	0.76	0.00	Triangular artificial pond with Weyerhaeuser logo island	Unlikely	Unlikely
ADX038	196.78	Private	R4SBFx	N/A	0.02	3.11	6.46	0.01	0.00	0.00	0.01	0.00	Irrigation ditch	Likely	Unlikely
AW037	196.79	Private	PEMAx	Slope/Flats	0.21	19.45	40.34	0.04	0.00	0.00	0.04	0.00	Wet ditch	Likely	Likely
NW091	196.82	Private	PEMC	Slope/Flats	2.51	307.71	638.22	0.74	0.23	0.00	0.97	0.00	Irrigated pasture wetland	Likely	Likely
ADX039	196.89	Private	R4SBFx	N/A	0.27	24.47	50.75	0.06	0.00	0.00	0.06	0.00	Irrigation ditch, connected to ADX38; 2' deep	Likely	Unlikely
ADX040	197.08	Private	R4SBFx	N/A	0.11	11.80	24.48	0.03	0.00	0.00	0.03	0.00	Irrigation ditch	Likely	Unlikely
AW041	197.09	Private	PEM/R4SBFx	Slope/Flats	0.16	11.54	23.94	0.03	0.00	0.00	0.03	0.00	Wet portion of abandoned ditch	Unlikely	Unlikely
AW042	197.10	Private	PEMC	Slope/Flats	17.24	2,175.87	4,512.91	4.78	0.80	0.00	5.58	0.00	Irrigated pasture wetland	Likely	Unlikely
AW043	197.80	Private	PEMC	Slope/Flats	4.09	408.98	848.25	0.98	0.18	0.00	1.16	0.00	Irrigated pasture wetland	Likely	Unlikely
AL044	198.99	Private	PABGh	Lacustrine Fringe	0.52	0.00	0.00	0.02	0.03	0.00	0.05	0.00	Pond adjacent to the Klamath River	Likely	Likely
AW045	199.25	Private	PEM/PSSCx	Slope/Flats	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Adjacent to Klamath River	Likely	Likely
AW090	199.27	State	PEMC	Slope/Flats	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Wetland within disturbed area	Likely	Likely
AW089	199.28	State	PEMC	Slope/Flats	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Wetland within disturbed area	Likely	Likely
ASP151 Klamath River	199.38	State	L1UBHh	Riverine F/T	8.75	985.67	2044.35	0.03	0.00	0.00	0.03	0.00	Klamath River/large irrigation channel	Likely	Likely
AW152	199.51	Private	PEM/PSS/R4UB3x	N/A	2.36	260.03	539..2	0.57	0.00	0.00	0.57	0.00	30' wide excavated channel with dense wetland vegetation	Likely	Likely
ADX153	199.52	Private	R4UB3x	N/A	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15' average width, excavated ditch	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [j/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
AW154	199.53	Private	PEMC	Slope/Flats	0.18	0.00	0.00	0.06	0.00	0.00	0.06	0.00	Low area to west of cattail marsh	Likely	Likely
AW155	199.55	Private	PEMC	Slope/Flats	0.33	49.99	103.67	0.11	0.00	0.00	0.11	0.00	Depressional area west of Highway 97	Likely	Likely
AW156	199.58	Private	PEMC	Slope/Flats	0.50	85.43	177.19	0.19	0.41	0.00	0.60	0.00	Similar to AW155, on east side of Highway 97	Likely	Likely
AW157	199.59	Private	PEMC/R4UB3x	N/A	0.06	14.12	29.28	0.03	0.03	0.00	0.06	0.00	Wet ditch associated with AW159	Likely	Likely
AW158	199.60	Private	PEMC/R4UB3x	N/A	0.04	5.78	11.98	0.01	0.02	0.00	0.03	0.00	Wet ditch associated with AW159	Likely	Likely
AW159	199.61	Private	PEMC	Slope/Flats	0.44	0.00	0.00	0.00	1.41	0.00	1.41	0.00	Wetland ditches and pasture depressional areas	Likely	Likely
AW160	199.76	Private	PEMC/R4UB3x	N/A	0.08	32.59	67.60	0.04	0.02	0.00	0.06	0.00	Wet ditch associated with AW159	Likely	Likely
AW312	200.00	Private	PEMC	Slope/Flats	3.76	407.72	845.64	0.94	0.81	0.00	1.75	0.00	Should be labeled BW161	Likely	Likely
AW255	200.08	Private	PEMC	Slope/Flats	7.38	764.48	1585.58	1.65	0.59	0.00	2.24	0.00	Irrigated livestock pasture surrounded by lg. Irrigation ditch	Likely	Likely
ADX293	200.31	Private	R2UB3Hy	Slope/Flats	0.85	0.00	0.00	0.38	0.00	0.00	0.38	0.00	Trap-shaped canal	Likely	Unlikely
ADX294	200.54	Private	R2UB3Hy	Slope/Flats	0.31	32.65	67.72	0.07	0.00	0.00	0.07	0.00	Trap-shaped canal	Likely	Unlikely
ADX295	200.55	Private	R2UB3Hy	Slope/Flats	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Trap-shaped canal	Likely	Unlikely
ADX092	200.59	Private	R4UB3x	N/A	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Trapezoidal irrigation ditch, <1% gradient	Likely	Unlikely
AW093	201.03	Private	PEMC	Slope/Flats	222.56	2480.22	5144.16	5.34	1.19	0.00	6.53	0.00	Irrigated hay field wetland	Likely	Likely
ADX094	201.49	Private	R4UB3x	N/A	0.07	10.10	20.95	0.02	0.02	0.00	0.04	0.00	Trapezoidal drainage ditch, <1% gradient	Likely	Likely
AW095	201.51	Private	PEMC	Slope/Flats	1.29	166.34	345.01	0.41	0.02	0.00	0.43	0.00	Irrigated hay field wetland, similar to AW93	Likely	Likely
ADX096	201.63	Private	R4UB3x	N/A	0.14	15.64	32.43	0.03	0.00	0.00	0.03	0.00	16' average width, u-shaped ditch, <1% gradient	Likely	Likely
ADX097	203.90	Private	R4UB3x	NA	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20' average width, trapezoidal ditch, <1% gradient	Likely	Likely
ADX099	203.97	Private	R4UB3x	N/A	0.08	10.95	22.72	0.02	0.03	0.00	0.05	0.00	Ditch along County Highway 888	Likely	Unlikely
AW098	203.98	Private	PEMC	Slope/Flats	0.11	0.00	0.00	0.00	0.05	0.00	0.05	0.00	Depressional wetland adjacent to ditch (ADX99)	Likely	Likely
ADX100	204.12	Private	R4UB3x	N/A	0.61	43.99	91.24	0.09	0.00	0.00	0.09	0.00	20' average width, trapezoidal ditch, <1% gradient	Likely	Likely
ADX101	204.33	Private	R4UB3x	N/A	0.15	12.91	26.78	0.03	0.00	0.00	0.03	0.00	15' average width, trapezoidal ditch, <1% gradient	Likely	Likely
AW102	204.33	Private	PEMC	Slope/Flats	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Emergent wetland adjacent to hayfield	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f/] (or fill) (acres)	Wetland Description [a/]	Regulated by the COE	Regulated by the ODSL
ADX103	204.50	Private	R4UB3x	N/A	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20' average width, trapezoidal ditch, <1% gradient	Likely	Likely
ADX104	204.74	Private	R4UB3x	N/A	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Contiguous to ADX103	Likely	Likely
ADX105	204.74	Private	R4UB3x	N/A	0.30	17.76	36.84	0.05	0.00	0.00	0.05	0.00	20' average width, trapezoidal ditch, <1% gradient	Likely	Likely
ADX106	204.91	Private	R4UB3x	N/A	0.06	7.31	15.16	0.02	0.01	0.00	0.03	0.00	3' average width, u-shaped ditch, <1% gradient	Likely	Unlikely
ADX107	204.98	Private	R4UB3x	N/A	0.06	7.35	15.25	0.02	0.00	0.00	0.02	0.00	7' average width, u-shaped ditch, <1% gradient	Likely	Unlikely
AW108	205.08	Private	PEMC	Slope/Flats	4.17	476.08	987.42	1.07	0.36	0.00	1.43	0.00	Irrigated pasture	Likely	Unlikely
ADX109	205.41	Private	R4UB3x	N/A	0.20	27.55	57.15	0.05	0.00	0.00	0.05	0.00	20' average width, u-shaped ditch, <1% gradient	Likely	Likely
					Total	**19206.38**	**36275.34**	**39.97**	**27.82**	**0.00**	**67.82**	**0.00**			
Eastern Slopes Ecoregion, Lost River Sub-basin (HUC 18010204), Mills Creek-Lost River (HUC 1801020409) Fifth field Watershed [e/], Klamath County, Oregon															
ADX111	205.95	Private	R4UB3x	N/A	0.49	54.90	113.87	0.12	0.00	0.00	0.12	0.00	25-30' wide canal adjacent to ADX110 and 112	Likely	Likely
ADX110	205.95	Private	R4UB3x	N/A	0.05	5.14	10.65	0.01	0.02	0.00	0.03	0.00	Maintained drainage ditch, 2-4' wide, 1-2" deep	Likely	Unlikely
ADX112	205.97	Private	R4UB3x	N/A	0.36	39.97	82.90	0.09	0.03 [f/]	0.00	0.12	0.00	Wet ditch, may be jurisdictional	Likely	Unlikely
ADX113	206.51	Private	R4UB3x	N/A	0.22	23.85	49.47	0.05	0.00	0.00	0.05	0.00	12' wide irrigation ditch connects to ADX111	Likely	Likely
AW114	207.12	Private	PEM/R4UB3x	Slope/Flats	0.043	3.90	8.08	0.01	0.00	0.00	0.01	0.00	Wet portion of drainage ditch	Likely	Likely
ADX115	207.26	Private	R4UB3x	N/A	0.48	53.20	110.34	0.11	0.00	0.00	0.11	0.00	Roadside drainage ditch, ~20' wide	Likely	Likely
ADX116	207.40	Private	R4UB3x	N/A	0.29	32.80	68.04	0.07	0.00	0.00	0.07	0.00	Mostly unvegetated drainage ditch adjacent to ADX117	Likely	Unlikely
ADX117	207.42	Private	R4UB3x	N/A	0.35	38.16	79.15	0.08	0.00	0.00	0.08	0.00	Adjacent to ADX116, eastern 50' contains wetland species	Likely	Unlikely
ADX118	207.60	Private	R4UB3x	N/A	0.53	62.21	129.03	0.13	0.00	0.00	0.13	0.00	30' wide drainage ditch with steep banks.	Likely	Likely
ADX119	207.98	Private	R4UB3x	N/A	0.91	34.26	71.05	0.07	0.00	0.00	0.07	0.00	30' wide drainage ditch with no vegetation on banks	Likely	Likely
AW122	208.01	Private	PEMC	Slope/Flats	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Depressional area near farm road, actively irrigated	Likely	Likely
ADX120	208.07	Private	R4UB3x	N/A	0.07	7.86	16.31	0.02	0.00	0.00	0.02	0.00	2' wide irrigation ditch	Likely	Unlikely
ADX121	208.07	Private	R4UB3x	N/A	0.05	5.79	12.01	0.01	0.00	0.00	0.01	0.00	Associated with AW122	Likely	Likely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [c/] (or fill) (acres)	Wetland Description [d/]	Regulated by the COE	Regulated by the ODSL
ADX123	208.18	Private	R4UB3x	N/A	0.35	30.24	65.72	0.08	0.00	0.00	0.08	0.00	Deep drainage ditch with reed canary grass	Likely	Unlikely
ADX124	208.23	Private	R4UB3x	N/A	0.07	8.23	17.07	0.02	0.03	0.00	0.05	0.00	3-5' wide ditch, 1' deep water with little vegetation	Likely	Unlikely
ADX125	208.28	Private	R4UB3x	N/A	0.05	12.83	26.61	0.03	0.01	0.00	0.04	0.00	2' wide irrigation ditch, 8" deep water with little vegetation	Likely	Unlikely
ADX126	208.29	Private	R4UB3x	N/A	0.07	15.15	31.43	0.03	0.00	0.00	0.03	0.00	2-2.5' wide irrigation ditch	Likely	Unlikely
ADX128	208.78	Private	R4UB3x	N/A	0.13	15.21	31.54	0.03	0.00	0.00	0.03	0.00	Roadside drainage ditch with little vegetation	Likely	Unlikely
AW127	208.79	Private	PEM/R4UB3x	N/A	0.11	12.57	26.08	0.03	0.00	0.00	0.03	0.00	Roadside drainage ditch with wetland characteristics	Likely	Unlikely
ADX129	208.85	Private	R4UB3x	N/A	0.27	48.98	101.58	0.12	0.04	0.00	0.16	0.00	Roadside ditch, trapezoidal, <2% gradient, 10-12' wide	Likely	Likely
ADX130	209.02	Private	R4UB3x	N/A	0.22	28.02	58.12	0.06	0.00	0.00	0.06	0.00	20' wide drainage ditch with no vegetation, 2' water	Likely	Likely
ADX131	209.05	Private	R4UB3x	N/A	0.07	10.10	20.95	0.02	0.00	0.00	0.02	0.00	1-2' wide roadside drainage ditch	Likely	Unlikely
AW132	209.14	Private	PEM/R4UB3x	N/A	0.17	13.42	27.84	0.03	0.00	0.00	0.03	0.00	5-8' wide roadside ditch overgrown with wetland species	Likely	
ADX133	209.15	Private	R4UB3x	N/A	0.02	2.57	5.32	0.01	0.00	0.00	0.01	0.00	1-2' wide ditch with wetland species	Likely	Unlikely
ADX134	209.15	Private	R4UB3x	N/A	0.13	16.03	33.254	0.03	0.00	0.00	0.03	0.00	10-12' wide irrigation lateral drainage	Likely	Unlikely
ADX135	209.16	Private	R4UB3x	N/A	0.07	7.99	16.57	0.02	0.00	0.00	0.02	0.00	15' wide irrigation lateral drainage, 2-3' deep water	Likely	Unlikely
ADX141	209.46	Private	R4UB3x	N/A	0.07	7.38	15.31	0.01	0.00	0.00	0.01	0.00	8-10' wide, 4-5' deep	Likely	Unlikely
ADX142	210.16	Private	R4UB3x	N/A	0.07	7.47	15.49	0.02	0.00	0.00	0.02	0.00	Roadside ditch, connects to other waters, 9-10' wide	Likely	Likely
ADX143	210.26	Private	R4UB3x	N/A	0.18	17.90	37.13	0.04	0.00	0.00	0.04	0.00	Deep, steep sided ditch,35' wide at top of bank	Likely	Likely
ADX260	210.85	Private	R4UB3x	N/A	0.10	8.83	18.31	0.02	0.00	0.00	0.02	0.00	U-shaped irrigation ditch 2-5' deep, 2' wide	Likely	Unlikely
ADX261	210.87	Private	R4UB3x	N/A	0.16	10.13	21.00	0.02	0.01	0.00	0.03	0.00	U-shaped irrigation ditch 2-5' deep, 2' wide	Likely	Unlikely
ADX262	210.90	Private	R4UB3x	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	U-shaped irrigation ditch 8-10'deep, 30' wide	Likely	Unlikely
NDX031	211.26	Private	R4UB3Cx	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Ditch	Likely	Unlikely
NDX029	211.32	Private	R4UB3Cx	N/A	0.20	18.13	37.30	0.04	0.00	0.00	0.04	0.00	Ditch	Likely	Unlikely
NDX030	211.34	Private	R4UB3Cx	N/A	0.15	17.45	36.19	0.04	0.00	0.00	0.04	0.00	Ditch	Likely	Unlikely
NDX092	211.53	Private	R4UB3Cx	N/A	0.12	8.61	17.85	0.02	0.00	0.00	0.02	0.00	Ditch	Likely	Likely
NDX093	211.53	Private	R4UB3Cx	N/A	0.25	9.08	18.83	0.02	0.05	0.00	0.07	0.00	Irrigation ditch	Likely	Unlikely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [j/] (or fill) (acres)	Wetland Description [g/]	Regulated by the COE	Regulated by the ODSL
AW144	211.58	Private	PUB3W	Slope/Flats	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Wet ditch, 25' west of centerline	Likely	Likely
ADX145	211.59	Private	R4UB3x	N/A	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigation ditch 2-4' wide	Likely	Unlikely
ADX145	211.64	Private	R4UB3x	N/A	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
NSP001 Lost River	212.05	State	R3UBH	Riverine F/T	1.15	118.38	245.53	0.26	0.01	0.00	0.27	0.00	Lost River	Likely	Likely
EW086	212.49	Private	PEMC	Slope/Flats	0.64	91.43	189.63	0.23	0.29	0.01	0.53	0.00	Emergent wetland associated with Lost River	Likely	Likely
EW087	212.52	Private	PEMC	Slope/Flats	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Emergent wetland associated with Lost River	Likely	Likely
ESI052	212.53	Private	PUB3Cx	Riverine F/	0.09	0.00	0.00	0.01	0.17	0.00	0.18	0.00	2' wide, 6' deep	Likely	Likely
EDX054 (EDX089)	212.61	Private	R4UB3Cx	N/A	0.0.2	0.00	0.00	0.00	0.00	0.01	0.01	0.00	Canal connected to Lost River	Likely	Likely
EDX055 (EDX090)	212.63	Private	R4UB3Cx	N/A	0.56	6.83	14.17	0.02	0.00	0.00	0.02	0.00	Canal connected to Lost River	Likely	Likely
ADX313	213.25	Private	R4UB3Cx	N/A	0.07	8.39	17.39	0.01	0.00	0.00	0.01	0.00	10' wide at TOB, 6' at OHWM	Likely	Unlikely
ADX314	213.26	Private	R4UB3Cx	N/A	0.23	22.36	46.37	0.04	0.00	0.00	0.04	0.00	U-shaped ditch; 10' higher than BDX4 and 6	Likely	Unlikely
ADX315	213.27	Private	R4UB3Cx	N/A	0.07	7.54	15.64	0.01	0.00	0.00	0.01	0.00	10' wide at TOB, 6' at OHWM; native wetland species	Likely	Unlikely
ADX316	213.28	Private	R4UB3Cx	N/A	0.02	2.69	5.58	0.00	0.00	0.00	0.00	0.00	2' side, 1' deep U-shaped ditch	Likely	Unlikely
ADX317	213.43	Private	R4UB3Cx	N/A	0.19	11.01	22.85	0.03	0.00	0.00	0.03	0.00	10' wide at TOB, 4' at OHWM, V-shaped ditch	Likely	Unlikely
ADX318	213.83	Private	R4UB3Cx	N/A	0.08	8.12	16.84	0.01	0.00	0.00	0.01	0.00	10' wide at TOB, 4' at OHWM, V-shaped ditch	Likely	Unlikely
ADX318	213.87	Private	R4UB3Cx	N/A	0.16	18.79	38.98	0.03	0.00	0.00	0.03	0.00	10' wide at TOB, 4' at OHWM, V-shaped ditch	Likely	Unlikely
ADX274	214.17	Private	R4UB3Cx	N/A	0.12	13.74	28.49	0.03	0.00	0.00	0.03	0.00	Ag. Ditch/canal dominated by Lemn asp.	Likely	Unlikely
ADX275	214.18	Private	R4UB3Cx	N/A	0.98	42.14	87.40	0.09	0.00	0.00	0.09	0.00	Ag. Canal dominated by Typha latifolia, Alisma sp.	Likely	Unlikely
ASI051 Unnamed Creek	216.10	Private	PEMA	Riverine F/T	0.13	12.80	26.56	0.03	0.00	0.00	0.03	0.00	6' wide, 2-3% gradient, 1-2" flowing water, 2-3" deep pools	Likely	Likely
ASI052 Unnamed Creek	216.11	Private	R4SB1	Riverine F/T	0.03	3.01	6.25	0.01	0.00	0.00	0.01	0.00	Ephemeral drainage, 3' average width	Likely	Unlikely
ASI050 Unnamed Creek	216.30	Private	R4SBC	Riverine F/T	0.08	25.23	52.34	0.02	0.00	0.00	0.02	0.00	Seep/stream with v-shape in northern portion, some wetland	Likely	Likely
ASI049 Unnamed Creek	216.43	Private	R4SBC	Riverine F/T	0.08	6.95	14.41	0.01	0.00	0.00	0.01	0.00	1-6' wide seep/stream; originates upslope of road off-site	Likely	Likely
AL047	217.38	Private	PABGx	Lacustrine Fringe	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Stock pond for cattle	Unlikely	Unlikely

TABLE N-1a

Wetlands and Waterbodies Impacted by the Pacific Connector Pipeline (includes all wetlands within 400-foot survey corridor)

Wetland ID [a/] (Waterbody [b/]	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Project Survey Corridor	Width of Crossing (feet)	Excavated Volume at Crossing (cubic yds)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion [f/] (or fill) (acres)	Wetland Description [g/]	Regulated by the COE	Regulated by the ODSL
AW048	217.38	Private	PEMC	Slope/Flats	0.20	72.08	149.49	0.11	0.00	0.00	0.11	0.00	Depressional area beyond berm west of stock pond	Unlikely	Likely
ASI136 Trib. to D Canal	218.09	Private	R4SB1x	Riverine F/T	0.19	23.48	48.69	0.06	0.00	0.00	0.06	0.00	4-25' wide ephemeral stream	Likely	Unlikely
ASI137 Trib. to D Canal	218.46	Private	R4SB1x	Riverine F/T	0.03	3.06	6.35	0.01	0.00	0.00	0.01	0.00	1-8' (Ave 3') wide ephemeral stream	Likely	Unlikely
ASI291 Trib. to D Canal	219.69	Private	R4UB3C	Riverine F/T	0.01	1.28	2.64	0.00	0.00	0.00	0.00	0.00	Intermittent stream	Likely	Likely
NL116	219.70	Private	PABGx	Lacustrine F	0.02	0.00	0.00	0.00	0.68	0.00	0.68	0.00	Excavated pond	Unlikely	Unlikely
AW292	219.70	Private	PEMC	Slope/Flats	0.05	0.00	0.00	0.02	0.00	0.00	0.02	0.00	Herb wetland	Likely	Likely
ASI138 Unnamed Creek	221.77	Private	R4UB3	Riverine F/T	0.05	5.02	10.41	0.01	0.00	0.00	0.01	0.00	Intermittent/ephemeral stream with upland vegetation	Likely	Unlikely
EL077 (EL091)	222.84	Private	PABGx	Lacustrine F	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Pond, PSS vegetation along edge, willow ELPA.	Likely	Likely
ADX139	223.20	Private	R4SB2x	N/A	0.08	7.55	15.66	0.02	0.00	0.00	0.02	0.00	Excavated drainage ditch with upland vegetation	Unlikely	Unlikely
ESI050 Trib. to V Canal	224.95	Private	R4SB1	Riverine F/T	0.00	0.00	0.00	0.00	60.13	0.00	0.13	0.00	5' wide, intermittent tributary to V Canal Need Description	Likely	Likely
ESI051 (ESI092) Trib. to V Canal	224.95	Private	R4SB1	Riverine F/T	<0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	3' wide, intermittent tributary to V Canal	Likely	Likely
ASI140 Trib. to V Canal	225.07	Private	R4SB1	Riverine F/T	0.23	28.33	58.77	0.06	0.00	0.00	0.06	0.00	Widths vary from 6-20'	Likely	Likely
NW112	226.78	Private	PEMC	Slope/Flats	4.58	637.31	1321.82	1.35	0.22	0.00	1.57	0.00	Possible agricultural wetland	Likely	Likely
NDX111	226.90	Private	R4SB2x	N/A	0.51	9.78	20.28	0.02	0.00	0.00	0.02	0.00	Agricultural pond/channel and roadside ditch	Likely	Likely
ADX319	228.67	Private	R4UB3Cx	Riverine F/T	<0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.00			
ADX289	229.36	Private	R2UB3Hx	Riverine F/T	<0.00	0.00	0.00	0.00	0.09	0.00	0.09	0.00			
AL288	229.36	Private	PABGx	Lacustrine	<0.00	0.00	0.00	0.00	0.20	0.00	0.20	0.00			
					Total	**1,875.66**	**3,892.93**	**4.01**	**2.04**	**0.02**	**6.07**	**0.00**			
				Total Wetland Impacts		**61,472.87**	**126,571.80**	**175.15**	**63.77**	**0.04**	**238.96**	**1.48**			

a/ Jones and Stokes Wetland Survey Waterbody Identification Number.
b/ Pacific Northwest Hydrography Database and Jones and Stokes Field Survey.
c/ USGS Hydrologic Unit Codes.
d/ Key Watershed.
e/ Impacts avoided by HDD and Direct Pipe
f/ Includes acres of uncleared storage area, hydrostatic test water discharge, and rock source and disposal.
g/ Jones and Stokes survey description of wetland and waterbody.

TABLE N-1b

Summary of Wetland Impacts by Fifth Field/HUC10 Watershed

Ecoregion and Sub-basin [a/]	HUC 10/Fifth field Watershed [a/]	Approximate Milepost Range [b/]	Miles Crossed	Cowardin Classification	Width of Crossing (feet)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion (or fill) (acres)
Coast Range Ecoregion Coos Subbasin (HUC 17100304)	Coos Bay Frontal (HUC 1710030403)	1.47 - 17.82	20.42	Estuarine	12951.34	73.88	2.40	0.00	76.28	0.00
				PEM	12759.75	27.63	24.25	0.00	51.88	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	425.40	0.89	0.54	0.00	1.43	0.29
				R	861.98	1.81	0.31	0.00	2.14	0.00
				PUB	0.00	0.00	0.00	0.00	<0.00	0.00
				Total	**26998.47**	**104.21**	**27.50**	**0.00**	**131.73**	**0.29**
Coast Range Ecoregion, Coquille Subbasin (HUC 17100305)	Coquille River (HUC 1710030505)	17.82 - 19.86	2.03	PEM	0.00	0.00	0.00	0.00	0.00	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	68.38	0.12	0.00	0.00	0.12	0.00
				Total	**68.38**	**0.12**	**0.00**	**0.00**	**0.12**	**0.00**
Coast Range Ecoregion Coquille Subbasin (HUC 17100305)	North Fork Coquille River (HUC 1710030504)	19.86 - 28.13	8.35	PEM	22.59	0.06	0.00	0.00	0.06	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	173.67	0.45	0.08	0.00	0.53	0.12
				R	129.45	0.26	0.00	0.00	0.26	0.00
				Total	**325.71**	**0.77**	**0.08**	**0.00**	**0.85**	**0.12**
Coast Range Ecoregion Coquille Subbasin (HUC 17100305)	East Fork Coquille River (HUC 1710030503)	28.13 - 42.48	10.21	PEM	40.41	0.24	0.00	0.00	0.24	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	175.01	0.31	0.00	0.00	0.31	0.00
				Total	**215.42**	**0.55**	**0.00**	**0.00**	**0.55**	**0.00**
Coast Range Ecoregion Coquille Subbasin (HUC 17100305)	Middle Fork Coquille River (HUC 1710030501)	35.81 - 45.70	9.04	PEM	0.00	0.00	0.00	0.00	0.00	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	48.59	0.11	0.00	0.00	0.11	0.00
				Total	**48.59**	**0.11**	**0.00**	**0.00**	**0.11**	**0.00**
Klamath Mountains Ecoregion Coquille Subbasin (HUC 17100305)	Middle Fork Coquille River (HUC 1710030501)	45.70 – 52.98	6.43	PEM	0.00	0.00	0.01	0.00	0.01	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	44.78	0.08	0.00	0.00	0.08	0.03
				R	142.15	0.28	0.00	0.00	0.28	0.00
				PUB	0.00	0.00	0.00	0.00	0.00	0.00
				Total	**186.93**	**0.36**	**0.01**	**0.00**	**0.37**	**0.03**
Klamath Mountains Ecoregion South Umpqua Subbasin (HUC17100302)	Olalla Creek - Lookingglass Cr (HUC 1710030212)	52.98 - 62.41	8.87	PEM	757.56	1.76	0.19	0.00	1.95	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	1251.17	2.39	0.60	0.00	2.99	0.87
				R	222.87	0.50	0.00	0.00	0.50	0.00
				Total	**2231.60**	**4.65**	**0.79**	**0.00**	**5.44**	**0.87**

TABLE N-1b

Summary of Wetland Impacts by Fifth Field/HUC10 Watershed

Ecoregion and Sub-basin [a/]	HUC 10/Fifth field Watershed [a/]	Approximate Milepost Range [b/]	Miles Crossed	Cowardin Classification	Width of Crossing (feet)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion (or fill) (acres)
Klamath Mountains Ecoregion South Umpqua Subbasin (HUC17100302)	Clarks Branch - South Umpqua River (HUC 1710030211)	62.41 - 74.62	13.26	PEM	429.20	0.81	0.00	0.00	0.81	0.00
				PSS	0.00	0.00	0.21	0.00	0.21	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	405.46	0.78	0.14	0.00	0.92	0.00
				Total	**834.66**	**1.59**	**0.35**	**0.00**	**1.94**	**0.00**
Klamath Mountains Ecoregion South Umpqua Subbasin (HUC17100302)	Myrtle Creek (HUC 1710030210)	74.62 – 82.75	8.87	PEM	148.56	0.27	0.03	0.00	0.30	0.00
				PSS	7.20	0.06	0.00	0.00	0.06	<0.01
				PFO	6.30	0.01	0.00	0.00	0.01	0.00
				R	141.07	0.26	0.16	0.00	0.42	0.00
				Total	**303.13**	**0.60**	**0.19**	**0.00**	**0.79**	**<0.01**
Klamath Mountains Ecoregion South Umpqua Subbasin (HUC17100302)	Days Creek - South Umpqua River (HUC 1710030205)	82.75 - 91.93	9.50	PEM	0.00	0.00	0.04	0.00	0.04	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	85.39	0.17	0.01	0.01	0.19	0.00
				Total	**85.39**	**0.17**	**0.05**	**0.01**	**0.23**	**0.00**
Cascades Ecoregion South Umpqua Subbasin (HUC17100302)	Days Creek - South Umpqua River (HUC 1710030205)	91.93 –101.83	10.21	PEM	616.98	1.05	0.56	0.00	1.61	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	279.17	0.61	0.88	0.00	1.49	0.00
				Total	**896.15**	**1.66**	**1.44**	**0.00**	**3.10**	**0.00**
Cascades Ecoregion South Umpqua Subbasin (HUC17100302)	Upper Cow Creek(HUC 1710030206)	102.81-111.12	5.15	PEM	93.95	0.21	0.00	0.00	0.21	0.00
				PSS	12.01	0.04	0.05	0.00	0.09	<0.01
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	94.61	0.19	0.03	0.00	0.22	0.00
				Total	**200.57**	**0.44**	**0.08**	**0.00**	**0.52**	**<0.01**
Cascades Ecoregion Upper Rogue Subbasin (HUC17100307)	Trail Creek(HUC 1710030706)	110.76 -121.78	10.62	PEM	27.89	0.05	0.00	0.00	0.05	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	78.42	0.14	0.01	0.00	0.15	0.00
				PUB	0.00	0.00	0.07	0.00	0.07	0.00
				Total	**106.31**	**0.19**	**0.08**	**0.00**	**0.27**	**0.00**
Cascades Ecoregion Upper Rogue Subbasin (HUC17100307)	Shady Cove- Rogue River (HUC 1710030707)	121.78 –130.16	8.13	PEM	139.85	0.30	0.04	0.00	0.34	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	30.00	0.07	0.00	0.00	0.07	0.02
				R	314.39	0.16	0.48	0.01	0.64	0.00
				Total	**484.24**	**0.53**	**0.52**	**0.01**	**1.05**	**0.02**
Cascades Ecoregion Upper Rogue Subbasin (HUC17100307)	Big Butte Creek(HUC 1710030704)	129.54 -135.04	5.00	PEM	2981.70	5.78	0.50	0.00	6.28	0.00
				PSS	291.094	0.42	0.04	0.00	0.46	0.07
				PFO	0.44	0.09	0.00	0.00	0.09	0.03
				R	153.18	0.40	0.23	0.00	0.63	0.00
				Total	**3466.41**	**6.69**	**0.77**	**0.00**	**7.46**	**0.10**

TABLE N-1b

Summary of Wetland Impacts by Fifth Field/HUC10 Watershed

Ecoregion and Sub-basin [a/]	HUC 10/Fifth field Watershed [a/]	Approximate Milepost Range [b/]	Miles Crossed	Cowardin Classification	Width of Crossing (feet)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion (or fill) (acres)
Cascades Ecoregion Upper Rogue Subbasin (HUC17100307)	Little Butte Creek (HUC 1710030708)	135.04 - 153.30	18.52	PEM	1682.29	4.27	1.95	0.00	6.22	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.01	0.00	0.00	0.01	0.00
				R	401.67	0.82	0.10	0.00	0.92	0.00
				PUB	54.30	0.06	0.00	0.00	0.06	0.00
				Total	**2138.26**	**5.16**	**2.05**	**0.00**	**7.21**	**0.00**
Eastern Slopes Ecoregion Upper Rogue Subbasin (HUC17100307)	Little Butte Creek (HUC 1710030708)	153.30 -167.41	14.37	PEM	0.00	0.00	0.00	0.00	0.00	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	45.13	0.14	0.00	0.00	0.14	0.00
				Total	**45.13**	**0.14**	**0.00**	**0.00**	**0.14**	**0.00**
Eastern Slopes Ecoregion Upper Klamath R. Subbasin (HUC18010206)	Spencer Creek (HUC 1801020601)	167.93 -185.46	15.14	PEM	227.46	0.43	<0.01	0.00	0.43	0.00
				PSS	181.79	0.35	0.00	0.00	0.35	0.05
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	17.26	0.04	<0.0	0.00	0.04	0.00
				Total	**426.51**	**0.82**	**10.00**	**0.00**	**0.82**	**0.05**
Eastern Slopes Ecoregion Upper Klamath R. Subbasin (HUC18010206)	John C Boyle Res-Klamath River (HUC 1801020602)	178.73 -189.01	5.38	PEM	1308.50	2.30	0.00	0.00	2.30	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				PUB	0.00	0.00	0.00	0.00	0.00	0.00
				R	20.47	0.07	0.00	0.00	0.07	0.00
				Total	**1328.97**	**2.37**	**0.00**	**0.00**	**2.37**	**0.00**
Eastern Slopes Ecoregion Lost River Subbasin (HUC 18010204)	Lake Ewauna - Klamath River (HUC1801020412)	189.01 -205.59	16.44	PEM	17561.22	37.97	24.63	0.00	62.63	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFOR	0.00	0.00	0.00	0.00	0.00	0.00
				PUB	659.49	1.95	2.40	0.00	4.35	0.00
				PABGh	0.00	0.00	0.76	0.00	0.76	0.00
				L1	0.00	0.02	0.03	0.00	0.05	0.00
				Total	985.67	0.03	0.00	0.00	0.03	0.00
					19206.38	**39.97**	**27.82**	**0.00**	**67.82**	**0.00**
Eastern Slopes Ecoregion Lost River Subbasin (HUC 18010204)	Mills Creek- Lost River (HUC 1801020409)	205.59 -230.87	22.54	PEM	843.51	1.81	0.51	0.01	2.33	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				R	1032.15	2.19	0.48	0.01	2.68	0.00
				PABGx	0.00	0.00	0.88	0.00	0.88	0.00
				PUB	0.00	0.01	0.17	0.00	0.18	0.00
				Total	**1875.66**	**4.01**	**2.04**	**0.02**	**6.07**	**0.00**
Total					**61472.87**	**175.11**	**63.77**	**0.04**	**238.96**	**1.48**

a/ Subbasin and Fifth Field Watersheds/HUC 10 USGS Hydrologic Unit Codes

b/ Mileposts overlap between fifth field watersheds when alignment is located on the boundary between two adjacent watersheds.

TABLE N-2

High Value Wetlands Affected by the Pacific Connector Pipeline Project

Wetland ID (Waterbody)	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Survey Corridor	Width of Crossing (feet)	Total Construction Disturbance in Wetland (ac)	High Quality/Value Wetland Justification
Coast Range Ecoregion, Coos Sub-basin (HUC 17100304), Coos Bay Frontal (HUC 1710030403) Fifth field Watershed [3], Coos County, Oregon								
NE026 Coos Bay	2.92R	State	E1UBL	Estuarine	118.93	12951.34	76.28	Estuarine salt marsh and tidal mudflats
BW110	8.75	Private	PFOC	Slope/Flats	2.39	405.26	0.85	Large forested wetland on edge of Coos River floodplain
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), North Fork Coquille River (HUC 1710030504) Fifth field Watershed [3,] Coos County, Oregon								
CW010	23.38	BLM - Coos Bay District	PFOC	Slope/Flats	0.62	173.67	0. 468	Forested slope wetland
Klamath Mountains Ecoregion, Coquille Sub-basin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501) Fifth field Watershed [3], Douglas County, Oregon								
BSP257 Deep Creek	48.27	BLM - Roseburg District	R3UB1H	Riverine F/T	0.79	80.89	0.16	Perennial stream listed here because it is heavily vegetated with scrub-shrub and may include a wetland fringe.
Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), Olalla Creek-Lookingglass Cr (HUC 1710030212) Fifth field Watershed [3], Douglas County, Oregon								
BW161	56.78	Private	PFOC	Slope/Flats	0.57	71.16	0.19	Ash-dominated wetland
BW162	56.83	Private	PFO/PEMC	Slope/Flats	0.42	98.88	0.24	Forested wetland – headwater
Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), Myrtle Creek (HUC 1710030211)) Fifth field Watershed [3], Douglas County, Oregon								
BW258	77.62	Private	PEMC	Slope/Flats	0.48	48.83	0.08	Spring seep wetland that continues off-site
Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), Elk Creek-South Umpqua River (HUC 1710030204)) Fifth field Watershed [3, 4], Douglas County, Oregon								
CW057	102.18	BLM - Roseburg District	PEMA	Slope/Flats	0.19	58.39	0.13	High watershed position surrounded by forest
Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), South Umpqua River (HUC 1710030205) Fifth field Watershed [3, 4], Douglas County, Oregon								
CW056	102.24	BLM - Roseburg District	PEMC	Slope/Flats	0.84	84.54	0.15	High watershed position surrounded by forest
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Rogue River-Shady Cove (HUC 1710030707)) Fifth field Watershed [3], Jackson County, Oregon								
AW309 Trib. to Indian Creek	128.89	BLM - Medford District	PFOC	Slope/Flats	0.27	30.00	0.07	Forested wetland/stream
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Big Butte Creek (HUC 1710030704)) Fifth field Watershed [3], Jackson County, Oregon								
AW264	132.77	Private	PFO/R4SB1C	Riverine F/T	0.50	40.44	0.09	Wetland with perennial stream running through it
AW263	133.13	Private	PEMC	Slope/Flats	4.74	497.68	1.00	Large, spring fed, slope wetland; continues off site
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Little Butte Creek (HUC 1710030708)) Fifth field Watershed [3], Jackson County, Oregon								
AW225	139.56	Private	PEMC	Slope/Flats	1.74	128.13	0.19	Linear swale fed by seeps/streams
EW033	142.45	Private	PEMC	Slope/Flats	9.93	764.76	2.83	Large PEM complex, associated with floodplain of Salt Creek. – irrigated
EW035	142.45	Private	PEMC	Slope/Flats	3.67	408.16	1.24	Large PEM complex, associated with floodplain of Salt Creek. - irrigated

TABLE N-2

High Value Wetlands Affected by the Pacific Connector Pipeline Project

Wetland ID (Waterbody)	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Acres Within Survey Corridor	Width of Crossing (feet)	Total Construction Disturbance in Wetland (ac)	High Quality/Value Wetland Justification
AW185	152.19	BLM - Medford District	PFOC	Slope/Flats	0.50	0.00	0.01	Forested streambank with wetland characteristics
Eastern Slopes Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Little Butte Creek (HUC 1710030708)) Fifth field Watershed [3, 4], Jackson County, OR								
ESI076 (ESI084) Daley Creek	166.21	Forest Service - Rogue River-Shady Cove NF	R4UBC	Riverine F/T	0.36	25.51	0.10	30-40' wide braided channel, cobble/gravel substrate, trib. to Daley Creek.- riparian
Eastern Slopes Ecoregion, Upper Klamath R. Sub-basin (HUC 18010206), Spencer Creek (HUC 1801020601)) Fifth field Watershed [3, 4], Klamath County, OR								
Spencer Creek EW085	171.06	Forest Service - Fremont-Winema NF	PEMC	Slope/Flats	1.51	150.80	0.27	Scrub-shrub wetland swale, associated with Spencer Creek
Clover Creek EW103	177.76	Private	PEMC/PSSC	Slope/Flats	2.40	181.79	0.35	Scrub-shrub, seep wetland associated with Clover Creek

TABLE N-3

Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbody [a]	Approximate Pipeline Milepost	Waterbody ID [d]	Pacific Northwest Hydrography Waterbody ID Number [e]	Width of Crossing (feet)	Excavated Volume (yds[c])	Crossing Method	FERC Classification [f]	Cowardin Classification	Stream Type	ODF or NWFP Stream Classification [g], [h]	Oregon DEQ Water Quality Limited Streams [i]
Coast Range Ecoregion, Coos Sub-basin (HUC 17100304), Coos Bay Frontal (HUC 1710030403) Fifth field Watershed [b], Coos County, Oregon											
Trib To Coos Bay	1.21	BSP 246		115.59		Dry Open-Cut	Major		Perennial	F	
Coos Bay	2.92	NE026	1243397433543	12845.19	29496.36	Wet Open-Cut	Major	E2EMP/N, E1UBL, E2USN, E1UBL,	Estuary	F	Fecal Coliform/Year-Round – Cat: 5
Trib to Coos Bay	4.89	GSI026	1242017434500	6.15	14.12	Dry Open-Cut	Minor	R4	Intermittent	N	
Trib to Kentuck Slough	6.23	EE004/GW27	1241795434269	12.93	20.11	Dry Open-Cut	Intermediate	PEM	Intermittent	N	
Kentuck Slough	6.28	EE005/GSP-28	1242068434143	61.74	141.77	Conventional Bore	Intermediate	R2	Perennial	F	Fecal Coliform/Year-Round – Cat: 5 (river mile 0-2.2)
Trib to Coos Bay	6.35	NW-117/EE06	1241902434209	544.60	847.15	Dry Open-Cut	Major	PEM	Perennial	F	
Willanch Slough	8.34	EE007	1242083434031	14.07	32.31	Dry Open-Cut	Intermediate	R2	Perennial	F	Fecal Coliform/Year-Round – Cat: 5 (river mile 0.7-2.8)
Trib to Willanch Slough	8.43	GDX029/EE008	1241601434068	-	-	Not Crossed by Centerline	Adjacent to centerline within ROW	R4	Perennial	F	
Trip to Willanch Slough	8.48	GDX030		12.84	29.48	Dry Open-Cut	Intermediate	R4	Intermittent	Unknown	
Trib to Willanch Slough	8.49	GDX031		49.89	114.56	Dry Open-Cut	Intermediate	R4	Intermittent	Unknown	
Trib to Coos Bay	10.99	BW242	1241663433710	1510.89	2350.27	Dry Open-Cut	Major	PEM	Perennial	F	
Trib to Coos Bay	11.12	GW033/EE010	1241722433697	123.56	192.21	Dry Open-Cut	Major	PEM	Perennial	F	
Trib. to Coos River	7.77	ESP013	1241551433636	12.49	31.23	Dry Open-Cut	Intermediate	R2UB3H	Perennial	F	
Trib. to Coos River	7.89	ESP012	1241551433636	10.62	26.55	Dry Open-Cut	Intermediate	R2UB3H	Perennial	F	
Trib. to Coos River	7.90	ESP111	1241551433636	-	-	Adjacent to centerline within ROW	Intermediate	R2UB3H	Perennial	F	
Coos River	8.18	BSP119	1241999433842	687.09	1717.78	HDD	Major	R2OWN	Perennial	F	Fecal Coliform/Year-Round – Cat: 5
Trib. to Coos River	8.37	BSP112	1241545433620	26.18	65.45	Dry Open-Cut	Intermediate	R2UB3Hx	Perennial	F	
Trib. to Catching Slough	9.02	BSP104	1241704433522	2.33	5.83	Dry Open-Cut	Minor	R2UB3H	Perennial	F	
Trib. to Catching Slough	9.19	BSP105	1241675433517	2.83	7.08	Dry Open-Cut	Minor	R2UB3H	Perennial	F	
Trib. to Catching Slough	9.33	DSI003	1241489433510	11.72	29.30	Dry Open-Cut	Intermediate	R4UB3C	Intermittent	Unknown	
Trib. to Catching Slough	9.51	DSP002	1241530433517	4.20	10.50	Dry Open-Cut (Streambed - bedrock	Minor	R3SB1H	Perennial	F	
Trib. to Stock Slough (Monkey Ranch Gulch)	10.13	BSP090		7.59	18.98	Dry Open-Cut	Minor	R2UBHx	Perennial	F	
Stock Slough	10.14, 10.16, 10.21	BSP088	1241571433361	58.08	145.23	Dry Open-Cut	Intermediate	R2UBHx	Perennial	F	Fecal Coliform/Year-Round – Cat: 5
Pasture Pond	10.40	BL084		-	-	Adjacent to centerline within ROW	NA	PUBYx	Stock Pond	N	
Catching Slough	11.11	BSP079	1241572433284	256.83	642.07	Conventional Bore	Major	R2OWN	Perennial	F	Fecal Coliform/Year-Round – Cat: 5
Trib. to Catching Slough	11.47	BSP114		2.02	5.05	Dry Open-Cut	Minor	R3UB3H	Perennial	F	
Trib. to Catching Slough	11.78	BSP103	1241608433185	3.07	7.67	Dry Open-Cut	Minor	R2UB3H	Perennial	F	
Trib. to Catching Slough	11.84	BSP101	1241655433196	1.22	3.05	Dry Open-Cut	Minor	R2UB3H	Perennial	F	
Trib. to Catching Slough	11.87	BSP100	1241655433196	4.76	11.90	Dry Open-Cut	Minor	R2UB3H	Perennial	Unknown	
Trib. to Catching Slough	12.05	NSI041	1241649433195	1.64	4.10	Dry Open-Cut	Minor	R4SBC	Intermittent	Unknown	
Trib. to Catching Slough	12.27	NSI092		4.99	12.48	Adjacent to centerline within ROW	Minor	R4SBC	Intermittent	F	
Trib. to Catching Slough	12.31	NSI093		4.00	10.00	Dry Open-Cut	Minor	R4SBC	Intermittent	Unknown	
Trib. to Catching Slough	12.39	NSI094		-	-	Adjacent to centerline within ROW	Minor	R4SBC	Intermittent	Unknown	
Trib. to Catching Slough	12.39	NSI095	1241711433132	6.76	16.90	Dry Open-Cut	Minor	R4SBC	Intermittent	Unknown	

TABLE N-3

Waterbodies Crossed by the Pacific Connector Pipeline

Waterbody [a/]	Approximate Pipeline Milepost	Waterbody ID [d/]	Pacific Northwest Hydrography Waterbody ID Number [e/]	Width of Crossing (feet)	Excavated Volume (yds³ [c/])	Crossing Method	FERC Classification [f/]	Cowardin Classsification	Stream Type	ODF or NWFP Stream Classification [g/, h/]	Oregon DEQ Water Quality Limited Streams [i/]
Trib. to Catching Slough	12.45	NSI097		5.54	13.85	Dry Open-Cut	Minor	R4SBC	Intermittent	Unknown	
Trib. to Catching Slough	12.52	NSI098	1241709433122	6.14	15.35	Dry Open-Cut	Minor	R4SBC	Intermittent	Unknown	
Trib. to Ross Slough	12.66	BSP120	1241852433075	-	-	Adjacent to centerline within ROW	Minor	R2SB3C	Perennial	F	
Trib. to Ross Slough	12.68	BSP121	1241852433075	-	-	Adjacent to centerline within ROW	Minor	R2SB3C	Perennial	F	
Trib. to Ross Slough	12.83	BSP122	1241842433046	1.23	3.08	Dry Open-Cut	Minor/Intermediate	R2SB3C	Perennial	F	
Trib. to Ross Slough	12.90	BSP125		5.82	14.55	Dry Open-Cut	Minor/Intermediate	R2SB3C	Perennial	F	
Trib. to Ross Slough	12.97	CSP031		4.21	10.53	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Trib. to Ross Slough	13.01	CSP030	1241793433038	3.01	7.52	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Trib. to Ross Slough	13.11	CSP029	1241778433044	4.19	10.48	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Ross Slough	13.55	CSP028	1241687433509	3.83	9.57	Dry Open-Cut	Minor	R3UB1F	Perennial	Unknown	Fecal Coliform/Year-Round – Cat: 5
Trib. to Ross Slough	13.61	CSP027	1241761432974	2.18	5.45	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Trib. to Ross Slough	13.70	CSP026	1241733432965	4.31	10.77	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Boone Creek	15.71	EDX078	1241532432789	4.99	12.48	Dry Open-Cut	Minor	R3SBH	Perennial	F	
Trib. to Boone Creek	16.36	CSI037	1241561432755	1.14	2.85	Dry Open-Cut	Minor	R4SB3C	Intermittent	*D or N	
Trib. to Boone Creek	16.36	CSP036	1241561432755	4.23	10.58	Dry Open-Cut	Minor	R3UB1F	Perennial	*D or N	
Trib. to Boone Creek	16.39	CSI035	1241598432687	1.02	2.55	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Trib. To Catching Creek	16.56	CSP024	1241612432631	1.5	3.83	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Trib. To Catching Creek	16.62	CSP023	1241604432619	3.08	7.70	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Trib. To Catching Creek	16.71	CSP022	1241594432613	2.34	5.85	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Trib. To Catching Creek	16.73	CSP021	1241596432612	5.01	12.53	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Trib. To Catching Creek	16.78	CSP020	1241603432608	5.81	14.52	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Trib. To Catching Creek	16.82	CSP019	1241561432616	3.00	7.50	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Trib. To Catching Creek	16.85	CSP018	1241606432606	8.46	21.15	Dry Open-Cut	Minor	R3UB1F	Perennial	F	
Catching Creek	17.47	CSP033	1241452433077	4.25	10.63	Dry Open-Cut	Minor	R3UB1F	Perennial	F	Fecal Coliform/Year-Round – Cat: 5
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), Lower Coquille River (HUC 1710030505) Fifth field Watershed [j/], Coos County, Oregon											
Trib. To Cunningham Creek	18.20	BSP092	1241387432420	2.32	5.80	Dry Open-Cut	Minor	R3UB1H	Perennial	F	
Trib. To Cunningham Creek	18.28	BSP093	1241469432436	1.34	3.35	Dry Open-Cut	Minor	R2UB3H	Perennial	Unknown	
Trib. To Cunningham Creek	18.33	BSP095	1241458432440	1.38	3.45	Dry Open-Cut	Minor	R2UB3H	Perennial	Unknown	
Trib. To Cunningham Creek	18.48	BSI096	1241461432438	1.08	2.70	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Cunningham Creek	18.93	NSP042	1242026431787	37.68	94.20	Dry Open-Cut	Intermediate	R3SB1H	Perennial	F	Fecal Coliform/Year Round – Cat: 5 Dissolved Oxygen/Year Round – Cat: 5 Habitat Modification – Cat: 4C Flow Modification – Cat: 4C
Trib. To Cunningham Creek	19.06	NSP043	1241375432355	24.58	61.45	Dry Open-Cut	Intermediate	R3SB1H	Perennial	F	
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), North Fork Coquille River (HUC 1710030504) Fifth field Watershed [k/] Coos County, Oregon											
Trib. to Steele Creek	20.34, 20.59	ESI028	1241154432240	9.71	24.28	Dry Open-Cut (Streambed – bedrock)	Minor	R3SB1H	Intermittent	I - Federal Land [h/]	
Steele Creek	21.10	NSP015	1240848432002	12.10	30.25	Dry Open-Cut	Intermediate	R3SB1H	Perennial	F	
Trib. to Steele Creek	21.36	ESI029	1241003432184	-	-	Dry Open-Cut (Streambed – bedrock)	Minor	R3SB1H	Intermittent	I - Federal Land [h/]	
North Fork Coquille River	23.06	BSP207	1241417430804	20.66	51.65	Dry Open-Cut	Intermediate	R2UBH	Perennial	F	Dissolved Oxygen/Year-Round – Cat: 5 (non-spawning) Temperature/Year-Round – Cat: 5 (non-spawning) Habitat Modification – Cat: 4C
Trib. to Middle Creek	27.01	BSI137	1240268431779	12.69	31.72	Dry Open-Cut	Intermediate	R4SB3C	Intermittent	I - Federal Land [h/]	

TABLE N-3

Waterbodies Crossed by the Pacific Connector Pipeline

Waterbody [a/]	Approximate Pipeline Milepost	Waterbody ID [d/]	Pacific Northwest Hydrography Waterbody ID Number [e/]	Width of Crossing (feet)	Excavated Volume (yds[c/])	Crossing Method	FERC Classification [f/]	Cowardin Classsification	Stream Type	ODF or NWFP Stream Classification [g/, h/]	Oregon DEQ Water Quality Limited Streams [i/]
Trib. to Middle Creek	27.02	BSI136	1240268431779	-	-	Adjacent to centerline within ROW	Minor	R4SB3C	Intermittent	I - Federal Land [h/]	
Trib. to Middle Creek	27.04	BSI135	1240268431779	-	-	Adjacent to centerline within ROW	Minor	R4SB3C	Intermittent	I - Federal Land [h/]	
Middle Creek	27.04	BSP133	1240712431628	65.03	162.57	Dry Open-Cut	Intermediate	R2SB4H	Perennial	F - Federal Land [h/]	Temperature/Year-Round– Cat: 5 (non-spawning)
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), East Fork Coquille River (HUC 1710030503)) Fifth field Watershed [b/], Coos County, Oregon											
Trib. To E. Fork Coquille	28.89	BSP077	1240014431632	12.48	31.20	Dry Open-Cut (Streambed – bedrock)	Intermediate	R3SB1F	Perennial	F	
Trib. To E. Fork Coquille	29.18	NSI099	1239937431584	6.23	15.58	Dry Open-Cut	Minor	R4UBC	Intermittent	F	
Trib. to E. Fork Coquille	29.49	BSI073	1241551433636	10.26	25.65	Dry Open-Cut	Intermediate	R3SB1H	Intermittent	Unknown	
Trib. To E. Fork Coquille	29.53	BSI076	1239946431580	5.48	13.70	Dry Open-Cut (Streambed – bedrock)	Minor	R4SB1C	Intermittent	Unknown	
East Fork Coquille River	29.88	BSP071	1240773431063	143.17	357.92	Dry Open-Cut	Major	R3OWH	Perennial	F	Temperature/Summer – Cat: 5 Habitat Modification – Cat: 4C
Trib. To E. Fork Coquille	31.64	BSI070	1239583431522	1.17	2.92	Dry Open-Cut	Minor	R4UB1C	Intermittent	I - Federal Land [h/]	
Elk Creek	32.40	BSP057	1240218431116	7.64	19.10	Dry Open-Cut	Minor	R3RB2H	Perennial	F	Temperature/Year-Round – Cat: 5 (non-spawning)
Trib. To Elk Creek	32.44	BSP055	1239513431370	3.55	8.88	Dry Open-Cut (Streambed – bedrock)	Minor	R3SB1H	Perennial	F	
Trib. To Elk Creek	32.99	BSP049	1239524431250	9.77	24.43	Dry Open-Cut	Minor	R3SB1C	Perennial	F	
Trib. To Elk Creek	33.02	BSP050	1239482431284	-	-	Adjacent to centerline within ROW (Streambed – bedrock)	Minor	R3SB1C	Perennial	F	
South Fork Elk Creek	34.46	CSP005	1239778431167	49.40	123.50	Dry Open-Cut (Streambed – bedrock)	Intermediate	R3SB1H	Perennial	F	
Trib. To S. Fork Elk Creek	35.51	BSI251	1239155431070	4.13	10.32	Dry Open-Cut	Minor	R4UB1J	Intermittent	I - Federal Land [h/]	
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501)) Fifth field Watershed [b/], Coos County, Oregon											
Trib. To Big Creek	36.48	GSI025/BSI253	1238985431032	4.60	11.50	Dry Open-Cut	Minor	R4UB1J	Intermittent	I - Federal Land [h/]	
Trib. To Big Creek	36.92	BSI252	1238901431044	3.06	7.65	Dry Open-Cut	Minor	R4UB1J	Intermittent	I - Federal Land [h/]	
Trib. to Big Creek	37.33	ESI019	1238846431056	2.75	6.88	Dry Open-Cut	Minor	R4UB1J	Intermittent	I - Federal Land [h/]	
Trib. To Big Creek	37.35	ESP020	1238856431054	14.93	37.32	Dry Open-Cut	Intermediate	R3UB1H	Perennial	F - Federal Land [h/]	
Upper Rock Creek	44.21	BSP041	1238692429883	16.04	40.10	Dry Open-Cut	Intermediate	R3UB1C	Perennial	F	Temperature/Summer – Cat: 5 (non-spawning) Habitat Modification – Cat: 4C
Klamath Mountains Ecoregion, Coquille Sub-basin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501)) Fifth field Watershed [b/], Douglas County, Oregon											
Deep Creek	47.73	BSI255	1237088430546	4.03	10.08	Dry Open-Cut	Minor	R4UB1J	Intermittent	F	
Deep Creek	48.27	BSP257	1237088430546	80.89	202.22	Dry Open-Cut	Intermediate	R3UB1H	Perennial	I - Federal Land [h/]	
Middle Fork Coquille River	50.28	BSP030	1241173430339	56.98	142.45	Dry Open-Cut (Streambed – bedrock)	Intermediate	R2OWH	Perennial	F	Temperature/Summer – Cat: 5 (non-spawning) Habitat Modification – Cat: 4C
Trib to Middle Fork Coquille	50.45	BSI066	1236800430537	-	-	Adjacent to centerline within ROW	Minor	R4UB3C	Intermittent	Unknown	
Trib to Middle Fork Coquille	50.74	BSP061/GSI037	1236823430366	6.23	15.58	Dry Open-Cut	Minor	R3UB3H	Perennial	F - Federal Land [h/]	

TABLE N-3

Waterbodies Crossed by the Pacific Connector Pipeline

Waterbody [a/]	Approximate Pipeline Milepost	Waterbody ID [d/]	Pacific Northwest Hydrography Waterbody ID Number [e/]	Width of Crossing (feet)	Excavated Volume (yds^3) [c/]	Crossing Method	FERC Classification [f/]	Cowardin Classsification	Stream Type	ODF or NWFP Stream Classification [g/, h/]	Oregon DEQ Water Quality Limited Streams [i/]
Trib to Middle Fork Coquille (PNW Hydrography)	51.02	GSI038	1236690430555	19.07	43.79	Dry Open-Cut	Intermediate	R4	Intermittent	I - Federal Land [h/]	
Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), Olalla Creek-Lookingglass Cr (HUC 1710030212) Fifth field Watershed [b/], Douglas County, Oregon											
Trib. to Shields Creek	55.90	BSI202	1235858430773	55.38	138.45	Dry Open-Cut	Intermediate	R4SB3C	Intermittent	Unknown	
Trib. to Shields Creek	55.94	BSI203	1235796430789	8.03	20.07	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Trib. to Olalla Creek	57.11, 57.14	BSI140	1235535430633	6.53	11.30	Dry Open-Cut (Streambed – bedrock)	Minor	R4SB1C	Intermittent	Unknown	
Trib. to Olalla Creek	57.31	BSI138	1235535430633	5.03	12.58	Dry Open-Cut	Minor	R4SB1C	Intermittent	Unknown	
Trib. to Olalla Creek	57.80	BSI147/EE012	1235479430651	4.20	10.50	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Trib to Olalla Creek	57.84	BSI147/EE012	1235479430651	4.26	10.50	Dry Open-Cut			Intermittent		
Trib. to Olalla Creek	58.20	BSI151	1235422430690	3.06	7.65	Dry Open-Cut	Minor	R4SB1C	Intermittent	Unknown	
Trib. to Olalla Creek	58.55	BSP159	1235362430712	10.60	26.50	Dry Open-Cut (Streambed – bedrock)	Intermediate	R2SB1H	Perennial	F	
Olalla Creek	58.77	BSP155	1234905431631	77.90	194.75	Dry Open-Cut	Intermediate	R2SB1H	Perennial	F	Biological Criteria – Cat: 5 Temperature/Year-Round – Cat: 5 Iron/Year-Round – Cat: 5 Flow Modification – Cat: 4C
Trib. to Olalla Creek	59.29	BSI132	1235250430793	8.65	21.63	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Trib. to Olalla Creek	59.65	BSI129	1235231430834	18.72	46.80	Dry Open-Cut	Intermediate	R4SB3C	Intermittent	Unknown	
Trib. to McNabb Creek	60.13	NSP014	1235104430875	6.01	15.03	Dry Open-Cut (Streambed – bedrock)	Minor	R3SB1H	Perennial	Unknown	
McNabb Creek	60.49	NSP013	1235187430921	16.06	40.15	Dry Open-Cut (Streambed – bedrock)	Intermediate	R3SB1H	Perennial	F	
Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), Middle South Umpqua River (HUC 1710030210)) Fifth field Watershed [b/], Douglas County, Oregon											
Kent Creek	63.95	BSP240	1234390431042	46.98	117.45	Dry Open-Cut	Intermediate	R2UB1H	Perennial	F	Flow Modification – Cat: 4C Habitat Modification – Cat: 4C
Trib. to Kent Creek	63.95	BSI241	1234490430771	-	-	Adjacent to centerline within ROW	Minor	R4UB1J	Intermittent	F	
Rice Creek	65.76	BSP227	1234142430839	132.94	332.35	Dry Open-Cut (Streambed – bedrock)	Major	R3SB1H	Perennial	F	Temperature/Summer – Cat: 5 (non-spawning) Habitat Modification – Cat: 4C Flow Modification – Cat: 4C
Trib. to Willis Creek	66.87	BSI230	1233983430694	-	-	Adjacent to centerline within ROW (Streambed – bedrock)	Minor	R4SB1J	Intermittent	Unknown	
Willis Creek	66.95	BSP168	1233989430788	46.79	94.15	Dry Open-Cut (Streambed – bedrock)	Intermediate	R3SB1C	Perennial	F	Flow Modification – Cat: 4C
Trib. to Willis Creek	67.00	BSI169	1233982430692	22.31	55.77	Dry Open-Cut (Streambed – bedrock)	Intermediate	R4SB3J	Intermittent	Unknown	
Trib. to South Umpqua River	68.89	BSI017	1233723430689	-	-	Adjacent to centerline within ROW (Streambed – bedrock)	Minor	R4SB1C	Intermittent	Unknown	

TABLE N-3

Waterbodies Crossed by the Pacific Connector Pipeline

Waterbody [a/]	Approximate Pipeline Milepost	Waterbody ID [d/]	Pacific Northwest Hydrography Waterbody ID Number [e/]	Width of Crossing (feet)	Excavated Volume (yds[c/])	Crossing Method	FERC Classification [f/]	Cowardin Classsification	Stream Type	ODF or NWFP Stream Classification [g/, h/]	Oregon DEQ Water Quality Limited Streams [i/]
South Umpqua River	69.02	BSP026	1234460432680	618.55	1546.38	Diverted Open-Cut	Major	R3OWH	Perennial	F	Fecal Coliform/Summer – Cat: 5 Biological Criteria – Cat: 5 Aquatic Weeds or Algar/Summer – Cat: 5 Dissolved Oxygen/Year Round – Cat: 5 (non-spawning) Temperature/Year-Round – Cat: 5 (non spawning) Chlorophyll a/Summer – Cat: 5 E Coli/Summer – Cat: 5 pH/Summer – Cat: 5 Chlorine/Year-Round – Cat: 4B Flow Modification – Cat: 4C Habitat Modification – Cat: 4C
Trib. to South Umpqua River	70.17, 70.40	BSP231	1233512430731	2.48	2.98	Dry Open-Cut (Streambed – bedrock)	Minor	R3SB1H	Perennial	F	
Trib. to Richardson Creek	72.55	BSI171	1233103430824	5.04	12.60	Dry Open-Cut	Minor	R4SB3J	Intermittent	Unknown	
Richardson Creek	73.20	BSP178	1233414430789	4.05	10.13	Dry Open-Cut	Minor	R4SB3J	Perennial	F	Flow Modification – Cat: 4C
Trib. to Richardson Creek	73.22	BSI177	1232971430801	2.86	7.15	Dry Open-Cut	Minor	R4SB3J	Intermittent	Unknown	
Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), Myrtle Creek (HUC 1710030211) Fifth field Watershed [b/], Douglas County, Oregon											
Bilger Creek	76.38	BSP001	1232578430422	6.30	15.75	Dry Open-Cut	Minor	PFO1A	Perennial	F	
Little Lick	77.71	BSP006	1232235430457	7.20	18.00	Dry Open-Cut	Minor	PSS1C	Perennial	F	
Trib. to Little Lick Creek	77.93	BSI008	1232244430631	12.59	31.48	Dry Open-Cut	Intermediate	R3SB1H	Intermittent	Unknown	
Trib. to Little Lick Creek	78.02	BSI010	1232239430620	2.01	5.02	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
North Myrtle Creek	79.12	NSP037	1232963430229	47.99	119.98	Dry Open-Cut (Streambed – bedrock)	Intermediate	R3SB1H	Perennial	F	Temperature/Year-Round – Cat: 5 (non-spawning) E Coli/Summer – Cat: 5 Habitat Modification – Cat: 4C Flow Modification – Cat: 4C
Trib. to North Myrtle Creek	79.15	NSP038	1232040430551	8.00	20.00	Dry Open-Cut (Streambed – bedrock)	Minor	R3SB1H	Perennial	F	
South Myrtle Creek	81.19	BSP172	1232847430231	68.27	170.67	Dry Open-Cut	Intermediate	R3OWH	Perennial	F	Temperature/Year-Round – Cat: 5 (non-spawning) Flow Modification – Cat: 4C
Trib. to S. Myrtle Creek	81.40	BSP259	1231856430317	2.41	6.03	Dry Open-Cut	Minor	R3SB1H	Perennial	F	
Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), South Umpqua River (HUC 1710030205)) Fifth field Watershed [b/, c/], Douglas County, Oregon											
Wood Creek	84.18	BSP226	1231503429810	8.22	20.55	Dry Open-Cut	Minor	R3SBH	Perennial	F	
Trib. to Fate Creek	88.20	BSI236	1231019429928	6.07	15.18	Dry Open-Cut (Streambed – bedrock)	Minor	R4SB1J	Intermittent	Unknown	
Fate Creek	88.48	BSP232	1231028429873	12.11	30.27	Dry Open-Cut (Streambed – bedrock)	Intermediate	R3SB1H	Perennial	F	Temperature/Year-Round – Cat: 5 (non-spawning)
Days Creek	88.60	BSP233	1231699429713	58.99	147.48	Dry Open-Cut (Streambed – bedrock)	Intermediate	R3SB1H	Perennial	F	Temperature/Year-Round – Cat: 5 (non-spawning) Habitat Modification – Cat: 4C Flow Modification – Cat: 4C
Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), South Umpqua River (HUC 1710030205)) Fifth field Watershed [b/, c/], Douglas County, Oregon											
Saint John Creek	92.62	ASP303	1230596429295	40.02	100.05	Dry Open-Cut	Intermediate	R3RB2H	Perennial	F	Flow Modification – Cat: 4C

TABLE N-3

Waterbodies Crossed by the Pacific Connector Pipeline

Waterbody [a/]	Approximate Pipeline Milepost	Waterbody ID [d/]	Pacific Northwest Hydrography Waterbody ID Number [e/]	Width of Crossing (feet)	Excavated Volume (yds³ [c/])	Crossing Method	FERC Classification [f/]	Cowardin Classsification	Stream Type	ODF or NWFP Stream Classification [g/, h/]	Oregon DEQ Water Quality Limited Streams [i/]
South Umpqua River	94.73	ASP196	1234460432680	204.92	512.30	Diverted Open-Cut	Major	R2OWH	Perennial	F	Fecal Coliform/Summer – Cat: 5 Biological Criteria – Cat: 5 Aquatic Weeds or Algar/Summer – Cat: 5 Dissolved Oxygen/Year Round – Cat: 5 (non-spawning) Temperature/Year-Round – Cat: 5 (non spawning) Chlorophyll a/Summer – Cat: 5 E Coli/Summer – Cat: 5 pH/Summer – Cat: 5 Chlorine/Year-Round – Cat: 4B Flow Modification – Cat: 4C Habitat Modification – Cat: 4C
Trib. to South Umpqua River	94.85/95.03	ASI193	1230382429323	25.62	38.20	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Trib. to South Umpqua River	98.46	ASI190	1230197429036	8.52	21.30	Dry Open-Cut (Streambed – bedrock)	Minor	R4SB1	Intermittent	I - Federal Land [h/]	
Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), Upper Cow Creek (HUC 1710030206) Fifth field Watershed [b/], Douglas County, Oregon											
Trib to East Fork Cow Creek	109.17	GW014/FS-HF-C	1229383427835	12.02	18.70	Dry Open-Cut	Intermediate	PSS	Perennial (FS – interpretation)	I - Federal Land [h/]	
Trib to East Fork Cow Creek	109.33	GSI016/FS-HF-F	1229369427819	7.54	17.31	Dry Open-Cut	Minor	R4	Intermittent	I - Federal Land [h/]	
East Fork Cow Creek	109.47, 109.69	GSP019, GSP022/FS-HF-G, ASP297	1229918428021	30.08	75.20	Dry Open-Cut	Intermediate	R3UB1H	Perennial	F - Federal Land [h/]	
Trib. to East Fork Cow Creek	109.69	FS-HF-J/AW298	1229332427779	<10	66.01	Dry Open-Cut	Minor	R3UB1H	Perennial	F - Federal Land [h/]	
Trib. to East Fork Cow Creek	109.78	FS-HF-K/AW299	1229332427781	<10	94.86	Dry Open-Cut	Minor	R3UB1H	Perennial	F - Federal Land [h/]	
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Trail Creek (HUC 1710030706)) Fifth field Watershed [b/], Jackson County, Oregon											
Trib. to W. Fork Trail Creek	110.76	ESI068		-	-	Adjacent to centerline within TEWA	Minor	R4SB1H	Intermittent	I - Federal Land [h/]	
West Fork Trail Creek	118.89	ASP202	1228425426750	24.77	61.92	Dry Open-Cut (Streambed – bedrock)	Intermediate	R2SB1H	Perennial	F	Dissolved Oxygen/Summer – Cat: 5 Flow Modification – Cat: 4C
Trib. to Trail Creek	119.83	RS019	1228364426705	1.50	42.94	Dry Open-Cut	Minor	R4SB1H	Intermittent	Unknown	
Canyon Creek	120.45	NSP011	1228328426655	6.61	16.53	Dry Open-Cut (Streambed – bedrock)	Minor	R4SB1H	Perennial	F - Federal Land [h/]	
Trib. to Trail Creek	120.92	ASI205	1228233426599	6.39	15.98	Dry Open-Cut	Minor	R4UBC	Intermittent	Unknown	
Trib. to Trail Creek	121.58	ASI206	1228173426535	14.34	35.85	Dry Open-Cut	Intermediate	R4UBC	Intermittent	*D or N	
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Rogue River-Shady Cove (HUC 1710030707)) Fifth field Watershed [b/], Jackson County, Oregon											
Trib. to Cricket Creek	121.87	ESI071	1228054426435	-	-	Adjacent to centerline within ROW	Minor	R4SB1C	Intermittent	Unknown	
Trib. to Cricket Creek	121.89	ESI070	1228054426435	-	-	Adjacent to centerline within ROW	Minor	R4SB1C	Intermittent	Unknown	
Trib. to Cricket Creek	121.93	ESI072	1228054426435	-	-	Adjacent to centerline within ROW	Minor	R4SB1C	Intermittent	Unknown	

TABLE N-3

Waterbodies Crossed by the Pacific Connector Pipeline

Waterbody [a/]	Approximate Pipeline Milepost	Waterbody ID [d/]	Pacific Northwest Hydrography Waterbody ID Number [e/]	Width of Crossing (feet)	Excavated Volume (yds[c/])	Crossing Method	FERC Classification [f/]	Cowardin Classsification	Stream Type	ODF or NWFP Stream Classification [g/, h/]	Oregon DEQ Water Quality Limited Streams [i/]
Trib. to Cricket Creek	121.94	ESI073	1228054426435	-	-	Adjacent to centerline within ROW	Minor	R4SB1C	Intermittent	Unknown	
Trib. to Cricket Creek	122.09	ESI074	1228054426435	-	-	Adjacent to centerline within ROW	Minor	R4SB1C	Intermittent	Unknown	
Rogue River	122.65	ASP235	1244292424210	244.59	611.48	HDD	Major	R3UBH	Perennial	F	
Trib. to Indian Creek	125.91	ASI223	1227634426166	4.87	12.18	Dry Open-Cut	Minor	R4UB1C	Intermittent	*D or N	
Trib. to Indian Creek	125.98	ASI222	1227628426207	5.43	13.57	Dry Open-Cut	Minor	R4UB1C	Intermittent	*D or N	
Trib. to Indian Creek	126.50	RS004	1227548426186	1.18	1.99	Dry Open-Cut	Minor	R4UB1C	Intermittent	I - Federal Land [h/]	
Trib. to Indian Creek	126.52	ASI220	1227541426191	4.08	10.20	Dry Open-Cut	Minor	R4UB1C	Intermittent	I - Federal Land [h/]	
Trib. to Indian Creek	126.59	ASI221	1227834426001	5.65	14.13	Dry Open-Cut	Minor	R4UB1C	Intermittent	I - Federal Land [h/]	
Trib. to Indian Creek	126.65	ASI311	1227537426184	3.28	8.20	Dry Open-Cut	Minor	R4UB1C	Intermittent	Unknown	
Deer Creek	128.08	ASP282	1227387426031	-	-	Adjacent to centerline within ROW	Minor	R4UB1C	Perennial	I - Federal Land [h/]	
Deer Creek	128.49	ASP307	1227449425936	51.04	127.60	Dry Open-Cut (Streambed – bedrock)	Intermediate	R3SB1H	Perennial	F	
Indian Creek	128.63	AW278	1227370425935	<10	614.92	Dry Open-Cut	Minor	PEMC/R3SB1H	Perennial	F	
Trib. to Indian Creek	128.70	ASP310	1227366425936	5.34	13.35	Dry Open-Cut (Streambed – bedrock)	Minor	R3SB1H	Perennial	Unknown	
Trib. to Indian Creek	128.89	AW309		<10	36.45	Dry Open-Cut	Minor	PFOC	Intermittent	I - Federal Land [h/]	
Trib. to Indian Creek	129.48	ASI277	1227196425923	3.51	8.77	Dry Open-Cut	Minor	R4UB1C	Intermittent	F	
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Big Butte Creek (HUC 1710030704)) Fifth field Watershed [b/], Jackson County, Oregon											
Trib. to Neil Creek	130.84	AW245		-	-	Adjacent to centerline within ROW	Minor	PSSC/R4UB1C	Intermittent	*D or N	
Trib. to Neil Creek	130.85	AW244		<10	224.21	Dry Open-Cut (Streambed – bedrock)	Minor	PSSC/R4UB1C	Intermittent	*D or N	
Trib. to Neil Creek	130.89	ASI246	1226986425909	2.02	5.05	Dry Open-Cut	Minor	PEMC	Intermittent	*D or N	
Trib. to Neil Creek	131.55	ASI250	1226855425888	4.79	11.98	Dry Open-Cut	Minor	R4UB1C	Intermittent	I - Federal Land [h/]	
Trib. to Neil Creek	131.55	ASI251	1226826425841	3.95	9.88	Dry Open-Cut	Minor	R4UB1C	Intermittent	I - Federal Land [h/]	
Neil Creek	132.00	ASP252	1226711425881	39.41	98.52	Dry Open-Cut (Streambed – bedrock)	Intermediate	R4SB1C	Perennial	F	
Quartz Creek	132.75	ASI265	1226814425828	2.36	5.90	Dry Open-Cut (Streambed – bedrock)	Minor	R4SB1C	Intermittent	F	
Trib. to Quartz Creek	132.77	AW264		<10	68.15	Dry Open-Cut (streambed – bedrock)	Minor	PFO/R4SB1C	Intermittent	*D or N	
Trib. to Quartz Creek	133.35	ASP241	1226739425651	44.80	112.00	Dry Open-Cut	Intermediate	R3UB3H	Perennial	F - Federal Land [h/]	
Medford Aqueduct (Ditch 3)	133.38	ASP240	1228043424382	29.36	73.40	Conventional Bore	Intermediate	R3UB3x	Perennial	F - Federal Land [h/]	
Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Little Butte Creek (HUC 1710030708)) Fifth field Watershed [b/], Jackson County, Oregon											
Whiskey Creek	137.48	ASI207	1226599424838	10.37	25.92	Dry Open-Cut	Intermediate	R4UB3C	Intermittent	*D or N	
Trib. to Lick Creek	138.26	ASI208	1226422425032	10.37	25.92	Dry Open-Cut	Intermediate	R4UB3C	Intermittent	F	
Trib. to Lick Creek	138.45	ASI210	1226367425084	1.72	4.30	Dry Open-Cut	Minor	R4UB1C	Intermittent	*D or N	
Trib. to Lick Creek	138.71	ASI211	1226343425011	7.22	18.08	Dry Open-Cut	Minor	R4UB1C	Intermittent	*D or N	
Trib. to Lick Creek	139.15	ASI214	1226268425015	6.99	17.47	Dry Open-Cut	Minor	R4UB1C	Intermittent	*D or N	
Stock Pond	139.17	AL215		54.30	91.51	Dry Open-Cut	NA	PUBYx	Stock Pond	N	

TABLE N-3

Waterbodies Crossed by the Pacific Connector Pipeline

Waterbody [a/]	Approximate Pipeline Milepost	Waterbody ID [d/]	Pacific Northwest Hydrography Waterbody ID Number [e/]	Width of Crossing (feet)	Excavated Volume (yds^3[f/])	Crossing Method	FERC Classification [i/]	Cowardin Classsification	Stream Type	ODF or NWFP Stream Classification [g/, h/]	Oregon DEQ Water Quality Limited Streams [j/]
Trib. to Lick Creek	139.19, 139.21	ASI216	1226260425019	23.35	25.78	Dry Open-Cut	Intermediate	R4SB1C	Intermittent	*D or N	
Trib. to Lick Creek	139.39	ASI217	1226395424936	15.84	39.60	Dry Open-Cut	Intermediate	R4SB1C	Intermittent	*D or N	
Trib. to Lick Creek	139.59	ASI226	1226220424994	6.59	16.47	Dry Open-Cut (Streambed – bedrock)	Minor	R4SB1C	Intermittent	Unknown	
Trib. to Lick Creek	139.63	ASI227	1226220424994	10.91	27.27	Dry Open-Cut (Streambed – bedrock)	Intermediate	R4SB1C	Intermittent	Unknown	
Trib. to Lick Creek	139.68	ASI228	1226220424994	31.75	79.38	Dry Open-Cut	Intermediate	R4EMC	Intermittent	Unknown	
Trib. to Lick Creek	139.72	ASI229	1226220424994	-	-	Adjacent to centerline within ROW	Minor	R4EMC	Intermittent	Unknown	
Trib. to Lick Creek	139.83	ASI232	1226295424937	1.20	3.00	Dry Open-Cut	Minor	R4SB1C	Intermittent	Unknown	
Lick Creek	140.26	ASI233	1226975424638	12.33	30.82	Dry Open-Cut	Intermediate	R4SB1C	Intermittent	I - Federal Land [h/]	Dissolved Oxygen/Summer – Cat: 5 E Coli/Summer – Cat: 5
Trib. to Lick Creek	140.58	ASI189	1226125424921	2.62	6.55	Dry Open-Cut (Streambed – bedrock)	Minor	R4SB1	Intermittent	F	
Trib. to Salt Creek	141.17	ASI187	1226075424805	2.51	6.27	Dry Open-Cut (Streambed – bedrock)	Minor	R4SB1	Intermittent	I - Federal Land [h/]	
Trib. to Salt Creek	141.44	ASI188	1226059424757	43.20	59.90	Dry Open-Cut (Streambed – bedrock)	Intermediate	R4SB1	Intermittent	I - Federal Land [h/]	
Trib. to Salt Creek	141.49	RS017	1226059424757	4.45	7.50	Dry Open-Cut	Minor	R4SB3C	Intermittent	I - Federal Land [h/]	
Trib. to Salt Creek	141.95	ESI030	1226069424718	6.17	7.92	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Trib. to Salt Creek	142.36	ESI031	1226114424647	18.10	12.32	Dry Open-Cut	Intermediate	R4SB3Cx	Intermittent	Unknown	
Salt Creek	142.57	ESP034	1226522424385	41.18	102.95	Dry Open-Cut	Intermediate	R3SB3H	Perennial	F	E Coli/Year-Round – Cat: 5
Trib. to Salt Creek	143.10	ESI037	1226145424620	4.82	12.05	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Trib. to Long Branch Creek	143.47, 143.73, 144.07	ESI038	1225948424477	5.56	13.91	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Trib. to Long Branch Creek	143.71	ESI039	1225959424522	3.40	8.50	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Stock Pond	143.73	EL041		-	-	Adjacent to centerline within ROW	NA	PEMKx	Stock Pond	N	
Trib. to Long Branch Creek	143.74	ESI040	1225957424527	3.32	8.30	Dry Open-Cut	Minor	R4SB3C	Intermittent	Unknown	
Trib. to S. Fork Long Branch	144.70	GSP005/ESP048	1225946424357	11.19	27.97	Dry Open-Cut	Intermediate	R3SB3H	Perennial	F	
South Fork Long Branch Cr.	145.27	GPS006/ESP059	1226063424364	6.18	8.73	Dry Open-Cut	Minor	R4SBC	Intermittent	Unknown	
Trib. to S. Fork Long Branch	145.54	ESI061	1225996424261	13.64	34.10	Dry Open-Cut	Intermediate	R4SBC	Intermittent	Unknown	
North Fork Little Butte Creek	145.68	ESP066	1226154424196	45.87	114.68	Dry Open-Cut	Intermediate	R3SB3H	Perennial	F	Temperature/Summer – Cat: 5 E Coli/Fall, Winter, Spring – Cat: 5 E Coli/Summer – Cat: 4A pH/Summer - Cat: 5
Trib. to N. Fork Little Butte	146.05	ESI056	1225859424250	9.37	23.42	Dry Open-Cut	Minor	R4SBC	Intermittent	Unknown	
Trib. to N. Fork Little Butte	146.38	ESI055	1225855424210	3.23	8.08	Dry Open-Cut	Minor	R4SBC	Intermittent	Unknown	
Trib. to N. Fork Little Butte	146.75	ESI052	1225847424179	11.52	28.80	Dry Open-Cut	Intermediate	R4SBC	Intermittent	Unknown	
Stock Pond	152.33	AL169		-	-	Adjacent to centerline within ROW	NA	PUBFx	Stock Pond	P -Federal Land [h/]	

TABLE N-3

Waterbodies Crossed by the Pacific Connector Pipeline

Waterbody [a/]	Approximate Pipeline Milepost	Waterbody ID [d/]	Pacific Northwest Hydrography Waterbody ID Number [e/]	Width of Crossing (feet)	Excavated Volume (yds[c/])	Crossing Method	FERC Classification [f/]	Cowardin Classsification	Stream Type	ODF or NWFP Stream Classification [g/, h/]	Oregon DEQ Water Quality Limited Streams [i/]
Eastern Slopes Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Little Butte Creek (HUC 1710030708) Fifth field Watershed [b/, c/], Jackson County, Oregon											
South Fork Little Butte Creek	162.45	ASP165	1226154424195	19.62	49.05	Dry Open-Cut	Intermediate	R3SB1H	Perennial	F - Federal Land [h/]	Temperature/Summer – Cat: 5 [i/] E Coli/Summer – Cat: 5 [i/] Sedimentation – Cat: 5[i/] Habitat Modification – Cat: 4C[i/] Flow Modification – Cat: 4C[i/]
Daley Creek	166.21	ESI076	1223666423096	26.15	65.38	Dry Open-Cut	Intermediate	R4UBC	Intermittent	I - Federal Land [h/]	
Eastern Slopes Ecoregion, Upper Klamath R. Sub-basin (HUC 18010206), Spencer Creek (HUC 1801020601)) Fifth field Watershed [b/, c/], Klamath County, Oregon											
Trib. to Spencer Creek	168.31	ASI162	1222523423081	-	-	Adjacent to centerline within ROW	Minor	R4UB1C	Intermittent	I - Federal Land [h/]	
Spencer Creek	171.06	EW085	1220277421487	<10	260.55	Dry Open-Cut	Minor	PEMC	Intermittent	I - Federal Land [h/]	Biological Criteria – Cat: 5 Sedimentation – Cat: 5 Temperature/Year-Round – Cat: 5 Habitat Modification – Cat: 4C Flow Modification: Cat: 4C
Trib to Spencer Creek	171.57	GSP007	1221988422850	4.05	9.30	Dry Open-Cut	Minor	R2	Perennial		
Trib. to Spencer Creek	172.48	EW107	1221837422760	<10	175.28	Dry Open-Cut	Minor	R4SB2	Intermittent	I - Federal Land [h/]	
Trib. to Spencer Creek	173.74	ESI106		5.03	12.58	Dry Open-Cut	Minor	R4SBC	Intermittent	I - Federal Land [h/]	
Trib. to Spencer Creek	176.44	ESI069/GSI010		2.37	5.92	Dry Open-Cut	Minor	R4SBC	Intermittent	I - Federal Land [h/]	
Clover Creek	177.76	EW103/GSI011	1220820421968	<10	427.77	Dry Open-Cut	Minor	R4SB2/PEMC/PSSC	Intermittent	Unknown	Sedimentation – Cat: 5 Habitat Modification – Cat: 4C
Eastern Slopes Ecoregion, Upper Klamath R. Sub-basin (HUC 18010206), Klamath R-John C Boyle Res (HUC 1801020602)) Fifth field Watershed [b/], Klamath County, Oregon											
Trib. to Klamath River	186.61	ESI097	1220000421555	3.13	7.83	Dry Open-Cut	Minor	R4SB2C	Intermittent	Unknown	
Trib. to Klamath River	186.65	ESI099	1220000421555	2.04	5.10	Dry Open-Cut	Minor	R4SB2C	Intermittent	Unknown	
Trib. to Klamath River	186.74, 186.76	ESI100	1220000421555	-	-	Dry Open-Cut	Minor	R4SB2C	Intermittent	Unknown	
Eastern Slopes Ecoregion, Lost River Sub-basin (HUC 18010204), Lake Ewauna-Upper Klamath R (HUC 1801020412) Fifth field Watershed [b/], Klamath County, Oregon											
Trib. To Klamath River	189.96	ASI013	1219145421230	4.05	10.13	Dry Open-Cut	Minor	R4EM2	Intermittent	Unknown	
Weyerhaeuser Pond	196.77	AL034		-	-	Adjacent to centerline within ROW	NA	PUBKx	Industrial Pond	N	
Klamath River	199.38	ASP151	1221913420005	989.26	2464.40	HDD	Major	L1UBHh	Perennial	F	Dissolved Oxygen/Year-Round – Cat: 5 (non-spawning) Ammonia/Year-Round – Cat: 5 Chlorophyll a/Summer – Cat: 5 pH/Summer – Cat: 5 Habitat Modification – Cat: 4C Flow Modification – Cat: 4C
Eastern Slopes Ecoregion, Lost River Sub-basin (HUC 18010204), Lower Lost River (HUC 1801020409)) Fifth field Watershed [b/], Klamath County, Oregon											
Lost River	212.05	NSP001	1212146420011	117.75	294.38	Dry Open-Cut	Major	R3UBH	Perennial	F	Dissolved Oxygen/Year-Round – Cat: 5 (non-spawning) Ammonia/Year-Round – Cat: 5 Chlorophyll a/Summer – Cat: 5 Habitat Modification – Cat: 4C Flow Modification – Cat: 4C
Unnamed Creek	216.10	ASI051	1215715420597	12.80	32.00	Dry Open-Cut	Intermediate	PEMA	Intermittent	Unknown	
Unnamed Creek	216.11	ASI052	1215715420597	3.01	7.52	Dry Open-Cut	Minor	R4SB1	Intermittent	Unknown	
Unnamed Creek	216.30	ASI050	1215715420596	25.23	63.08	Dry Open-Cut	Intermediate	R4SBC	Intermittent	Unknown	
Unnamed Creek	216.43	ASI049	1215677420606	6.95	17.38	Dry Open-Cut	Minor	R4SBC	Intermittent	Unknown	
Trib. to D Canal	218.09	ASI136	1215371420655	23.48	58.70	Dry Open-Cut	Intermediate	R4SB1x	Intermittent	Unknown	
Trib. to D Canal	218.46	ASI137	1215384420611	3.06	7.65	Dry Open-Cut	Minor	R4SB1x	Intermittent	Unknown	

TABLE N-3

Waterbodies Crossed by the Pacific Connector Pipeline

Waterbody [a/]	Approximate Pipeline Milepost	Waterbody ID [d/]	Pacific Northwest Hydrography Waterbody ID Number [e/]	Width of Crossing (feet)	Excavated Volume (yds[c/])	Crossing Method	FERC Classification [f/]	Cowardin Classsification	Stream Type	ODF or NWFP Stream Classification [g/, h/]	Oregon DEQ Water Quality Limited Streams [i/]
Trib. to D Canal	219.69	ASI291	1214908420305	1.28	3.20	Dry Open-Cut	Minor	R4UB3C	Intermittent	Unknown	
Excavated Pond	219.70	NL116		-	-	Off ROW – Temp Extra Workspace	NA	PAGBx	Excavated pond	N	
Unnamed Creek	221.77	ASI138	1214569420610	5.02	12.55	Dry Open-Cut	Minor	R4UB3	Intermittent	Unknown	
Pond	222.84	EL077		-	-	Adjacent to centerline within ROW	NA	PAGBx	Pond	N	
Trib. to V Canal	224.95	ESI050	1214001420661	-	-	Adjacent to centerline within ROW	Minor	R4SB1	Intermittent	Unknown	
Trib. to V Canal	224.95	ESI051	1214053420564	-	-	Adjacent to centerline within ROW	Minor	R4SB1	Intermittent	Unknown	
Trib. to V Canal	225.07	ASI140	1214053420564	28.34	70.85	Dry Open-Cut	Intermediate	R4SB1	Intermittent	Unknown	

a/ Pacific Northwest Hydrography Database and Jones and Stokes Field Survey
b/ USGS Hydrologic Unit Codes.
c/ Key Watershed
d/ Jones and Stokes Wetland Survey Waterbody Identification Number
e/ Pacific Northwest Hydrography Framework Clearinghouse Waterbody longitude/latitude unique identifier number.
f/ Minor waterbody includes all waterbodies less than or equal to 10 feet wide at the water's edge at the time of construction; intermediate waterbody includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of construction; and major waterbody includes all waterbodies greater than 100 feet wide at the water's edge at the time of construction.
g/ Oregon Department of Forestry Classifications: F – Fish, D- Domestic, N- none, * Domestic use yet to be determined.
h/ Northwest Forest Plan Classifications: fish bearing streams (F), permanently flowing non-fish bearing streams (N), seasonally flowing or Intermittent streams (I), lakes and natural ponds (P)
i/ Source: Oregon Department of Environmental Quality, 2004/2006 303d GIS coverage. Cat: 4A – water quality Limited, TMDL approved, Cat: 4B – water quality limited, other control measures, Cat: 4C – water quality limited, not a pollutant, Cat: 5 – water quality limited, 303(d) list, TMDL needed.
j/ Water quality limited within one mile of crossing, not at point of crossing.

TABLE N-4

Shallow Groundwater Areas Crossed by the Pacific Connector Pipeline Project a/

SSURGO Soil Mapping Unit Symbol	Beginning MP	Ending MP	Length Crossed (miles)	Season of High Groundwater	Typical Depth to Water Table (ft)
Sitka Spruce Belt b/					
61D	1.47R	1.71R	0.24	Oct-May	0->6
3	1.71R	1.74R	0.03	Jan-Dec	0->6
23	4.12R	4.14R	0.02	Jan-Dec	0->6
12	4.14R	4.16R	0.02	Jan-Dec	0->6
42	6.2R	6.26R	0.06	Nov-Apr	1.0->6
12	6.26R	6.45R	0.19	Jan-Dec	0->6
42	8.31R	8.46R	0.15	Nov-Apr	1.0->6
12	10.95R	11.08R	0.13	Jan-Dec	0->6
41	11.18R	11.35R	0.17	Nov-Apr	1.0->6
12	11.35R	11.91R	0.56	Jan-Dec	0->6
34	11.61R	11.91R	0.30	Nov-May	0->6
12	11.91R	8.6	0.49	Jan-Dec	0->6
34	8.6	8.66	0.06	Nov-May	0->6
9	8.66	8.75	0.09	Oct-Apr	0->6
41	10.03	10.04	0.01	Nov-Apr	1.0->6
12	10.04	10.13	0.09	Jan-Dec	0->6
34	10.13	10.41	0.28	Nov-May	0->6
34	10.96	11.03	0.07	Nov-May	0->6
12	11.03	11.09	0.06	Jan-Dec	0->6
12	11.13	11.34	0.21	Jan-Dec	0->6
12	11.34	11.39	0.05	Jan-Dec	0->6
42	15.69	15.8	0.11	Nov-Apr	1.0->6
Northern Pacific Coast Range, Foothills, and Valleys b/					
47B	22.64	22.87	0.23	Oct-May	0->6
10B	22.68	22.71	0.03	Nov-Mar	1.5->6
10A	22.87	23.04	0.17	Nov-Mar	1.5->6
33	27	27.06	0.06	Nov-Apr	3.5->6
10A	27.09	27.13	0.04	Nov-Mar	1.5->6
47B	29.5	29.64	0.14	Oct-May	0->6
10B	29.54	30.27	0.73	Nov-Mar	1.5->6
48	44.19	44.28	0.09	Nov-Apr	0->6
Siskiyou-Trinity Area b/					
75C	48.29	48.39	0.1	Dec-April	1.5-3
188D	49.31	49.41	0.1	Nov-May	0-2.5
235C	49.41	49.57	0.16	Nov-April	1.5-3
29A	49.86	50.1	0.24	Nov-May	0->6
42B	50.1	50.34	0.24	Nov-May	1.5->6
44A	50.68	50.76	0.08	Nov-May	0->6
224B	50.76	50.78	0.02	Oct-June	0.5-5
235D	50.78	50.85	0.07	Nov-April	1.5-3
152E	51.79	52	0.21	Nov-May	1.5->6
152E	53.03	53.7	0.67	Nov-May	1.5->6
202B	55.9	55.95	0.05	Nov-May	0.5->6
235C	56.31	56.58	0.27	Nov-April	1.5-3
44A	56.58	57.29	0.71	Nov-May	0->6
188D	57.05	57.15	0.1	Nov-May	0-2.5
44A	58.01	58.06	0.05	Nov-May	0->6
235D	58.96	59.27	0.31	Nov-April	1.5-3
14C	59.41	59.6	0.19	Dec-June	1.0->6
75C	59.78	59.88	0.1	Dec-April	1.5-3
75E	59.88	60.03	0.15	Dec-April	1.5-3
175E	60.03	60.59	0.56	Nov-Apr	1.5-3
188D	60.48	60.55	0.07	Nov-May	0-2.5

TABLE N-4

Shallow Groundwater Areas Crossed by the Pacific Connector Pipeline Project a/

SSURGO Soil Mapping Unit Symbol	Beginning MP	Ending MP	Length Crossed (miles)	Season of High Groundwater	Typical Depth to Water Table (ft)
175E	60.59	60.68	0.09	Nov-Apr	1.5-3
174F	67.06	67.56	0.5	Nov-Apr	1.5-3
174E	67.56	68.22	0.66	Nov-Apr	1.5-3
174F	67.76	68.35	0.59	Nov-Apr	1.5-3
175E	69.18	69.29	0.11	Nov-Apr	1.5-3
175E	69.37	69.55	0.18	Nov-Apr	1.5-3
235E	73.79	73.98	0.19	Nov-April	1.5-3
185D	73.98	74.38	0.4	Dec-April	0-1
42B	76.42	76.48	0.06	Nov-May	1.5->6
44A	77.82	77.97	0.15	Nov-May	0->6
202B	77.97	77.98	0.01	Nov-May	0.5->6
235D	77.98	78.06	0.08	Nov-April	1.5-3
224B	78.98	79.03	0.05	Oct-June	0.5-5
138F	85.81	88.11	2.3	Nov-May	2->6
137F	86.46	86.49	0.03	Nov-May	2->6
137F	86.85	86.94	0.09	Nov-May	2->6
185D	88.11	88.21	0.1	Dec-April	0-1
14D	88.15	88.56	0.41	Dec-June	1.0->6
224B	88.39	88.5	0.11	Oct-June	0.5-5
14D	88.73	88.8	0.07	Dec-June	1.0->6
188D	94.46	94.58	0.12	Nov-May	0-2.5
188D	94.79	95.12	0.33	Nov-May	0-2.5
64F	96.93	97.67	0.74	Nov-May	1.5->6
138F	97.23	98.94	1.71	Nov-May	2->6
136E	97.73	97.86	0.13	Nov-May	2->6
137F	98.06	98.64	0.58	Nov-May	2->6
137F	98.94	99.02	0.08	Nov-May	2->6
138F	99.14	99.31	0.17	Nov-May	2->6
138F	99.91	100.38	0.47	Nov-May	2->6
119F	115.15	115.62	0.47	Dec-March	0.5-1.6
128B	118.84	118.91	0.07	Dec-April	3.0->6
125F	119.58	119.79	0.21	Dec-March	0.5-1.6
119F	119.88	120.14	0.26	Dec-March	0.5-1.6
125F	120.27	120.45	0.18	Dec-March	0.5-1.6
126F	120.45	120.7	0.25	Dec-March	0.5-1.6
121E	120.7	121.19	0.49	Dec-March	0.5-1.6
119F	121.09	121.85	0.76	Dec-March	0.5-1.6
122E	121.19	121.54	0.35	Dec-March	0.5-1.6
112F	121.26	121.65	0.39	Dec-March	0.5-1.6
121E	121.54	121.69	0.15	Dec-March	0.5-1.6
122E	121.85	122.24	0.39	Dec-March	0.5-1.6
28D	122	122.18	0.18	Dec-April	3.0-3.5
126F	122.24	122.3	0.06	Dec-March	0.5-1.6
120C	122.3	122.49	0.19	Dec-March	0.5-1.6
154	122.67	122.73	0.06	Jan-Dec	0->6
122E	123.08	123.19	0.11	Dec-March	0.5-1.6
126F	125.04	125.49	0.45	Dec-March	0.5-1.6
28E	125.07	125.14	0.07	Dec-April	3.0-3.5
122E	125.77	126.06	0.29	Dec-March	0.5-1.6
112F	126.51	127.64	1.13	Dec-March	0.5-1.6
122E	127.94	128.57	0.63	Dec-March	0.5-1.6
125C	128.57	128.67	0.1	Dec-March	0.5-1.6
122E	128.67	128.7	0.03	Dec-March	0.5-1.6
118E	128.8	128.86	0.06	Dec-March	0.5-1.6

TABLE N-4

Shallow Groundwater Areas Crossed by the Pacific Connector Pipeline Project a/

SSURGO Soil Mapping Unit Symbol	Beginning MP	Ending MP	Length Crossed (miles)	Season of High Groundwater	Typical Depth to Water Table (ft)
122E	129.08	129.23	0.15	Dec-March	0.5-1.6
118E	129.7	130.83	1.13	Dec-March	0.5-1.6
125C	130.84	131.05	0.21	Dec-March	0.5-1.6
125F	131.05	131.2	0.15	Dec-March	0.5-1.6
126F	131.37	131.78	0.41	Dec-March	0.5-1.6
125C	131.78	131.9	0.12	Dec-March	0.5-1.6
76A	131.9	132.48	0.58	Dec-May	0->6.0
125F	132.02	132.13	0.11	Dec-March	0.5-1.6
125C	132.48	132.99	0.51	Dec-March	0.5-1.6
125F	132.99	133.23	0.24	Dec-March	0.5-1.6
118E	133.36	134.16	0.8	Dec-March	0.5-1.6
126F	134.41	134.94	0.53	Dec-March	0.5-1.6
118E	134.94	135.58	0.64	Dec-March	0.5-1.6
118E	136.79	137.28	0.49	Dec-March	0.5-1.6
27D	137.28	137.45	0.17	Dec-April	3.0-3.5
125F	137.48	140.12	2.64	Dec-March	0.5-1.6
126F	137.94	138.49	0.55	Dec-March	0.5-1.6
27D	138.25	138.39	0.14	Dec-April	3.0-3.5
27D	138.49	139.89	1.4	Dec-April	3.0-3.5
125F	140.28	140.48	0.2	Dec-March	0.5-1.6
126F	141.51	141.55	0.04	Dec-March	0.5-1.6
125F	141.55	142.28	0.73	Dec-March	0.5-1.6
33C	142.28	142.55	0.27	Dec-April	0.5->6
112F	142.7	142.94	0.24	Dec-March	0.5-1.6
125F	143.11	145.41	2.3	Dec-March	0.5-1.6
112F	143.55	144.01	0.46	Dec-March	0.5-1.6
121E	144.79	144.85	0.06	Dec-March	0.5-1.6
122E	144.85	145.18	0.33	Dec-March	0.5-1.6
112F	145.18	145.25	0.07	Dec-March	0.5-1.6
120C	145.25	145.36	0.11	Dec-March	0.5-1.6
28D	145.27	145.33	0.06	Dec-April	3.0-3.5
125C	145.27	145.41	0.14	Dec-March	0.5-1.6
122E	145.45	145.5	0.05	Dec-March	0.5-1.6
120C	145.5	145.54	0.04	Dec-March	0.5-1.6
120C	145.54	145.55	0.01	Dec-March	0.5-1.6
128B	145.55	145.85	0.3	Dec-April	3.0->6
128B	145.85	146	0.15	Dec-April	3.0->6
121E	146	146.07	0.07	Dec-March	0.5-1.6
120C	146.07	146.1	0.03	Dec-March	0.5-1.6
112F	146.1	146.23	0.13	Dec-March	0.5-1.6
125F	146.23	148.16	1.93	Dec-March	0.5-1.6
27B	146.31	146.38	0.07	Dec-April	3.0-3.5
27B	146.38	146.78	0.4	Dec-April	3.0-3.5
125F	146.78	146.86	0.08	Dec-March	0.5-1.6
28D	147.68	147.75	0.07	Dec-April	3.0-3.5
18C	152.94	152.99	0.05	Dec-April	1.0-3.5
28D	154.72	154.79	0.07	Dec-April	3.0-3.5
Klamath and Shasta Valleys and Basins b/					
36	191.36	191.39	0.03	March-Sept.	2.5->6
40	191.39	193.19	1.8	Jan-Dec	1.0->6
91	191.69	192.67	0.98	Jan-Dec	0.0->6
63	191.98	192.11	0.13	Jan-Dec	1.0->6
63	192.52	192.56	0.04	Jan-Dec	1.0->6
28	192.67	192.73	0.06	Jan-Dec	1.0->6

TABLE N-4

Shallow Groundwater Areas Crossed by the Pacific Connector Pipeline Project a/

SSURGO Soil Mapping Unit Symbol	Beginning MP	Ending MP	Length Crossed (miles)	Season of High Groundwater	Typical Depth to Water Table (ft)
70	192.73	193.35	0.62	Jan-Dec	0.0->6
53	193.35	194.68	1.33	Jan-Dec	0.0->6
40	194.46	199.13	4.67	Jan-Dec	1.0->6
38	194.85	194.86	0.01	March-Aug.	3.0->6
36	194.87	194.95	0.08	March-Sept.	2.5->6
78	195.33	195.44	0.11	Jan-Dec	0.0->6
53	195.44	196.78	1.34	Jan-Dec	0.0->6
40	195.59	195.68	0.09	Jan-Dec	1.0->6
28	195.9	196.91	1.01	Jan-Dec	1.0->6
40	197.86	198.59	0.73	Jan-Dec	1.0->6
53	198.02	198.19	0.17	Jan-Dec	0.0->6
78	199.13	199.27	0.14	Jan-Dec	0.0->6
78	199.27	199.28	0.01	Jan-Dec	0.0->6
77	199.46	199.59	0.13	Jan-Dec	0.0->6
53	199.59	200.03	0.44	Jan-Dec	0.0->6
38	199.65	200.29	0.64	March-Aug.	3.0->6
62	200.29	200.53	0.24	Jan-Dec	1.0->6
28	200.53	201.72	1.19	Jan-Dec	1.0->6
53	201.44	201.52	0.08	Jan-Dec	0.0->6
31	205.33	205.42	0.09	Jan-Dec	1.0->6
31	206.75	206.77	0.02	Jan-Dec	1.0->6
62	208.07	208.3	0.23	Jan-Dec	1.0->6
31	208.34	208.42	0.08	Jan-Dec	1.0->6
26	209.19	209.27	0.08	Jan-Dec	1.0->6
25	209.27	210.13	0.86	Jan-Dec	1.0->6
31	209.53	209.96	0.43	Jan-Dec	1.0->6
36	212	212.04	0.04	March-Sept.	2.5->6
36	212.28	212.55	0.27	March-Sept.	2.5->6
31	213.36	213.5	0.14	Jan-Dec	1.0->6
40	213.87	213.91	0.04	Jan-Dec	1.0->6
63	213.91	214.05	0.14	Jan-Dec	1.0->6
		Total	**65.09**		

a/ Data are based on soil mapping units and only provide a general indication of where high water tables might be encountered.

b/ Defined areas based on Natural Resource Conservation Service Major Land Resource Areas, geographically associated areas based on climate, resources, and land use and used to assist in land use planning.

Source: NRCS (2014)

APPENDIX O

Vegetation and Wildlife

O-1. **Commonly Occurring Fish and Invertebrate Species in Coos Bay**

O-2. **Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project**

O-3. **Special Status Marine Mammal and Terrestrial Wildlife Species that May Occur Near the JCE & PCGP Project**

O-4. **Special Status Fish Species and Aquatic Invertebrates that May Occur Near the JCE & PCGP Project**

O-5. **Special Status Plants (Vascular and Non-Vascular) and Fungi Species that May Occur Near the JCE & PCGP Project**

TABLE O-1

Commonly Occurring Fish and Invertebrate Species in Coos Bay

Common Name	Scientific Name
Fish Species	
American shad	*Alosa sapidissima*
Arrow goby	*Clevelandia ios*
Bay goby	*Lepidogobius lepidus*
Bay pipefish	*Syngnathus griseolineatus*
Black rockfish	*Sebastes melanops*
Bocaccio	*Sebastes paucispinis*
Brown rockfish	*Sebastes auriculatus*
Buffalo sculpin	*Enophrys bison*
Cabezon	*Scorpaenichthys marmoratus*
Chinook salmon	*Oncorhynchus tshawytscha*
Coast range sculpin	*Cottus aleuticus*
Coho salmon	*Oncorhynchus kisutch*
Copper rockfish	*Sebastes caurinus*
Crescent gunnel	*Pholis laeta*
Cutthroat trout	*Oncorhynchus clarki clarki*
English sole	*Parophrys vetulus*
Fluffy sculpin	*Oligocottus snyderi*
Green sturgeon	*Acipencer medirostris*
High cockscomb	*Anoplarchus purpurescens*
Jack smelt	*Atherinopsis californiensis*
Kelp greenling	*Hexagrammos decagrammus*
Largescale sucker	*Catostomus macrocheilus*
Lingcod	*Ophiodon elongatus*
Longnose dace	*Rhinichthys cataractae*
Northern anchovy	*Engraulis mordax*
Pacific herring	*Clupea harengus pallasi*
Pacific lamprey	*Entosphenus tridentatus*
Pacific sand lance	*Ammodytes hexapterus*
Pacific sardine	*Sardinops sagax*
Pacific staghorn sculpin	*Leptocottus armatus*
Pacific tomcod	*Microgadus proximus*
Pile perch	*Rhacochilus vacca*
Pinpoint gunnel	*Apodichthys flavidus*
Prickly sculpin	*Cottus asper*
Rainbow (steelhead) trout	*Oncorhynchus mykiss*
Red Irish lord	*Hemilepidotus hemilepidotus*
Redside shiner	*Richardsonius balteatus*
Rex sole	*Glyptocephalus zachirus*
Rock greenling	*Hexagrammos lagocephalus*
Rockweed gunnel	*Xererpes fucorum*
Saddleback gunnel	*Pholis ornata*
Sand sole	*Psettichthys melanostictus*
Sand lance	*Ammodytes hexapterus*
Shiner perch	*Cymatogaster aggregata*
Silver surf perch	*Hyperprosopon ellipticum*
Speckled dace	*Rhinichthys osculus*
Speckled sanddab	*Citharichthys stigmaeus*
Staghorn sculpin	*Leptocottus armatus*
Starry flounder	*Platichthys stellatus*
Striped bass	*Morone saxatilis*
Striped perch	*Embiotoca lateralis*
Surf smelt	*Hypomesus pretiosus*
Threespine stickleback	*Gasterosteus aculeatus*
Topsmelt	*Atherinops affinis*
Tube-snout	*Aulorhynchus flavidus*
Walleye perch	*Hyperprosopon argenteum*
White bait smelt	*Aliosmerus elongatus*
White perch	*Phanerodon furcatus*
White sturgeon	*Acipenser transmontanus acipenser*

TABLE O-1

Commonly Occurring Fish and Invertebrate Species in Coos Bay

Common Name	Scientific Name
Invertebrate Species	
Butter clams	*Saxidomus gigantea*
Cockle clam	*Clinocardium nuttallii.*
Dungeness crab	*Cancer magister*
Porcelain crab	*Petrolisthes cinctipes*
Pea crab	*Pinnotheres pisum*
Green crab	*Carcinus maenas (introduced sp.)*
Gaper clams	*Tresus capax*
Ghost shrimp	*Neotrypaea californiensis*
Olympia oyster	*Ostrea lurida*
Pacific oyster	*Crassostrea gigas*
Mussels	*Mytilus spp.*
Softshell clam	*Mya arenaria*

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Coast Range Ecoregion, Coos Sub-basin (HUC 17100304), Coos Bay-Frontal Pacific Ocean (HUC 1710030403) Fifth field Watershed [h/], Coos County, Oregon												
Coos Bay (NE026)	1243397433543 State	2.92R	Estuary Major	Wet Open-Cut	Wet open-cut only feasible/practical in-bay crossing method.	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, migration, rearing habitat T, CH	Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Various Marine Fish and Shellfish	4 Coastal Pelagic spp., 21 Groundfish spp, 2 Salmonid spp. Pelagic, Groundfish, and Salmonids (see Table 3B-6)	Coastal Pelagic spp., Groundfish spp, Salmonid spp. Fall Chinook/ Coho Rearing, Migration	Oct 1 to Feb 15	N
Trib. to Coos Bay (GSI026)	1242017434500 Private	4.89R	Intermittent Minor	Dry Open-Cut	Dry open-cut method feasible/practical on small intermittent headwater tributary if flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib to Kentuck Slough (EE004/GW27)	1241795434269 Private	6.23R	Intermittent Intermediate	Dry Open-Cut	Dry open-cut method feasible/practical on small intermittent ditched tributary if flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Kentuck Slough (EE005/GSP-28)	1242068434143 Private	6.28R	Perennial Intermediate	Conventional Bore	Dry open-cut methods likely feasible using coffer dams/diversions based on flow, channel size (depth and width). Conventional bore feasible based on width and depth; however extensive dewatering requirements expected because of anticipated groundwater conditions. Local traffic encumbrances would be avoided with boring methods. An HDD is likely probable, based on topography and expected geotechnical conditions, but likely not along the same alignment because of geometry requirements associated with large diameter pipe. Significant HDD costs, HDD time requirements were the determinants for the proposed conventional bore.	• Oregon Coast ESU Coho, migration, rearing habitat T, CH	Coho, Winter Steelhead	Unknown	Coho	Coho Rearing, Migration	Jul 1 to Sep 15	N
Trib to Coos Bay (NW-117/EE06)	1241902434209 Private	6.35R	Perennial Major	Dry Open-Cut	Dry open-cut method feasible/practical on small channelized tributary within golf course lacking effect on riparian vegetation.	• Oregon Coast ESU Coho, assumed habitat T	Coho Assumed, Winter Steelhead	Unknown	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Willanch Creek (Denied Access 01)	124164934037 Private	7.99R	Intermittent Minor	Dry Open-Cut	Dry open-cut method feasible/practical on small headwater tributary, if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Willanch Slough (EE007)	1242083434031 Private	8.34R	Perennial Intermediate	Dry Open-Cut	Dry open-cut method feasible/practical on small tributary within pasture/hayfield lacking effect on riparian vegetation.	• Oregon Coast ESU Coho, migration, rearing habitat T, CH	Coho, Winter Steelhead	Unknown	Coho	Coho Rearing, Migration	Jul 1 to Sep 15	Y*

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib to Willanch Slough (GDX029/EE008)	1241601434068	8.43R	Perennial N/A	Not Crossed by Centerline	Not crossed by centerline (likely intermittent – headwater trib.)	• Oregon Coast ESU Coho, migration, rearing habitat T, CH	Coho, Winter Steelhead	Unknown	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	N
Trip to Willanch Slough (GDX030)	Private	8.48R	Intermittent Intermediate	Dry Open-Cut	Dry open-cut method feasible/practical on small intermittent channelized tributary on edge of pasture.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib to Willanch Slough (GDX031)	Private	8.49R	Intermittent Intermediate	Dry Open-Cut	Dry open-cut method feasible/practical on small intermittent tributary if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Tributary to Coos River (GW34)	Private	9.55R	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline (likely intermittent – headwater trib.)	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Trib. to Cooston Channel (Echo Creek) (SS-100-002)	1241722433697 Private	10.22R	Intermittent Intermediate	Dry Open-Cut	Dry open-cut method feasible/practical on small headwater tributary, if flowing at the time of construction.	• Oregon Coast ESU Coho, spawning habitat T, CH	Winter Steelhead Coho	Unknown	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y*
Trib. to Coos River (SS-001-003)	Private	10.79R	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline (intermittent – headwater trib.)	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Coos River (BSP119)	1241999433842 (State)	11.13R	Perennial Major	HDD [i/] Level 1 [k/]	HDD feasible based on geometry, topography, and geotechnical conditions along proposed alignment. Primary HDD activities are significantly set back from crossing. Conventional bore not feasible/practical because of crossing length and high groundwater areas on either side of river. Dry open-cut or diverted open-cut methods not practical/feasible based on flow volumes and tidal influence.	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, migration, rearing habitat T, CH	Fall Chinook, Coho, Winter Steelhead, Green Sturgeon, Pacific Lamprey	Various Marine Fish and Shellfish	Chinook, Coho Pelagic, Groundfish, (see Table 3B-5)	Fall Chinook/ Coho (Rearing, Migration)	Oct 1 to Feb 15 [i/]	N
Vogel Creek (SS-100-005)	Private	11.53R	Perennial Intermediate	Dry Open-Cut	Dry open-cut method feasible/practical on 45-foot wide waterbody during low flow period within fish window. Low gradient waterbody will minimize flow volumes that require management during crossing. Impacts to riparian vegetation minimized by placement/setbacks of TEWAs on edges of waterbody in field. Conventional bore crossing method avoided because of high groundwater present on either side of waterbody.	• Oregon Coast ESU Coho, spawning habitat T, CH	, Coho, Winter Steelhead	Assumed	Coho	Coho Rearing, Migration	Jul 1 to Sep 15	Y*
Vogel Creek (SS-100-005	Private	11.58R	Perennial N/A	Adjacent to centerline within ROW	Not crossed by centerline. HDD pull back crossing will occur on rollers across small 10-foot wide ditched waterbody	• Oregon Coast ESU Coho, spawning habitat T, CH	, Coho, Winter Steelhead	Assumed	Coho	Coho Rearing, Migration	Jul 1 to Sep 15	Y*
Trib. to Coos River ((SS-100-006)	Private	11.77R	Perennial Minor	Dry Open-Cut	Dry open-cut method feasible/practical on small ditched tributary in pasture, if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Lillian Creek (SS-100-007)	Private	11.91R	Perennial Minor	Dry Open-Cut	Dry open-cut method feasible/practical on small ditched tributary, if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Lillian Creek (SS-100-002a)	Private	12.07R	Perennial Intermediate	Dry Open-Cut	Dry open-cut method feasible/practical on 80-foot wide trapezoidal channeled waterbody during low flow period within fish window. Low gradient waterbody will minimize flow volumes that require management during crossing. Impacts to riparian vegetation minimized by placement/setbacks of TEWAs on edges of waterbody in field. Conventional bore crossing method avoided because of high groundwater present on either side of waterbody.	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, migration, rearing habitat T, CH	Coho, Winter Steelhead, Green Sturgeon	Unknown	Coho	Coho Rearing, Migration	Jul 1 to Sep 15	Y1o
Trib. to Coos River (SS-100-008)	Private	12.22R	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small ditched tributary in pasture.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Coos River (BDX109)	1241562433627	8.67	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small ditched tributary	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Coos River (BDX109a)	1241562433627	8.73	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small headwater tributary. No additional workspace required within forested wetland.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Catching Slough (BSP104)	1241704433522 Private	9.02	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide headwater tributary. No additional workspace required. Waterbody is on outer edge of ¼ mile buffer of MAMU-occupied stand (C1032). Conflicts with ODFW-recommended in-water work periods are not expected based on proposed two year construction schedule.	• Oregon Coast ESU Coho, assumed habitat T,	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
Trib. to Catching Slough (BSP105)	1241675433517 Private	9.19	Perennial Minor	Dry Open-Cut	Dry open cut methods feasible/practical on small 2-3' wide waterbody. Waterbody is on outer edge of ¼ mile buffer of MAMU-occupied stand (C1032). Conflicts with ODFW-recommended in-water work periods are not expected based on proposed 2-year construction schedule.	• Oregon Coast ESU Coho, assumed habitat T,	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
Trib. to Catching Slough (DSI003)	1241489433510 Private	9.33	Intermittent Intermediate	Dry Open-Cut	Small intermittent headwater tributary - dry open-cut methods feasible/practical if flowing at time of construction. No additional workspace required. Waterbody is on outer edge of ¼ mile buffer of MAMU-occupied stand (C1032). Conflicts with ODFW-recommended in-water work periods are not expected based on proposed 2-year construction schedule.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Catching Slough (DSP002)	1241530433517 Private	9.51	Perennial Minor	Dry Open-Cut (Streambed – bedrock) [12/]	Dry open-cut methods feasible/practical on small 3-5' wide headwater tributary. No additional workspace required. Waterbody is on outer edge of ¼ mile buffer of MAMU-occupied stand (C1032). Conflicts with ODFW-recommended in-water work periods are not expected based on proposed 2-year construction schedule.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y
Monkey Gulch (Denied Access 05X)	Private	10.20	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5-6' wide trapezoidal channel. Immediately adjacent to county road. High groundwater area is problematic for conventional bore crossing because of water management.	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, spawning habitat T, CH	Coho, Winter Steelhead,	Assumed	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y*
Stock Slough (BSP088)	1241571433361 Private	10.32	Perennial Intermediate	Dry Open-Cut Level 1 [k/]	Dry open-cut methods feasible/practical on channelized slough crossings. PI, residential area and topographic conditions limit workspace on north for bore. Dewatering issues likely due to high groundwater issues on south side in floodplain agricultural wetland. Multiple crossings of slough required because of residential routing constraints.	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, rearing habitat T, CH	Coho, Winter Steelhead	Cutthroat Trout	Coho	Spawning, Rearing	Jul 1 to Sep 15	Y
Pasture Pond (BL084)	Private	10.40	Stock pond N/A	Adjacent to centerline within ROW	Man-made pond expected to be dry at the time of construction and will be avoided if possible. Pond will be reconstructed if disturbed.	None	None	None	None	None	Jul 1 to Sep 15	N
Catching Slough (BSP079)	1241572433284 Private	11.11	Perennial Major	Conventional Bore Level 1 [k/]	Dry open-cut methods not feasible based on flow, channel size (depth and width). Conventional bore feasible based on width, depth and expected groundwater dewater requirements. An HDD is probable at the approximate crossing location based on the topography, geometry and expected geotechnical conditions. Significant HDD costs, HDD time requirements were the determinants for the proposed conventional bore.	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, migration, rearing habitat T, CH	Fall Chinook, Coho, Winter Steelhead	Various Marine Fish and Shellfish	Chinook, Coho	Fall Chinook, Coho Rearing, Migration	Jul 1 to Sep 15	N
Trib. to Catching Slough (BDX118)	1241553433277 Private	11.29	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small ditched tributary in pasture.	• Oregon Coast ESU Coho, assumed habitat T	Coho, Winter Steelhead,	Unknown	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Catching Slough (BSP114)	Private	11.47	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2-3' wide headwater tributary. No additional workspace required.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Catching Slough (BSP103)	1241608433185 Private	11.78	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2-4' wide waterbody. ROW necked-down & no additional workspace required for crossing.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Cutthroat Trout	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Catching Slough (BSP101)	1241655433196 Private	11.84	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide waterbody. ROW necked-down & no additional workspace required for crossing.	None	Unknown	Unlikely	None	None	Jul 1 to Sep 15	Y*

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Catching Slough (BSP100)	1241655433196 Private	11.87	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide waterbody ROW necked-down & no additional workspace required for crossing.	None	Unknown	Unlikely	None	None	Jul 1 to Sep 15	Y
Trib. to Catching Slough (NSI041)	1241655433196 Private	12.05	Intermittent Minor	Dry Open-Cut	Small intermittent headwater tributary - dry open-cut methods feasible/practical if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib to Catching Slough (NSI092)	Private	12.27	Intermittent Minor	Dry Open-Cut	Small intermittent headwater tributary - dry open-cut methods feasible/practical if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib to Catching Slough (NSI093)	Private	12.31	Intermittent Minor	Dry Open-Cut	Small intermittent headwater tributary - dry open-cut methods feasible/practical if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib to Catching Slough (NSI094)	Private	12.39	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by centerline. Small headwater waterbody expected to be dry during construction	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Trib to Catching Slough (NSI095)	1241711433132 Private	12.39	Intermittent Minor	Dry Open-Cut	Small intermittent headwater tributary - dry open-cut methods feasible/practical if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib to Catching Slough (NSI096)	Private	12.41	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by centerline. Small headwater waterbody expected to be dry during construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Trib to Catching Slough (NSI097)	Private	12.45	Intermittent Minor	Dry Open-Cut	Small intermittent headwater tributary - dry open cut methods feasible/practical if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib to Catching Slough (NSI098)	1241709433122 Private	12.52	Intermittent Minor	Dry Open-Cut	Small intermittent headwater tributary - dry open-cut methods feasible/practical if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Ross Slough (BSP120)	1241852433075 Private	12.66	Perennial Minor	Adjacent to centerline within ROW	Not crossed by centerline (likely intermittent – headwater trib.)	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Ross Slough (BSP121)	1241852433075 Private	12.68	Perennial Minor	Adjacent to centerline within ROW	Not crossed by centerline (likely intermittent headwater trib.)	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Trib. to Ross Slough (BSP122)	1241842433046 Private	12.83	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small headwater tributary. No additional workspace required. (likely intermittent)	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Ross Slough (BSP125)	Private	12.90	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small headwater tributary. No additional workspace required. (likely intermittent)	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Ross Slough (CSP031)	Private	12.97	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide headwater tributary.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y
Trib. to Ross Slough (CSP030)	1241793433038 Private	13.01	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide headwater tributary.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y
Trib. to Ross Slough (CSP029)	1241778433044 Private	13.11	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide headwater tributary. No additional workspace required.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y
Ross Slough (CSP028)	1241687433509 Private	13.55	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide headwater tributary.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y

TABLE O-2

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Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Ross Slough (CSP027)	1241761432974 Private	13.61	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2-3' wide headwater tributary.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y
Trib. to Ross Slough (CSP026)	1241733432965 Private	13.70	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide headwater tributary.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y
Boone Creek (EDX078)	1241532432789 Private	15.71	Perennial Minor	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on small 5' wide waterbody. Road and topography on north side prevent conventional bore feasibility due to excessive grading/excavation requirements for bore pit on north side.	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Trib. to Boone Creek (CSI037)	1241561432755 Private	16.36	Intermittent Minor	Dry Open-Cut	Small 1'wide intermittent tributary - dry open-cut methods feasible/practical if flowing at time of construction.	None	none	none	None	None	Jul 1 to Sep 15	Y*
Trib. to Boone Creek (CSP036)	1241561432755 Private	16.36	Perennial Minor	Dry Open-Cut	Dry open cut methods feasible/practical on small 4' wide headwater tributary. No additional workspace required for crossing.	None	none	none	None	None	Jul 1 to Sep 15	Y
Trib. to Boone Creek (CSI035)	1241598432687 Private	16.39	Intermittent Minor	Dry Open-Cut	Small 1'wide intermittent tributary - dry open-cut methods feasible/practical if flowing at time of construction.	None	none	none	None	None	Jul 1 to Sep 15	Y*
Trib. To Catching Creek (CSP024)	1241612432631 Private	16.56	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1.5' wide headwater tributary.	None	Unknown	Unlikely	None	None	Jul 1 to Sep 15	Y
Trib. To Catching Creek (CSP023)	1241604432619 Private	16.62	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide headwater tributary.	None	Assumed	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. To Catching Creek (CSP022)	1241594432613 Private	16.71	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide headwater tributary. No additional workspace required	None	Assumed	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. To Catching Creek (CSP021)	1241596432612 Private	16.73	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide headwater tributary. No additional workspace required	None	Assumed	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. To Catching Creek (CSP020)	1241603432608 Private	16.78	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide headwater tributary. No additional workspace required	None	Assumed	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. To Catching Creek (CSP019)	1241561432616 Private	16.82	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide headwater tributary. No additional workspace required	None	Assumed	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. To Catching Creek (CSP018)	1241606432606 Private	16.85	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide headwater tributary. No additional workspace required	None	Assumed	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. To Catching Creek (BLM 17.42)	BLM – Coos Bay District	17.42	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide headwater tributary.	None	None	None	None	None	Jul 1 to Sep 15	
Catching Creek (CSP033)	1241452433077 Private	17.47	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-4' wide headwater stream. Steep topographic constraints prevent a conventional bore crossing because of bore pit grading/excavation requirements on both sides of stream.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead	Cutthroat Trout	Coho	Coho Spawning, Rearing,	Jul 1 to Sep 15	Y

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), Coquille River (HUC 1710030505) Fifth field Watershed [h/], Coos County, Oregon												
Trib. To Cunningham Creek (BSP092)	1241387432420 Private	18.20	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide tributary. Steep topographic constraints also prevent a conventional bore crossing because of bore pit grading/excavation requirements on north side of stream.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. To Cunningham Creek (BSP093)	1241469432436 Private	18.28	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide headwater tributary.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. To Cunningham Creek (BSP095)	1241458432440 Private	18.33	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide headwater tributary.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. To Cunningham Creek (BSI096)	1241461432438 Private	18.48	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide headwater tributary if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Cunningham Creek (NSP042)	1242026431787 Private	18.93	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/] Level 1	Dry open-cut methods feasible/practical on small stream. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. Steep topographic constraints on either side of stream prevent a conventional bore crossing because of bore pit grading/excavation requirements.	• Oregon Coast ESU Coho, assumed habitat T	Coho assumed, Winter Steelhead,	Cutthroat Trout	Coho Assumed	Unknown	Jul 1 to Sep 15	Y 1o Access Restriction
Trib. To Cunningham Creek (NSP043)	1241375432355 Private	19.06	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small stream. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. Steep topographic constraints on either side of stream prevent a conventional bore crossing because of bore pit grading/excavation requirements.	• Oregon Coast ESU Coho, assumed habitat T	Coho Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y 1o Access Restriction
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), North Fork Coquille River (HUC 1710030504) Fifth field Watershed [h/] Coos County, Oregon												
Trib. to Steele Creek (ESI028)	1241154432240 BLM – Coos Bay District	20.34	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 2-3' wide intermittent tributary, if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Steele Creek (ESI028)	1241154432240 BLM – Coos Bay District	20.59	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 2-3' wide intermittent tributary, if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Steele Creek (Denied Access 06)	Private	20.72	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-3' wide intermittent tributary, if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Steele Creek (Denied Access 07)	Private	20.79	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-3' wide intermittent tributary, if flowing at time of construction	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Steele Creek (Denied Access 08)	Private	20.94	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-3' wide intermittent tributary, if flowing at time of construction	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Steele Creek (NSP015)	1240848432002 Private	21.10	Perennial Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6' wide tributary.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	, Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Trib. to Steele Creek (Denied Access 09)	Private	21.13	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-3' wide intermittent tributary, if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Steele Creek (ESI029)	1241003432184 BLM-Coos Bay District	21.36	Intermittent Minor	Adjacent to centerline within ROW (Streambed-bedrock) [12/]	Small 3' wide intermittent tributary adjacent to ROW not crossed.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
North Fork Coquille River (BSP207)	11241417430804 Private	23.06	Perennial Intermediate	Dry Open-Cut Level 1 [k/]	Dry open-cut method feasible/practical on 20' wide river during low flow period within fish window. Impacts to riparian vegetation minimized by placement/setbacks of TEWAs on west side of river in field and eastside setback 100 feet from waterbody. ROW also necked down to 75 feet. Topographic conditions on east side of the crossing prevent HDD crossing methods because of elevation differences between entry/exit and necessary workspace grading requirements.	• Oregon Coast ESU Coho, spawning, rearing, migration habitat T, CH	Spring Chinook, Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Cutthroat Trout	Chinook, Coho	Spring and Fall Chinook, Coho Rearing, Migration	Jul 1 to Sep 15	Y-1i
Trib. to Middle Creek (BSI137)	1240268431779 BLM- Coos Bay District	27.01	Intermittent Intermediate	Dry Open-Cut	Intermittent tributary to be crossed at the same time as the crossing of Middle Creek at MP 27.04 using dry open-cut. Tributary expected to be dry at the time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Middle Creek (BSI136)	1240268431779 BLM- Coos Bay District	27.02	Intermittent Minor	Adjacent to centerline within ROW	Intermittent tributary not crossed by centerline.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Trib. to Middle Creek (BSI135)	1240268431779 BLM- Coos Bay District	27.04	Intermittent Minor	Adjacent to centerline within ROW Level 2	Intermittent tributary not crossed by centerline.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Middle Creek (BSP133)	1240712431628 BLM- Coos Bay District	27.04	Perennial Intermediate	Dry Open-Cut Level 2 [k/]	Dry open-cut methods feasible/practical on creek during low flow period within fish window. A conventional bore crossing is not feasible because of topographic constraints on west side of creek because of grading/excavation requirements for bore pit. An HDD is not feasible because of topographic/geometry conditions.	• Oregon Coast ESU Coho, rearing, migration habitat T, CH	Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Cutthroat Trout	Chinook, Coho	Fall Chinook, Coho Rearing, Migration	Jul 1 to Sep 15	Y-1i
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), East Fork Coquille River (HUC 1710030503) Fifth field Watershed [m/], Coos County, Oregon												
Trib. To E. Fork Coquille (BSP077)	1240014431632 Private	28.86	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/] Level 1	Dry open-cut methods feasible/practical on small incised headwater trib. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. Steep topographic conditions prevent a conventional bore because of bore pit grading/excavation requirements on both sides of the crossing.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Cutthroat Trout	Coho Assumed	Unknown	Jul 1 to Sep 15	Y

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To E. Fork Coquille (NSI099)	1239937431584 Private	29.18	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6' wide incised trib. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. Steep topographic conditions prevent a conventional bore because of bore pit grading/excavation requirements on both sides of the crossing.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Present, Unspecified	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. To E. Fork Coquille (BSI073)	1241551433636 Private	29.49	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small tributary. Steep topographic conditions prevent a conventional bore because of bore pit grading/excavation requirements on west side of the crossing.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Unknown	Coho Assumed	None	Jul 1 to Sep 15	Y*
Trib. To E. Fork Coquille (BSI076)	1239946431580 Private	29.53	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 3-4' intermittent tributary if flowing at the time of construction.	None	Unknown	possible	None	None	Jul 1 to Sep 15	Y*
East Fork Coquille River (BSP071)	1240773431063	29.88	Perennial Intermediate	Dry Open-Cut Level 1 [k/]	Project alignment was selected based on landowner negotiations and requirement to avoid landowner's air strip. Dry open-cut methods feasible/practical during low flow crossing period during ODFW in-water work window. Conventional bore is not practical because of significant grading/excavation requirements for bore pits. The river is deeply incised below stream banks requiring extensive pits for installation below streambed. Continued bore pit dewatering would be required to keep bore pits dry. A temporary bridge is also necessary to prevent entire spread move around. A crossing bridge will require bank grading for crossing access. An HDD is probable at the approximate crossing location based on the topography, geometry and expected geotechnical conditions. Significant HDD costs, HDD time requirements and the need for a crossing bridge were the determinants for the proposed dry-open cut crossing method.	• Oregon Coast ESU Coho, spawning, rearing, migration habitat T, CH	Spring Chinook, Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Cutthroat Trout	Chinook, Coho	Spring Chinook Rearing, Migration Fall Chinook Spawning, Rearing, Coho Rearing, Migration	Jul 1 to Sep 15	Y-1i
Trib. to E. Fork Coquille (Denied Access 11)	Private	30.21	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary if flowing at the time of construction	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to E. Fork Coquille (Denied Access 12)	Private	30.27	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. To E. Fork Coquille (BSI070)	1239583431522 BLM- Coos Bay District	31.64	Intermittent Minor	Dry Open-Cut	Small 1-wide intermittent headwater tributary, dry open-cut methods feasible/practical, if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*

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Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Elk Creek (BSP057)	1240218431116 Private	32.40	Perennial Minor	Dry Open-Cut Level 1 [k/]	Dry open-cut methods feasible/practical on small 8' wide tributary. Steep topographic conditions on north side of stream prevent a conventional bore because of grading/excavation requirements for bore pit. StreamNet data indicates anadromy below crossing (~ 1 mile). Waterbody is within the ¼ mile buffer of MAMU-occupied stand (C3098). Conflicts with ODFW-recommended in-water work periods are not expected based on proposed 2-year construction schedule. However, proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and installation of flumes or dams/pumps.	• Oregon Coast ESU Coho, assumed habitat T	Coho, Winter Steelhead,	Cutthroat Trout	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
Trib. To Elk Creek (BSP055)	1239513431370 Private	32.44	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 3-4' wide tributary. Waterbody is within the ¼ mile buffer of MAMU-occupied stand (C3098). Conflicts with ODFW-recommended in-water work periods are not expected based on proposed 2-year construction schedule. However, proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and installation of flumes or dams/pumps.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
Trib. To Elk Creek (BSP049)	1239524431250 Private	32.99	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 10' wide tributary. Topographic conditions on both sides of stream limit a conventional bore because of grading/excavation requirements for bore pits.	None	Assumed	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. To Elk Creek (BSP050)	1239482431284 Private	33.02	Perennial Minor	Adjacent to centerline within ROW (Streambed-bedrock) [12/]	Not crossed by pipeline centerline. Small 2' wide headwater tributary expected to be dry during construction. Trib. would be crossed at the same time as BSP049 at MP 32.99.	None	Assumed	Assumed	None	None	Jul 1 to Sep 15	Y*
South Fork Elk Creek (CSP005)	1239778431167 Private	34.46	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/] Level 2 [k/]	Dry open-cut methods feasible/practical on stream. Steep topographic conditions on both sides of stream prevent conventional bore crossing methods because of grading/excavation requirements for bore pits.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To S. Fork Elk Creek (BSI251)	1239155431070 BLM-Coos Bay District	35.51	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent headwater tributary, if flowing at time of construction. Crossing will occur adjacent to road where existing culvert is in place. This waterbody is located within an occupied MAMU-stand (C3093). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed 2-year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N (In existing road)
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501) Fifth field Watershed [8], Coos County, Oregon												
Trib. to Big Creek (BLM 35.87)	1239061430967 BLM-Coos Bay District	35.87	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater tributary, if flowing at time of construction. Crossing occurs within Elk Creek Road (BLM 28-11-29-0) and flows through a 12" culvert which will be replaced. Waterbody is within the ¼ mile buffer of MAMU-occupied stand (C3093). Conflicts with ODFW-recommended in-water work periods are not expected based on proposed 2-year construction schedule. However, proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream and to allow the removal of road culvert, installation of flumes or dams/pumps and replacement of the road culvert.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. To Big Creek (BLM 36.48)	1238985431032 BLM – Coos Bay District	36.48	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater tributary, if flowing at time of construction. This waterbody is located adjacent to an occupied MAMU-stand (C3073). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed 2-year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing to facilitate the crossing and allow the installation/removal of flumes or dams/pumps and to minimize the duration of instream work.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To Big Creek (GSI025/BSI253)	1238985431032 BLM-Coos Bay District	36.54	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent headwater tributary, if flowing at time of construction. No additional workspace required. ODFW fish passage barrier data reports a downstream boulder canyon with a 10-foot falls at upper end (RecordID 52488). StreamNet data indicates anadromy below crossing (~ 0.5 mile) at ODFW barrier 52488. This waterbody is located within an occupied MAMU-stand (C3073). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed 2-year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. To Big Creek (BLM 36.85)	BLM-Coos Bay District	36.85	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater tributary, if flowing at time of construction. Crossing occurs within Elk Creek Road (BLM 28-11-29-0) and flows through a 12-18" culvert which will be replaced. This waterbody is located within an occupied MAMU-stand (C3073). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed 2-year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing to facilitate the crossing and allow the installation/removal of flumes or dams/pumps and to minimize the duration of instream work.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*

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Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a]	Proposed Crossing Method Scour Level [b]	Waterbody Crossing Rationale [c]	ESA Species Present/Habitat [d]	Anadromous Species Present [e]	Resident Coldwater Species Present	EFH Species Present [f]	EFH Component Present [g]	Fishery Construction Window [e], [g]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To Big Creek (BSI252)	1238901431044 BLM-Coos Bay District	36.92	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater tributary, if flowing at time of construction. No additional workspace required. Alignment and trib. crossing along existing road. ODFW fish passage barrier data reports a downstream boulder canyon with a 10 foot falls at upper end (RecordID 52488). StreamNet data indicates anadromy below crossing (~ 1 mile) at ODFW barrier 52488. This waterbody is located within an occupied MAMU stand (C3073). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed 2-year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N (In existing road)
Trib. To Big Creek (ESI019)	1238846431056 BLM-Coos Bay District	37.33	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater tributary, if flowing at time of construction. No additional workspace required. ODFW fish passage barrier data reports a downstream boulder canyon with a 10 foot falls at upper end (RecordID 52488). StreamNet data indicates anadromy below crossing (~ 1 mile) at ODFW barrier 52488. StreamNet data indicates anadromy below crossing (~ 1 mile) at ODFW barrier 52488. This waterbody is located within an occupied MAMU stand (C3090). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed 2-year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.	None	Unknown	Cutthroat Trout Assumed	None	None	Jul 1 to Sep 15	Y*

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Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a]	Proposed Crossing Method Scour Level [b]	Waterbody Crossing Rationale [c]	ESA Species Present/Habitat [d]	Anadromous Species Present [e]	Resident Coldwater Species Present	EFH Species Present [f]	EFH Component Present [g]	Fishery Construction Window [e], [g]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To Big Creek (ESP020)	1238856431054 BLM-Coos Bay District	37.35	Perennial Intermediate	Dry Open-Cut Level 1 [k]	Dry open-cut methods feasible/practical on stream. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. Steep topography on both sides of stream prevents conventional bore crossing methods because of grading/excavation requirements for bore pits. No additional workspace proposed. ODFW fish passage barrier data reports a downstream boulder canyon with a 10 foot falls at upper end (RecordID 52488). StreamNet data indicates anadromy below crossing (~ 1 mile) at ODFW barrier 52488. This waterbody is located within an occupied MAMU-stand (C3090). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed 2-year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.	• Oregon Coast ESU Coho, Spawning, rearing habitat T	Coho	Cutthroat Trout Assumed	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Upper Rock Creek (BSP041)	1238692429883 Private	44.21	Perennial Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on stream. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. Steep topography on both sides of stream prevents conventional bore crossing methods because of grading/excavation requirements for bore pits. ODFW fish passage barrier data indicated two potential downstream falls may limit passage one report as 6-8 feet (RecordID 52484). StreamNet data indicates anadromy below crossing (~ 6 miles) at ODFW barrier RecordID 52484.	None	None	Cutthroat Trout Assumed	None	None	Jul 1 to Sep 15	Y
Klamath Mountains Ecoregion, Coquille Sub-basin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501) Fifth field Watershed [a], Douglas County, Oregon												
Deep Creek (BSP257)	1237088430546 BLM – Roseburg District	48.27	Perennial Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on broad stream and associated wetlands. ODFW fish passage barrier data (Recordid 56033) reports downstream falls on the Middle Fork Coquille River restrict anadromy at crossing.	None	Unknown	Cutthroat Trout Assumed	None	None	Jul 1 to Sep 15	N

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Middle Fork Coquille River (BSP030)	1241173430339 Private	50.28	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/] Level 1 [b/]	Dry open-cut methods feasible/practical on broad stream during low flows within ODFW in-water work windows. ROW has been necked down to 75 feet and TEWAs located in existing cleared areas to minimize riparian impacts. ODFW fish passage barrier data (RecordID 56033) reports downstream falls on the Middle Fork Coquille River restrict anadromy at crossing. StreamNet data also indicates duplicates this anadromy restriction at this barrier.	None	Unknown	Cutthroat Trout Assumed	None	None	Jul 1 to Sep 15	Y-1i
Trib. to Middle Fork Coquille (GDX36/BSI066)	1236800430537 Private	50.45	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-4' wide intermittent ditched tributary in ag field if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Belieu Creek (BSP061/GSI037)	1236823430366 Private	50.74	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide headwater tributary. Steep topography on west side of crossing prevents conventional bore because of grading/excavation requirements for a bore pit. ODFW fish passage barrier data (RecordID 56033) reports downstream falls on the Middle Fork Coquille River restrict anadromy at the crossing.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. to Middle Fork Coquille (GSI038)	1236690430555 BLM-Roseburg District	51.02	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-4' wide intermittent headwater tributary if flowing at time of construction. No additional workspace required.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y
Klamath Mountains Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Olalla Creek-Lookingglass Creek (HUC 1710030212) Fifth field Watershed [h/], Douglas County, Oregon												
Trib. to Shields Creek (BSI202)	1235858430773 Private	55.90	Intermittent Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on intermittent tributary if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Shields Creek (BSI203)	1235796430789 Private	55.94	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 8' wide intermittent tributary if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Shields Creek (Denied Access 13)	1235757430747 Private	56.28	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3-4' wide intermittent tributary if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Shields Creek (Denied Access 14)	1235785430811 Private	56.34	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3-4' wide intermittent tributary if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek (BSI140)	1235535430633 Private	57.11	Intermittent Minor	Dry Open-Cut (Streambed – bedrock) [12/]	Dry open-cut methods feasible/practical on small intermittent tributaries if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek (BSI140)	1235535430633 Private	57.14	Intermittent Minor	Dry Open-Cut (Streambed – bedrock) [12/]	Dry open-cut methods feasible/practical on small intermittent tributaries if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek (BSI138)	1235535430633 Private	57.31	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide intermittent tributary if flowing at time of construction. ROW has been necked down to 75 feet and TEWAs located in existing cleared areas to minimize riparian impacts.	• Oregon Coast ESU Coho, assumed habitat T	Unknown	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Olalla Creek (BSI147/EE012)	1235479430651 Private	57.84	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent tributary if flowing at time of construction. ROW has been necked down to 75 feet and TEWAs located in existing cleared areas to minimize riparian impacts.	• Oregon Coast ESU Coho, assumed habitat T	Unknown	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek (BSI151)	1235422430690 Private	58.20	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent tributary if flowing at time of construction. ROW has been necked own to 75 feet and TEWAs located in existing cleared areas to minimize riparian impacts.	• Oregon Coast ESU Coho, assumed habitat T	Unknown	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek (BSP159)	1235362430712 Private	58.55	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 10' wide tributary. ROW has been necked down to 75 feet and TEWA located in existing cleared area to minimize riparian impacts.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
Olalla Creek (BSP155)	1234905431631 Private	58.77	Perennial Intermediate	Dry Open-Cut Level 2 [b/]	Dry open-cut methods feasible/practical on broad stream during low flows within ODFW in-water work windows. (USGS Gage station 1431120 reports Mean of monthly discharge recording period 1956 to 1973 of 2.0, 0.52 & 0.77 cfs, respectively for Jul, Aug & Sep). TEWAs have been located in existing cleared areas to minimize riparian impacts.	• Oregon Coast ESU Coho, spawning, rearing, migration habitat T, CH	Coho, Winter Steelhead	Cutthroat Trout	Coho	Coho Spawning, Rearing, Migration	Jul 1 to Sep 15	Y-1i
Trib. to Olalla Creek (BSI132)	1235250430793 Private	59.29	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 9' wide intermittent tributary if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek (BSI129)	1235231430834 Private	59.65	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Present, Unspecified	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to McNabb Creek (NSP014)	1235104430875 Private	60.13	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 6' wide tributary. Extensive grading/excavation requirements limit feasibility of conventional bore methods.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
McNabb Creek (NSP013)	1235187430921 Private	60.49	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/] Level 1	Dry open-cut methods feasible/practical on tributary. TEWAs located in existing cleared areas to minimize riparian impacts.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Klamath Mountains Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Clark Branch-South Umpqua River (HUC 1710030211) Fifth field Watershed [h/], Douglas County, Oregon												
Kent Creek (BSP240)	1234390431042 Private	63.95	Perennial Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on broad stream during low flows within ODFW in-water work windows. Steep topographic conditions on both sides of the stream prevent conventional bore methods because of extensive grading/excavation requirements for bore pits	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Trib. to Kent Creek (BSI241)	1234490430771 Private	63.95	Intermittent Minor	Adjacent to centerline within ROW Level 1	Not crossed by centerline. Small intermittent tributary expected to be dry during construction and will be restored to approximate original contour and grade during restoration.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	N (can be avoided)

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Rice Creek (BSP227)	1234142430839 Private	65.76	Perennial Major	Dry Open-Cut (Streambed-bedrock) [12/] Level 1	Dry open-cut methods feasible/practical during low flows periods within ODFW in-water work windows. Alignment is defined by residential development in immediate area. ROW has been necked down to 75 feet and TEWAs located in cleared areas to minimize riparian disturbances.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Trib. to Willis Creek (BSI230)	1233983430694 Private	66.87	Intermittent Minor	Adjacent to centerline within ROW (Streambed-bedrock) [12/]	Not crossed by centerline, 2' wide intermittent tributary expected to be dry during summer construction period. Tributary will be restored to approximate original contour and grade during restoration.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Willis Creek (BSP168)	1233989430788 Private	66.95	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/] Level 1	Dry open-cut methods feasible/practical during low flows periods within ODFW in-water work windows. ROW has been necked down to 75 feet and TEWAs located in cleared areas to minimize riparian disturbances.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y-1i
Trib. to Willis Creek (BSI169)	1233982430692 Private	67.00	Intermittent Intermediate	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small intermittent tributary, if flowing at time of construction.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-100-011)	Private	69.10	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Small intermittent headwater tributary expected to be dry during construction and will be restored to approximate original contour and grade during restoration.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Trib. to South Umpqua River (SS-100-012)	Private	69.28	Perennial Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical during low flows periods within ODFW in-water work windows. No TEWAs are proposed to minimize riparian and landowner impacts.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-100-013)	Private	69.35	Perennial Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical during low flows periods within ODFW in-water work windows. No TEWAs are proposed to minimize landowner impacts.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-100-014)	Private	69.57	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on 2'to 3' foot wide headwater tributary which is expected to be dry at the time of construction. If flowing, crossing would be completed during low flows periods within ODFW in-water work windows.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-100-015)	Private	71.11	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary which is expected to be dry at the time of construction. Crossing would be completed during low flows periods within ODFW in-water work windows. Tributary is within required laydown area for the Direct Pipe crossing of the South Umpqua River.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*

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South Umpqua River (BSP026)	1234460432680 Private	71.30	Perennial Major	Direct Pipe Level 2 [k/]	The Direct Pipe crossing method has been evaluated and determined to be feasible at the proposed crossing location. The proposed alignment has been rerouted to facilitate the crossings of I-5, South Umpqua River, Dole Road, and the railroad using a single Direct Pipe crossing. Because of subsurface geotechnical conditions the HDD crossing method has been determined to be infeasible. This crossing method/location avoids the need to use a diverted open cut to cross the South Umpqua River on the 2009 FEIS route or an open cut crossing on Reroute 67.6.	• Oregon Coast ESU Coho, migration habitat T, CH	Spring Chinook, Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Present, unspecified	Chinook, Coho	Spring Chinook-Migration Fall Chinook Spawning, Rearing, Migration Coho Migration	Jul 1 to Aug 31	N
Trib. to South Umpqua River (SS-100-016)	Private	71.37	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. This waterbody passes through a culvert on a road which is encompassed by TEWA 71.25 which would not affect the waterbody.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Trib. to South Umpqua River (SS-100-017)	Private	71.69	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Small intermittent headwater tributary expected to be dry during construction and will be restored to approximate original contour and grade during restoration.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Trib. to South Umpqua River (SS-100-018)	Private	72.82	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on 2'to 3' foot wide headwater tributary which is expected to be dry at the time of construction. If flowing, crossing would be completed during low flows periods within ODFW in-water work windows.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-100-019)	Private	72.96	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on 2'to 3' foot wide headwater tributary which is expected to be dry at the time of construction. If flowing, crossing would be completed during low flows periods within ODFW in-water work windows.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-100-021)	Private	73.21	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on 2'to 3' foot wide headwater tributary which is expected to be dry at the time of construction. If flowing, crossing would be completed during low flows periods within ODFW in-water work windows.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-100-020)	Private	73.41	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on 2'to 3' foot wide headwater tributary which is expected to be dry at the time of construction. If flowing, crossing would be completed during low flows periods within ODFW in-water work windows.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Richardson Creek (SS-100-022)	Private	74.03	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on 2'to 3' foot wide headwater tributary which is expected to be dry at the time of construction. If flowing, crossing would be completed during low flows periods within ODFW in-water work windows.	• Oregon Coast ESU Coho, assumed habitat T	Unknown	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*

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Klamath Mountains Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Myrtle Creek (HUC 1710030210) Fifth field Watershed [h/]; Douglas County, Oregon												
Bilger Creek (BSP001)	1232578430422 Private	76.38	Perennial Minor	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on small 6' wide tributary. ROW necked down and TEWAs set in existing cleared areas to minimize riparian impacts. ODFW fish passage barrier data indicate two potential downstream barriers (RecordID 2571 & 2603).	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Little Lick (BSP006)	1232235430457 Private	77.71	Perennial Minor	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on small 7' wide tributary. No additional workspace required. Steep topographic conditions make a conventional bore impractical because of extensive grading/excavation requirements as well as subsequent riparian disturbance.	• Oregon Coast ESU Coho, assumed habitat T	Unknown	Present, unspecified	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
Trib. to Little Lick Creek (BSI008)	1232244430631 Private	77.93	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical intermittent tributary if flowing at time of construction. The tributary within the TEWA would be matted and silt fenced installed as necessary to minimize disturbance and the potential for sedimentation.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y*
Trib. to Little Lick Creek (BSI010)	1232239430620 Private	78.02	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical small 2' wide intermittent tributary if flowing at time of construction. The tributary within the TEWA would be matted and silt fenced installed as necessary to minimize disturbance and the potential for sedimentation.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y*
North Myrtle Creek (NSP037)	1232963430229 Private	79.12	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/] Level 2 [b/]	Dry open-cut methods feasible/practical during low flow periods within ODFW in-water work window. (USGS Gage Station 14311000 records mean monthly flow as 5.8, 3.5 & 5.1 cfs respectively for Jul, Aug & Sep). ROW necked down to 75' to minimize riparian impacts.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Trib. to North Myrtle Creek (NSP038)	1232040430551 Private	79.15	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 8.0' wide trib. if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
South Myrtle Creek (BSP172)	1232847430231 Private	81.19	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/] Level 2 [b/]	Dry open-cut methods feasible/practical during low flow periods within ODFW in-water work window. (USGS Gage Station 14310700 records mean monthly flow as 5.6, 3.2 & 5.0 cfs, respectively for Jul, Aug & Sep). ROW necked down to 75' and TEWAs placed in existing cleared areas where feasible to minimize riparian impacts. Conventional bore not feasible/practical because of grading/excavation requirements on north side of stream.	• Oregon Coast ESU Coho, spawning, rearing, migration habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing,	Jul 1 to Sep 15	Y-1i
Trib. to S. Myrtle Creek (BSP259)	1231856430317	81.40	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2.0' wide trib. if flowing at time of construction.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. to S. Myrtle Creek (SS-100-023)	Private	81.45	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Small intermittent tributary expected to be dry during construction and will be restored to approximate original contour and grade during restoration.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N

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Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to S. Myrtle Creek (SS-100-024)	Private	81.78	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Tributary is within UCSA and will not be affected; headwater tributary expected to be dry during construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Klamath Mountains Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Days Creek-South Umpqua River (HUC 1710030205) Fifth field Watershed [h/], Douglas County, Oregon												
Wood Creek (BSP226)	1231503429810 Private	84.18	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12/] Level 1 [k/]	Dry open-cut methods feasible/practical on small 8' wide stream. Steep topographic conditions on either side of waterbody prevent conventional bore. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. StreamNet data indicates anadromy below crossing (~ 1 mile).	None	None	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. to Fate Creek (BSI236)	1231019429928 Private	88.20	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small intermittent ditched trib. if flowing at time of construction. Appropriate BMPs would be installed to minimize disturbance/sedimentation if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Fate Creek (BSP232)	1231028429873 Private	88.48	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/] Level 1 [k/]	Dry open-cut methods feasible/practical on 12' wide stream. Stream flow expected to be insignificant during low flow periods within ODFW in-water work period. TEWAs placed in existing cleared areas and alignment selected to minimize riparian impacts. ODFW fish passage barrier data indicates that immediately downstream of crossing (RecordID 2602): "Gabion below forms pool and creates a probable impassable juvenile barrier. Adults may pass at higher flows. Additional STEP work above culvert" A conventional bore is probable based on topography and geometry but geotechnical investigations have not been completed to confirm. A bridge is required at the crossing which would require bank grading for access. Significant costs, time requirements and the need for a bridge were the determinants for the proposed dry open-cut crossing method. Significant cultural resource sites occur in the area and a dry open-cut crossing will minimize excavation/grading disturbance compared to conventional bore.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Days Creek (BSP233)	1231699429713 Private	88.60	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/] Level 1 [b/]	Dry open-cut methods feasible/practical on stream during low flow periods within ODFW in-water work window. (USGS Gage Station 14308700 records mean monthly flow as 2.2, 1.0 & 1.5 cfs, respectively for Jul, Aug & Sep). The ROW has been necked down to 75' and TEWAs located in previously disturbed areas to minimize riparian impacts. A conventional bore is probable based on topography and geometry but geotechnical investigations have not been completed to confirm. A bridge is required at the crossing which would require bank grading for access. Significant costs, time requirements and the need for a bridge were the determinants for the proposed dry open-cut crossing method. Significant cultural resource sites occur in the area and a dry open-cut crossing will minimize excavation/grading disturbance compared to conventional bore.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y-1i
Cascades Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Days Creek-South Umpqua River (HUC 1710030205) Fifth field Watershed [h/, i/], Douglas County, Oregon												
Saint John Creek (ASP303)	1230596429295 Private	92.62	Perennial Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical during low flow periods within ODFW in-water work window. Steep topographic conditions on either side of creek prevent conventional bore. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate issues/risk of threading pipe string under flume within the incised valley.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y-1i

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
South Umpqua River (ASP196)	1234460432680 Private	94.73	Perennial Major	Diverted Open-Cut Level 2 [k/]	Diverted open-cut methods feasible/practical during low flow periods within ODFW in-water work window. (USGS Gage Station 143308600 records mean monthly flow as 168, 91 & 110 cfs, respectively for Jul, Aug & Sep). ROW and TEWAs locations primarily affect shrub vegetation. Temporary bridge required at crossing because the existing bridge at Milo is not expected to handle project weight limits. Heavy equipment access from the south is restricted by topographic constraints therefore temporary bridge at crossing is critical to facilitate construction (i.e., movement of materials and equipment along ROW). Because of geometry and topographic conditions, the only feasible HDD alignment required the alignment to pass immediately adjacent to the north side of the Milo Academy. From the exit point on the east side of the academy the route then needed to circle back to the west passing immediately adjacent to the south side of the academy. The HDD alignment ultimately required the academy to be encircled by the pipeline on three sides. This alignment would extensively encumber the academy and was determined to be impractical. A conventional bore is feasible based on topography and geometry but geotechnical investigations have not been completed to confirm. If subsoils are similar as surface conditions (cobbles), a bore would be infeasible. Because a bridge is required at the crossing which would require bank grading for access the diverted open-cut crossing method was selected as most appropriate crossing method based on feasibility/practicality and the method with the least risk.	• Oregon Coast ESU Coho, spawning, rearing, migration habitat T, CH	Spring Chinook, Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Cutthroat Trout	Chinook, Coho	Spring Chinook Migration Fall Chinook Spawning, Rearing, Migration Coho Rearing, Migration	Jul 1 to Aug 31	Y-1i with mid-stream support
Trib. to South Umpqua River (ASI193)	1230382429323 Private	94.85	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary if flowing at the time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Unknown	Unknown	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (ASI193)	1230382429323 Private	95.03	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua (ASI190)	1230197429036 BLM – Roseburg District	98.46	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 2-4' wide intermittent tributary (ditch) if flowing at the time of construction	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Cascades Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Upper Cow Creek (HUC 1710030206) Fifth field Watershed [h/], Douglas County, Oregon												
Trib. to East Fork Cow Creek (GW014/FS-HF-C)	1229383427835 Forest Service – Umpqua NF	109.17	Perennial (FS – Interpretation) Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small headwater wetland/tributary-if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*

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Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a]	Proposed Crossing Method Scour Level [b]	Waterbody Crossing Rationale [c]	ESA Species Present/Habitat [d]	Anadromous Species Present [e]	Resident Coldwater Species Present	EFH Species Present [f]	EFH Component Present [g]	Fishery Construction Window [e], [g]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to East Fork Cow Creek (GSI016/FS-HF-F)	1229369427819 Forest Service – Umpqua NF	109.33	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide headwater intermittent tributary if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
East Fork Cow Creek (GSP019/FS-HF-G)	1229918428021 Forest Service – Umpqua NF	109.47	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small headwater stream during low flow periods within ODFW in-water work period. No additional work areas proposed.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y
East Fork Cow Creek (GSP022/FS-HF-G ASP297)	1229918428021 Forest Service – Umpqua NF	109.69	Perennial Intermediate	Adjacent to centerline within TEWA	Not crossed by centerline. Waterbody flows through culvert on road which is encompassed by TEWA 109.68-N. This TEWA was selected for parking/staging as well as for potential mitigation to remove the culvert if the road is not required.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	N
Trib. to East Fork Cow Creek (FS-HF-J/AW298)	1229332427779 Forest Service – Umpqua NF	109.69	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' headwater tributary. ROW necked down to 75' and TEWAs only utilized on north side of creek to minimize riparian impacts. Steep topographic conditions prevent a conventional bore because of extensive grading/excavation requirements.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y
Trib. to East Fork Cow Creek (FS-HF-K/AW299)	1229332427781 Forest Service – Umpqua NF	109.78	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2-4' headwater tributary. ROW necked down to 75' and no TEWAs utilized to minimize riparian impacts.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y
Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), Upper Cow Creek (HUC 1710030206) Fifth field Watershed [h], Jackson County, Oregon												
Trib. to East Fork Cow Creek (ESI068/FS-HF-N)	Forest Service – Umpqua NF	110.98	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2-4' headwater tributary which is expected to be dry at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Cascades Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Trail Creek (HUC 1710030706) Fifth field Watershed [h], Jackson County, Oregon												
Trib. to W. Fork Trail Creek (ESI068)	Forest Service – Umpqua NF	110.76	Intermittent Minor	Adjacent to centerline within TEWA 110.73	Small 1-2' wide ephemeral drainage located Peavine Quarry within TEWA; drainage to be avoided by construction; drainage expected to be dry during construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	N –to be avoided
West Fork Trail Creek (ASP202)	1228425426750 Private	118.89	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 2 [b]	Dry open-cut methods practical/feasible during low flow periods during ODFW in-water work window. ROW necked down to 75' and TEWAs located in previously disturbed areas to minimize riparian impacts.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead, Winter Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y
Trib. to Trail Creek (RS019)	1228364426705 BLM-Medford District	119.83	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide intermittent headwater tributary if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Trail Creek (Denied Access16)	1228364426705 Private	119.90	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater tributary if flowing at the time of construction (Denied Access).	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Canyon Creek (NSP011)	1228328426655 BLM-Medford District	120.45	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12] Level 1	Dry open-cut methods feasible/practical on small 7' wide tributary during low flow periods within ODFW in-water work window. Only UCSAs utilized at crossing to minimize impacts to riparian areas.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y
Trib. to Trail Creek (ASI205)	1228233426599 Private	120.92	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6' wide intermittent headwater tributary if flowing at the time of construction. No additional workspace required.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*

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Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a]	Proposed Crossing Method Scour Level [b]	Waterbody Crossing Rationale [c]	ESA Species Present/Habitat [d]	Anadromous Species Present [e]	Resident Coldwater Species Present	EFH Species Present [f]	EFH Component Present [g]	Fishery Construction Window [e], [g]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Trail Creek (ASI206)	1228173426535 Private	121.58	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on 12' wide intermittent tributary if flowing at the time of construction. No additional workspace required.	• SONCC Coho, spawning, rearomg habitat T, CH	Coho	Unknown	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y*
Cascades Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Shady Cove-Rogue River (HUC 1710030707) Fifth field Watershed [h], Jackson County, Oregon												
Trib. to Cricket Creek (ESI071)	1228054426435 Private	121.87	Intermittent Minor	Adjacent to centerline within ROW	Small 1' wide ephemeral stream expected to be dry during construction when the Rogue River HDD pullback would cross this tributary. Rollers would be used to span tributary with HDD pullback string.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Cricket Creek (ESI070)	1228054426435 Private	121.89	Intermittent Minor	Adjacent to centerline within ROW	Small 7' wide intermittent stream expected to be dry during construction when the Rogue River HDD pullback would cross this tributary. Rollers would be used to span tributary with HDD pullback string.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Cricket Creek (ESI072)	1228054426435 Private	121.93	Intermittent Minor	Adjacent to centerline within ROW	Small 2' wide ephemeral stream expected to be dry during construction when the Rogue River HDD pullback would occur, however this drainage would be avoided by construction activities.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Cricket Creek (ESI073)	1228054426435 Private	121.94	Intermittent Minor	Adjacent to centerline within ROW	Small 2' wide ephemeral stream expected to be dry during construction when the Rogue River HDD pullback would occur, however this drainage would be avoided by construction activities.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Cricket Creek (ESI074)	1228054426435 Private	122.09	Intermittent Minor	Adjacent to centerline within ROW	Small 2' wide ephemeral stream expected to be dry during construction when the Rogue River HDD pullback would occur.	None	Unknown	Unknown			Jun 15 to Sep 15	Y*
Rogue River (ASP235)	1244292424210 Private	122.65	Perennial Major	HDD Level 2 [k]	HDD feasible based on geometry, topography and geotechnical conditions along proposed alignment. Primary HDD activities are significantly set back from crossing and would not be visible from the highway or the river Conventional bore not feasible/practical because highway and topographic constraints on the west side of the crossing Dry open-cut or diverted open-cut methods not practical/feasible based on flow and channel characteristics (USGS Gage Station 14339000 records mean monthly flow as 2,170, 2,160 and 1,710 respectively for Jul, Aug & Sep).	• SONCC Coho, rearing, migration habitat T, CH	Spring Chinook, Fall Chinook, Coho, Summer Steelhead, Winter Steelhead, Pacific Lamprey	Trout, unspecified	Chinook, Coho	Spring, Fall Chinook and Coho Rearing Migration	Jun 15 to Aug 31	N
Trib. to Indian Creek (ASI223)	1227634426166 Private	125.91	Intermittent Major	Dry Open-Cut	Dry open-cut methods feasible/practical on small <5' wide intermittent headwater tributary if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Indian Creek (ASI222)	1227628426207 Private	125.98	Intermittent Major	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide intermittent headwater tributary if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Indian Creek (RS004)	1227548426186 BLM-Medford District	126.50	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide intermittent headwater tributary if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*

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Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Indian Creek (ASI220)	1227541426191 BLM-Medford District	126.52	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent headwater tributary if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Indian Creek (ASI221)	1227834426001 BLM-Medford District	126.59	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide intermittent headwater tributary if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Indian Creek (RS003)	1227537426184 BLM-Medford District	126.59	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by the centerline. Small headwater tributary expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	N
Trib. to Indian Creek (ASI311)	1227537426184 Private	126.65	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater tributary if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Deer Creek (ASP307)	1227449425936 Private	128.49	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical during low flow periods within ODFW in-water work window. No additional workspace required. StreamNet data reports anadromy below crossing (~ 2 miles).	None	Unknown	Present, unspecified	None	None	Jun 15 to Sep 15	Y
Indian Creek (AW278)	1227370425935 Private	128.63	Perennial Minor	Dry Open-Cut Level 1 [b/]	Dry open-cut methods feasible/practical small < 10' wide stream low flow periods within ODFW in-water work window. Stream located in heavily grazed irrigated pasture and riparian vegetation consists of emergent pasture species. StreamNet data reports anadromy below crossing (~ 2 miles).	• SONCC Coho assumed habitat T, CH	Assumed	Present, unspecified	Coho Assumed	Unknown	Jun 15 to Sep 15	Y
Trib. To Indian Creek (ASP310)	1227366425936 Private	128.70	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical small 5' wide ditch tributary located in heavily grazed irrigated pasture. StreamNet data reports anadromy below crossing (~ 2 miles).	None	Unknown	Present, unspecified	None	None	Jun 15 to Sep 15	Y
Trib. To Indian Creek (AW309)	BLM-Medford District	128.89	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 10 wide intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y
Trib. To Indian Creek (ASI400)	BLM-Medford District	129.13	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3-4' wide intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. To Indian Creek (ASI306)	BLM-Medford District	129.21	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by centerline. Small headwater tributary expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	N
Trib. to Indian Creek (ASI277)	1227196425923 Private	129.48	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3-4' wide intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Cascades Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Big Butte Creek (HUC 1710030704) Fifth field Watershed [h/], Jackson County, Oregon												
Trib. to Neil Creek (AW245)	Private	130.84	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by centerline. Small tributary expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Neil Creek (AW244)	Private	130.85	Intermittent Major	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small < 10' wide intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*

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Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a]	Proposed Crossing Method Scour Level [b]	Waterbody Crossing Rationale [c]	ESA Species Present/Habitat [d]	Anadromous Species Present [e]	Resident Coldwater Species Present	EFH Species Present [f]	EFH Component Present [g]	Fishery Construction Window [e], [g]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Neil Creek (ASI246)	1226986425909 Private	130.89	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide intermittent headwater trib. if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Neil Creek (ASI250)	1226855425888 BLM-Medford District	131.55	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide intermittent headwater trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Neil Creek (ASI251)	1226826425841 BLM-Medford District	131.72	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide intermittent headwater tributary.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Neil Creek (ASP252)	1226711425881 Private	132.00	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 1	Dry open-cut methods feasible/practical during low flow within ODFW in-water work window. ROW narrowed to 75 feet and TEWAs placed in pasture to minimize riparian impacts.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y
Quartz Creek (ASI265)	1226814425828 Private	132.75	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 2' wide intermittent stream if flowing at the time of construction.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y*
Trib. to Quartz Creek (AW264)	Private	132.77	Intermittent Intermediate	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small intermittent stream/wetland, if flowing at the time of construction. ROW necked down to 75' and TEWAs set back to minimize riparian impacts.	• SONCC Coho possible habitat T, CH	Coho possible	Unknown	Coho possible	Unknown	Jun 15 to Sep 15	Y*
Trib. to Quartz Creek (ASP241)	1226739425651 BLM-Medford District	133.35	Perennial Intermediate	Dry Open-Cut	Tributary will likely be crossed with the bore of the Medford Aqueduct.	• SONCC Coho assumed habitat T	Unknown	Assumed	Coho Assumed	Unknown	Jun 15 to Sep 15	Y*
Medford Aqueduct Ditch 3 (ASP240)	1228043424382 BLM-Medford District	133.38	Perennial Intermediate	Conventional Bore	Proposed conventional bore feasible/practical based on flow volume, channel geometry and potential risk in disturbing man-made aqueduct. Dry open cut feasible	• SONCC Coho assumed habitat T	Unknown	Assumed	Coho Assumed	Unknown	Jun 15 to Sep 15	Y
Cascades Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Little Butte Creek (HUC 1710030708) Fifth field Watershed [h], Jackson County, Oregon												
Whiskey Creek (ASI207)	1226599424838 Private	137.48	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 10' wide intermittent headwater stream if flowing at the time of construction. ROW necked down to 75' and TEWAs set back to minimize riparian impacts.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI208)	1226422425032 Private	138.26	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 10' wide intermittent headwater stream if flowing at the time of construction.	None	None	Present, unspecified	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI210)	1226367425084 Private	138.45	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small <10' wide intermittent headwater stream if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI211)	1226343425011 Private	138.71	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 7' wide intermittent headwater stream if flowing at the time of construction. No additional workspace required.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI214)	1226268425015 Private	139.15	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 7' wide intermittent headwater stream if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Stock Pond (AL215)	Private	139.17	Stock pond N/A	Dry Open-Cut	Man-made stock pond to be reconstructed after construction	None	None	None	None	None	Jun 15 to Sep 15	Y*

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Lick Creek (ASI216)	1226260425019 Private	139.19	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater stream if flowing at the time of construction. No additional workspace required.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI216)	1226260425019 Private	139.21	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater stream if flowing at the time of construction. No additional workspace required.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI217)	1226395424936 Private	139.39	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater stream if flowing at the time of construction. No additional workspace required.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI226)	1226220424994 Private	139.59	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 7' wide intermittent headwater stream if flowing at the time of construction. ROW necked down to 75 feet and TEWAs located in existing disturbed pasture to minimize riparian impacts.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI227)	1226220424994 Private	139.63	Intermittent Intermediate	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 1-2' wide intermittent headwater stream if flowing at the time of construction. ROW necked down to 75 feet and no TEWAs utilized to minimize riparian impacts.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI228)	1226220424994 Private	139.68	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent headwater drainage if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI229)	1226220424994 Private	139.72	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by centerline. Small intermittent headwater drainage not expected to be flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI232)	1226295424937 Private	139.83	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide intermittent headwater drainage if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Lick Creek (ASI233)	1226975424638 BLM-Medford District	140.26	Intermittent Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on intermittent drainage if flowing at the time of construction. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. ROW necked down to 75' and TEWAs set back to minimize riparian impacts. StreamNet data indicates anadromy below crossing (~ 2 miles)	• SONCC Coho assumed habitat T	Assumed	Trout, unspecified	Coho Assumed	Unkown	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI189)	1226125424921 Private	140.58	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction. No additional workspace required.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Salt Creek (ASI187)	1226075424805 BLM-Medford District	141.17	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction. No additional workspace required.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Salt Creek (ASI188)	1226059424757 BLM-Medford District	141.44	Intermittent Intermediate	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*

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Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Salt Creek (RS017)	1226059424757 BLM-Medford District	141.49	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent headwater trib., if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Salt Creek (ESI030)	1226069424718 BLM-Medford District	141.95	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6' wide intermittent headwater trib. if flowing at the time of construction. No additional workspace required.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Salt Creek (ESI031)	1226114424647 Private	142.36	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater trib. if flowing at the time of construction. Altered trib. part of pasture irrigation system.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Salt Creek (ESP034)	1226522424385 Private	142.57	Perennial Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on creek during low flow period within ODFW in-water work window. ROW necked down to 75' and TEWAs located in existing disturbed pasture to minimize riparian impacts. Bore not practical because both bore pits would be located in wetland likely requiring significant dewatering efforts to access bore pits.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y
Trib. to Salt Creek (ESI037)	1226145424620 Private	143.10	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent headwater trib. if flowing at the time of construction.	None	None	Trout, unspecified	None	None	Jun 15 to Sep 15	Y*
Trib. to Long Branch Creek (ESI038)	1225948424477 Private	143.47	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Long Branch Creek (ESI039)	1225959424522 Private	143.71	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Stock Pond (EL041)	Private	143.73	Stock Pond N/A	Adjacent to centerline within ROW	Man-made pond expected to be dry at the time of construction and the pond will be reestablished after construction	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Long Branch Creek (ESI038)	1225948424477 Private	143.73	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by centerline. Intermittent drainage on very edge of TEWA; likely can be avoided during construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	N
Trib. to Long Branch Creek (ESI040)	1225957424527 Private	143.74	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Long Branch Creek (ESI038)	1225948424477 Private	144.11	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide intermittent headwater trib. if flowing at the time of construction.	• SONCC Coho, assumed habitat T	Coho Assumed Summer Steelhead	Assumed	Coho Assumed	Unknown	Jun 15 to Sep 15	Y*
Trib. to S. Fork Long Branch (GSP005/ESP048)	1225946424357 Private	144.70	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction.	• SONCC Coho assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jun 15 to Sep 15	Y
South Fork Long Branch Cr (GPS006/ESP059)	1226063424364 Private	145.27	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to S. Fork Long Branch (ESI061)	11225996424261 Private	145.54	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*

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Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat[d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
North Fork Little Butte Creek (ESP066)	1226154424196 Private	145.69	Perennial Intermediate	Dry Open-Cut Level 2 [b/]	Dry open-cut methods feasible/practical on stream during ODFW in-water work window. USGS Gage Station 1434300 reports that mean monthly flow are 89, 111, 105 and 67 for Jun, Jul, Aug and Sep, respectively. Flows in Jul and Aug are highest yearly flow periods for creek. TEWA set back and located primarily in previously disturbed (pastures) areas to minimize riparian impacts.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead, Winter Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y-1i with mid-stream support
Trib. to N. Fork Little Butte Creek (ESI056)	1225859424250 Private	146.05	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib, if flowing at the time of construction. No additional workspace required.	• SONCC Coho possible habitat T	Coho possible	Unknown	Coho possible	Unknown	Jun 15 to Sep 15	Y*
Trib. to N. Fork Little Butte Creek (ESI055)	1225855424210 Private	146.38	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide intermittent trib. if flowing at the time of construction.	• SONCC Coho possible habitat T	Coho possible	Unknown	Coho possible	Unknown	Jun 15 to Sep 15	Y*
Trib. to N. Fork Little Butte Creek (ESI052)	1225847424179 Private	146.75	Intermittent Intermediate	Adjacent to ROW	Not crossed by centerline or ROW.	None	None	Unknown	None	None	Jun 15 to Sep 15	N
Stock Pond (AL169)	BLM-Medford District	152.33	Stock Pond N/A	Adjacent to TEWA 152.29-N	Stock pond not to be disturbed by construction activities.	None	None	None	None	None	Jun 15 to Sep 15	N
Eastern Slopes Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Little Butte Creek (HUC 1710030708) Fifth field Watershed [h/, i/], Jackson County, Oregon												
South Fork Little Butte Creek (ASP165)	1226154424195 Forest Service-Rogue River Siskiyou NF	162.45	Perennial Intermediate	Dry Open-Cut Level 1	Dry-open cut feasible and practical on creek. ODFW fish passage barrier data (RecordID 51163) indicates that downstream irrigation diversion dam/barrier (~ 0.5 miles): is unladdered and impassible. USGS Gage Station 14339500 – located below diversion reports monthly mean flow of 14, 12 and 11 cfs, respectively for Jul, Aug & Sep. ROW necked down to 75 feet and TEWAs set back to minimize riparian impacts.	None	None	Trout, unspecified	None	None	Jun 15 to Sep 15	Y-1i with mid-stream support
Daley Creek (ESI076)	1223666423096 Forest Service-Rogue River Siskiyou NF	166.21	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small headwater intermittent trib. if flowing at the time of construction.	None	None	Trout, Unspecified	None	None	Jun 15 to Sep 15	Y*
Eastern Slopes Ecoregion, Upper Klamath River (HUC 18010206) Sub-basin, Spencer Creek (HUC 1801020601) Fifth field Watershed [h/, i/], Klamath County, Oregon												
Spencer Creek (EW085)	1220277421487 Forest Service-Fremont-Winema NF	171.07	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 10' wide stream with associated wetland. ROW necked down 75 feet and TEWAs set back or located to the edge of existing road disturbance to minimize riparian and wetland impacts. Conventional bore not practical because of topographic conditions and grading/excavation requirements on the south side of creek.	None	None	Redband Trout Possible Brook Trout	None	None	Aug 1 to Sep 30	Y
Trib. to Spencer Creek (GSP007)	1221988422850 Forest Service-Fremont-Winema NF	171.57	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 2' wide intermittent trib/wetland. if flowing at the time of construction.	None	None	Unknown	None	None	Aug 1 to Sep 30	Y*
Trib. to Spencer Creek (EW107)	1221837422760 Forest Service-Fremont-Winema NF	172.48	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 10' wide intermittent trib. if flowing at the time of construction. ROW necked down 75 feet and TEWAs set back to minimize riparian and wetland impacts.	None	None	Unknown	None	None	Aug 1 to Sep 30	Y*

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Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Spencer Creek (ESI106)	Forest Service-Fremont-Winema NF	173.74	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 5' wide ephemeral trib. if flowing at the time of construction.	None	None	Assumed	None	None	Aug 1 to Sep 30	Y
Trib. to Spencer Creek (ESI069/GSI010)	BLM-Lakeview District	176.55	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 4' wide intermittent trib. if flowing at the time of construction.	None	None	Redband Trout Possible	None	None	Aug 1 to Sep 30	Y*
Clover Creek (EW103/GSI011)	11220820421968 Private	177.76	Intermittent Minor	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on small < 10' wide intermittent trib. if flowing at the time of construction. No additional workspace required.	None	None	Redband Trout	None	None	Aug 1 to Sep 30	Y*
Eastern Slopes Ecoregion, Upper Klamath River (HUC 18010206) Sub-basin, John C Boyle Reservoir-Klamath River (HUC 1801020602) Fifth field Watershed [h/], Klamath County, Oregon												
Trib. to Klamath River (ESI097)	1220000421555 Private	186.61	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent trib. if flowing at the time of construction. Intermittent stream feeds stock pond.	None	None	Unknown	None	None	Jul 1 to Jan 31	Y*
Trib. to Klamath River (ESI099)	1220000421555 Private	186.65	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Jan 31	Y*
Trib. to Klamath River (ESI100)	1220000421555 Private	186.74	Intermittent Intermediate	Dry Open-Cut	Small 2' wide intermittent tributary that runs adjacent to centerline within ROW. Tributary expected to be dry during construction and would be restored to approximate original contour and grade during restoration.	None	None	Unknown	None	None	Jul 1 to Jan 31	Y*
Eastern Slopes Ecoregion, Lost (HUC 18010204) Sub-basin, Lake Ewauna-Upper Klamath River (HUC 1801020412) Fifth field Watershed [h/], Klamath County, Oregon												
Trib. To Klamath River (ASI013/SS-100-025)	1219145421230 Private	188.90	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Jan 31	Y*
Weyerhaeuser Pond (AL034)	Private	196.77	Industrial Pond N/A	Adjacent to centerline within ROW	Pond will not be disturbed by construction activities. The pond may be used for discharge.	None	None	None	None	None	Jul 1 to Jan 31	N
Klamath River (ASP151)	1221913420005 State	199.38	Perennial Major	HDD Level 1	HDD feasible/practical based on river crossing width (~ 1000') flow volumes, topography, geotechnical and geometry conditions. Dry open-cut infeasible because of width and flow volume. USGS Gage Station 11507501 records mean monthly discharge of 1,190, 1,060, 1,120 cfs respectively for Jul, Aug, Sep.	• Lost River Sucker E, CH • Shortnose Sucker E, CH	Pacific Lamprey	Redband Trout, Endemic Klamath Fish Species	None	None	Jul 1 to Jan 31	N
Eastern Slopes Ecoregion, Lost (HUC 18010204) Sub-basin, Mills Creek-Lost River (HUC 1801020409) Fifth field Watershed [h/], Klamath County, Oregon												
Lost River (NSP001)	1212146420011 State	212.05	Perennial Major	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical during low flow periods during ODFW in-water work window. An HDD and conventional bore are likely probable at the approximate crossing location based on the topography, geometry and expected geotechnical conditions. Landowner restricted access for geotechnical investigations. Significant costs, time requirements were the determinants for the proposed dry open-cut method.	• Lost River Sucker E • Shortnose Sucker E	None	Endemic Klamath Fish Species	None	None	Jul 1 to Mar 31	Y-1i with mid-stream support
Unnamed Creek (ASI051)	1215715420597 Private	216.10	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6-12' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y i

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Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Unnamed Creek (ASI052)	1215715420597 Private	216.11	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y i
Unnamed Creek (ASI050)	1215715420596 Private	216.30	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y i
Unnamed Creek (ASI049)	1215677420606 Private	216.43	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y i
Trib. to D Canal (ASI136)	1215371420655 Private	218.09	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent trib. if flowing at the time of construction.	• Lost River Sucker potential E, • Shortnose Sucker potential E	None	Unknown	None	None	Jul 1 to Mar 31	Y i
Trib. to D Canal (ASI37)	1215384420611 Private	218.46	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12/]	Dry open-cut methods feasible/practical on small 3' wide intermittent trib. if flowing at the time of construction.	• Lost River Sucker potential E, • Shortnose Sucker potential E	None	Unknown	None	None	Jul 1 to Mar 31	Y i
Trib. to D Canal (ASI291)	1214908420305 Private	219.69	Intermittent Minor	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on small 1' wide intermittent trib. if flowing at the time of construction.	• Lost River Sucker potential E, • Shortnose Sucker potential E	None	Unknown	None	None	Jul 1 to Mar 31	Y i
Excavated Pond (NL116)	Private	219.70	Excavated Pond N/A	Off ROW – Temp Extra Workspace	Pond will not be disturbed by construction activities. The pond may be used for a water source for dust control.	None	None	None	None	None	Jul 1 to Mar 31	N
Unnamed Creek (ASI138)	1214569420610 Private	221.77	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide intermittent trib. if flowing at the time of construction.	• Lost River Sucker potential E, • Shortnose Sucker potential E	None	Unknown	None	None	Jul 1 to Mar 31	Y i
Pond (EL077)	Private	222.84	Pond N/A	Adjacent to centerline within ROW	Pond will not be disturbed by construction activities. The pond may be used for a water source for dust control.	None	None	None	None	None	Jul 1 to Mar 31	N
Trib. to V Canal (ESI050)	1214001420661 Private	224.95	Intermittent Minor	Adjacent to centerline within ROW	Intermittent trib. will not be disturbed by project disposal activities within county landfill/quarry.	• Lost River Sucker potential E, • Shortnose Sucker potential E	None	Unknown	None	None	Jul 1 to Mar 31	N
Trib. to V Canal (ESI051)	1214053420564 Private	224.95	Intermittent Minor	Adjacent to centerline within ROW	Intermittent trib. will not be disturbed by project disposal activities within county landfill/quarry.	• Lost River Sucker potential E, • Shortnose Sucker potential E	None	Unknown	None	None	Jul 1 to Mar 31	N
Trib. to V Canal (ASI140)	1214053420564 Private	225.07	Intermittent Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on intermittent trib. if flowing at the time of construction.	• Lost River Sucker potential E, • Shortnose Sucker potential E	None	Unknown	None	None	Jul 1 to Mar 31	Y*

a/ FERC waterbody definitions:
Minor = less than or equal to 10 feet wide
Intermediate = greater than 10 feet wide but less than or equal to 100 feet wide
Major = greater than 100 feet wide

b/ Level 1 and 2 waterbodies have been identified; all others are Level 0. According to GeoEngineers (2013d), channel migration is defined as the lateral movement, over time, of an entire channel segment perpendicular to the direction of stream flow; channel avulsion is the sudden abandonment of an active channel for a newly created or previously abandoned channel located on the floodplain; channel widening is defined as erosion and subsequent recession of one or both stream banks that widens the channel without changing the channel location; streambed scour is erosion of the streambed resulting in the development of deep pools and/or the systematic lowering of the channel floor elevation.
Level 0 = streams not likely subject to migration, avulsion and/or scour
Level 1 = streams with a moderate potential for migration, avulsion and/or scour
Level 2 = streams with a high potential for migration, avulsion and/or scour

TABLE O-2

Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Pacific Connector Pipeline Project

Waterbodies Crossed and Waterbody ID	Identification Number (LLID) and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [a/]	Proposed Crossing Method Scour Level [b/]	Waterbody Crossing Rationale [c/]	ESA Species Present/Habitat [d/]	Anadromous Species Present [e/]	Resident Coldwater Species Present	EFH Species Present [f/]	EFH Component Present [g/]	Fishery Construction Window [e/, g/]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None

c/ Dry open-cut crossing methods include Flume or Dam and Pump procedures. Dam and Pump methods would be utilized where streambed blasting is anticipated to eliminate blasting around the flume. The Dam and Pump crossing method is the preferred crossing procedure in steep incised drainage valleys where worker safety may be compromised when placing ("threading") the pipe string under the flume pipe and where there is a risk of upsetting the flume during this operation. The Dam and Pump crossing method is also the preferred crossing method on small streams under low flow conditions during the recommended ODFW-recommended in-water work period. Pacific Connector requests permission for temporary/short-term fish passage restriction when completing Dam and Pump crossings within the ODFW-recommended in-water work period.

d/ FWS, NMFS, and StreamNet. T = Threatened, E = Endangered, CH = Critical Habitat

e/ ODFW 2012a

f/ PFMC 1999; ODFW 2012a.

g/ Pacific Connector understands that fisheries' construction windows only apply to those waterbodies flowing at the time of construction and that the windows do not apply to HDD crossings.

h/ USGS Hydrologic Unit Codes.

i/ Key Watershed.

j/ ODFW-recommended in-water work window is from October 1 through February 15. Because of the extensive wetland location on the south side of the Coos River, Pacific Connector has scheduled the HDD during the dry season outside the in-water work window between August 1 and September 30 to minimize surface impacts within the saturated floodplain wetland.

k/ These sites were field reviewed and analyzed for potential migration, avulsion and/or scour (see GeoEngineers 2013d, Channel Migration and Scour Analysis).

l/ Streambed bedrock based on Pacific Connector's Wetland and Waterbody delineation surveys (see the Wetland Delineation Report, submitted as a standalone document). Streambed bedrock may require special construction techniques to ensure pipeline design depth. Special construction techniques may include rock hammering, drilling and hammering, or blasting. The need for blasting would be determined by the contractor and would only be initiated after ODFW blasting permits are obtained.

TABLE O-3

Special Status Marine Mammal and Terrestrial Wildlife Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a]				Expected Habitat	Documented or Suspected Occurrence [b]				Effect of Impact [d]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Mammals											
Preble's shrew *Sorex preblei*	SOC				Near streams in arid to semi-arid shrub/grassland and high elevation coniferous forests. Also in openings in coniferous forests and sagebrush; frequents sagebrush thickets and willow or aspen stands in moist parts of the Great Basin.	Klamath			No documented occurrences within project area; known to occur in northern portion of Klamath County.	MIIH	Modification of habitat, potential for injury, death, and disturbance.
Hoary bat *Lasiurus cinereus*		SV			Usually associated with montane boreal forests, although during spring and autumn migrations, species has been located in arid shrub-steppe. Forages over water, roads, and forest openings.	Coos Douglas Jackson Klamath			(T34S, R1W, Historical) associated with fringed myotis.	MIIH	Modification of habitat, potential for injury, death, and disturbance.
Pallid bat *Antrozous pallidus pacificus*	SOC	SV	SEN	SEN	Arid regions, open forest types, desert vegetation types. Uses cliff faces, caves, mines, bridges, tree cavities, or buildings for roosts.	Coos Douglas Jackson Klamath	CB-S LV-D MD-D RO-D	RRS-D UMP-S F-W-D	PV (T28S,R7W,S31; 1993): 1.6 miles (mi) NE of MP 55.92; PV (T28S,R6W,S20; 1994): 2.8 mi N of MP 64.75; PV (T28S,R6W,S32; 1983): 1.3 mi N of MP 64.75; PV (T29S,R6W,S3; 1994): 0.5 mi NW of MP 68.15; PV (T29S,R6W,S2; 1994): 0.1 mi N of MP68.99.	MIIH	Modification of foraging habitat and disturbance to foraging bats; potential for injury or death if roosting in fell tree or snag, or in rock outcrops removed for pipe.
Townsend's big-eared bat *Corynorhinus townsendii*	SOC	SC	SEN	SEN	Forested regions of the Cascade Mountains. Roosts in buildings, caves, mines, buildings, and bridges.	Coos Douglas Jackson Klamath	CB-D LV-D MD-D RO-D	RRS-D UMP-D F-W-D	Ben Irving Reservoir/RB (T29S,R7W,S17, 18, 19, 20; 1993): 1.2 mi S of MP 57.13; PV (T29S,R7W,S5; 1983): hibernaculum / Tenmile Mountain Cave approximately 0.9 mi NW of MP 58.13; PV (T29S,R6W,S2; 1994): 0.1 mi N of MP68.99; MD (T34S, R2E, S5; 1976): historic breeding site in large basalt cave 2.5 mi NE of MP 126.3; MD (T34S,R2E,S31; 1994): breeding site 2.2 mi E of MP 133.05.	MIIH	Potential disturbance to roosting or foraging bats.
Silver-haired bat *Lasionycteris noctivagans*	SOC	SV			Forested areas, especially older Douglas-fir (*Pseudotsuga menziesii*)/western hemlock (*Tsuga heterophylla*) forests. Also in ponderosa pine (*Pinus ponderosa*) forests. Forages over ponds and streams in the woods, finds a day roost under a flap of loose bark.	Coos Douglas Jackson Klamath			MD (T33S, R1W, 1993), F-W (T37S, R5E, 2002) associated with fringed myotis and pallid bat.	MIIH	Disturbance, modification of habitat.
California myotis *Myotis californicus*		SV			Occupy a variety of habitats including shrub-steppe, shrub desert, juniper, sagebrush, ponderosa pine forest, and Douglas fir forest.	Coos Douglas Jackson Klamath			MD (T39S, R5E, Historical), MD (T33S, R1W, 1993)	MIIH	Modification of habitat, potential for injury, death, and disturbance.
Small-footed myotis *Myotis ciliolabrum*	SOC				Cliffs and rocky canyons in arid grasslands and desert scrub, also in ponderosa pine and mixed conifer forests. Roosts and retreats in rock crevices, under boulders, and beneath bark. Hibernates in mines and caves.	Douglas Klamath				NI	Not documented in Project vicinity.
Long-eared myotis *Myotis evotis*	SOC				Forested habitats, especially forested edges including juniper woodlands, open areas in ponderosa pine woodlands, Douglas-fir, spruce, true fir, and subalpine forests as well as willow and alder forests along streams. Arid shrublands with roosting sites.	Coos Douglas Jackson Klamath			PV (2004): 2.8, 3.3 mi W of MP 33.77; CB (T28,R11,S36; 2004): 1.4 mi SW of MP 33.77; PV (T28S,R10W,S22; 2003): 0.8 mi N of MP 37.94; CB (T29S,R10W,S13; 1998): 2.15 mi SW of MP 43.94.	MIIH	Disturbance, modification of habitat.
Fringed myotis *Myotis thysanodes*	SOC	SV	SEN	SEN	Wide range of habitats, prefers forested or riparian areas. Within flying distance of forested areas. Roosts in decadent trees and snags, sometimes buildings.	Coos Douglas Jackson Klamath	CB-D LV-D MD-D RO-D	UMP-D RRS-D F-W-D	CB (T28, R11, S35; 2004): 1.7 mi SW of MP 33.77; PV (T28S,R10W, S22; 2003): 0.3 mi NE of MP 38.54; F-W (T37S,R5E,S34; 2002): 1.6mi NE of MP 170.0.	MIIH	Modification of foraging habitat, disturbance to foraging bats; potential for injury or death if roosting in fell tree or snag.
Long-legged myotis *Myotis volans*	SOC	SV			Coniferous forests, including Douglas-fir, true fir, Sitka spruce (*Picea sitchensis*), lodgepole pine (*Pinus contorta*), and ponderosa pine forests. Roosts in cliff faces, abandoned buildings, caves, mines.	Coos Douglas Jackson Klamath			PV (2004): 3.3 mi W of MP 33.77; CB (T28, R11, S35; 2004): 1.7 mi SW of MP 33.77; PV (T28S, R7W, S31; 1993): 1.3mi NE of MP 55.92; RO (T29S,R7W,S15; 1994): 1.8mi S of MP 58.53; PV (T29S,R6W,S2; 1994): 0.1mi N of MP68.99.	MIIH	Disturbance, modification of habitat.
Yuma myotis *Myotis yumanensis*	SOC				Riparian, desert scrub, moist woodlands, open forests. Frequents woodlands in western Oregon.	Coos Douglas Jackson Klamath			CB (T28S,R11W,S11; 1998): 0.6 mile NE of MP 29.84; PV/CB (T28,R10,S31; 1997): 1.7 mi SW of MP 35.8; CB (T29,R10,S6; 1997): 2.8mi SW of 35.8; CB (T29S,R10W,S13; 1998): 2.15mi SW of MP 43.94; RB (T29S,R7W,S20; 1994): 2.2mi S of MP 57.43; PV (T29S,R6W,S3; 1994): 0.5mi NW of MP 68.15; PV (T29S,R6W,S2; 1994): 0.1mi N of MP 68.99;	MIIH	Disturbance, modification of habitat.
Spotted bat *Euderma maculatum*		SV	SEN		Wide variety of habitat types ranging from ponderosa pine forests to desert water holes. Nests in cliff crevices.	Klamath	LV-S			NI	Very rare vagrant in Oregon, does not occur in Project vicinity.

TABLE O-3

Special Status Marine Mammal and Terrestrial Wildlife Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status[1/]				Expected Habitat	Documented or Suspected Occurrence[2/]				Effect of Impact[4/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area[3/]		
White-tailed jackrabbit *Lepus townsendii*		SV			Open regions such as sagebrush deserts and grasslands, and open areas in coniferous forests and alpine meadows.	Klamath				NI	Not documented in Project vicinity.
Pygmy rabbit *Brachylagus idahoensis*	SOC	SV	SEN	SEN	Tall dense clumps of sagebrush, also in greasewood. Deep, friable soils for burrows.	Klamath	LV-D	F-W-S	Klamath Falls (T38S,R9E; Historical)	NI	No currently known sites in Klamath County.
Gold Beach pocket gopher *Thomomys mazama helleri*			STR		Open grassy meadows, wet pastures in mountain forests.	Coos	CB-S		Not Documented in ORBIC within 25 mi	NI	Not documented in Project vicinity.
Pistol River pocket gopher *Thomomys bottae detumidus*			STR		Moist meadows, pastures, grasslands, riparian areas. Requires deep soils.	Coos	CB-S			MIIH	Disturbance, modification of habitat.
White footed vole *Arborimus albipes*	SOC				Riparian areas, coniferous forests, small clearings.	Coos Douglas Jackson				NI	Not documented in Project vicinity.
Red tree vole *Arborimus longicaudus*		SV	S&M-C	S&M-C	Dense, moist, coniferous and mixed hardwood-coniferous forests with Douglas-fir component.	Coos Douglas Jackson	CB-D RO-D MD-D	UMP-D	Observed in Coos Bay BLM, Roseburg BLM, Medford BLM, and Umpqua NF; see Survey and Manage stand-alone report.	MIIH	Modification of habitat, disturbance, potential for injury or death if in fell tree or snag.
Gray wolf *Canis lupus*	E	E			Habitat generalist.	Jackson Douglas Klamath				NLAA	Potential disturbance.
Kit Fox *Vulpes macrotis*		T	SEN		Open desert, shrub or shrub-grassland, salt bush, greasewood, sagebrush in Great Basin.	Klamath	LV-D		Klamath Falls (T39S,R9E; Historical)	NI	Does not occur in Project vicinity.
Ringtail *Bassariscus astutus*		SV			Woodlands containing tanoak (*Notholithocarpus densiflorus*) near rocky areas and rivers. In coniferous forests, especially riparian areas.	Coos Douglas Jackson Klamath			RO (T29S,R9W,S15; 1995): 0.88mi SW of MP 46.4; PV (T29S,R5W,S4; 1986): 0.4mi S of MP 73.75.	MIIH	Disturbance, modification of habitat.
American marten *Martes americana*		SV			Prefers mature forests with closed canopies, sometimes observed in openings.	Coos Douglas Jackson Klamath			CB (T27S,R11W,S29; 1991): 0.6mi NE of MP 24.98; PV (1991): 1.4 mi NE of MP 26.04; PV (1991): 0.1 mile from MP 29.9; ROR (T37S,R5E,S20; 1978): 2.0mi NE of MP 167.15; ROR (T37S,R5E,S31; 1980): 0,5mi SW of MP 1677.15; F-W (T37S,R5E,S27; 1991): 2.0mi NE of MP 168.3; F-W (T37S,R5E,S34; 1997): 0.9mi NE of MP 169.08; F-W (37S,R5E,S35; 1991): 1.5mi NE of MP 170.94; BLM (T38S,R5E,S15; 1999): 1.2mi SW of MP 171.2; LV (T38S,R5E,S21; 1999): 2.6mi SW of MP 173.07; LV (T38S,R5E,S34; 1999): 2.6mi SW of MP 174.65; LV (T38S,R5E,S36; 2000): 1.5mi SW of MP 174.65; LV (T39S,R5E,S1; 1999): 2.5mi SW of MP 176.5.	MIIH	Disturbance, modification of habitat.
Fisher *Pekania pennanti* West Coast DPS	PT	SC	SEN	SEN	Mature, closed canopy coniferous forests with some deciduous component. Frequently along riparian corridors. Sometimes in clearcuts.	Coos Douglas Jackson Klamath	CB-D MD-D RO-S	RRS-D UMP-D F-W-D	CB (T26S,R12W,S9; 1991): 1.4mi E of MP 10.37; Buck Lake (T38S,R5E,S14; 1978): 0.4mi SW of MP 172.58.	NLAA	Construction of the Project would result in removal of suitable habitat, as well as disruption if individuals are present. However, less than 1 percent of available suitable habitat within 5 miles of the Project would be removed, and noise generated during construction is not expected to be substantially different than noise from existing sources..
North American wolverine *Gulo gulo luscus*		T	SEN	SEN	Alpine, tundra, conifer forests, grassland, and shrubland/chaparral.	Douglas Jackson Klamath		UMP-S RRS-S F-W-S		NI	Does not occur in Project vicinity.
California wolverine *Gulo gulo luteus*		T			Likely extirpated, subalpine and alpine habitats; dens in caves and rock crevices.	Douglas Jackson Klamath				NE	Does not occur in Project vicinity.
Columbian white-tailed deer *Odocoileus virginianus leucurus*		SV	SEN		Restricted to a few islands in the Columbia River and white-oak (*Quercus garryana*) woodlands near Roseburg.	Douglas	RO-D		RB (T26S,R4W; 1993): 15 mi N of MP 71.61.	NI	Does not occur in Project vicinity.
Sea Otter *Enhydra lutris*			STR		Marine mammal in coastal waters/shallows with kelp beds and abundant shellfish.	Coos	CB-S			MIIH	Potential disturbance.

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Common Name and/or Scientific Name	Status [a]				Expected Habitat	Documented or Suspected Occurrence [b]				Effect of Impact [d]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Blue whale *Balaenoptera musculus*	E	E			Worldwide in coastal waters and offshore.	Coos				NLAA	With mitigation, potential injury and/or mortality due to ship strikes, potential adverse effects from vessel underwater noise, ship spill and/or release of LNG at sea are expected to be minimal.
Fin whale *Balaenoptera physalus*	E	E			Found in waters of all major oceans; concentrates in mixing zones between coastal and oceanic waters associated with the continental shelf.	Coos				NLAA	With mitigation, potential injury and/or mortality due to ship strikes, potential adverse effects from vessel underwater noise, ship spill and/or release of LNG at sea are expected to be minimal.
Gray whale *Eschrichtius robustus*		E			Found mainly in shallow coastal waters in the North Pacific Ocean.	Coos				MIIH	With mitigation, potential injury and/or mortality due to ship strikes, potential adverse effects from vessel underwater noise, ship spill and/or release of LNG at sea are expected to be minimal.
Humpback whale *Megaptera novaeangliae*	E	E			Feeds in cold, productive, shallow coastal waters. Calving grounds are commonly in shallow waters near offshore reef systems, islands, or continental shores. During migration, humpbacks stay near the surface of the ocean.	Coos				NLAA	With mitigation, potential injury and/or mortality due to ship strikes, potential adverse effects from vessel underwater noise, ship spill and/or release of LNG at sea are expected to be minimal.
Killer whale *Orchinus orca* Eastern North Pacific Southern Resident stock	E				Found in all oceans, in both open seas and coastal waters. The Southern Resident stock tends to spend more time in deeper water or waters where there is more salmon abundance.	Coos				NLAA	With mitigation, potential injury and/or mortality due to ship strikes, potential adverse effects from vessel underwater noise, ship spill and/or release of LNG at sea are expected to be minimal.
North Pacific right whale *Eubalaena glacialis*	E				Primarily occur in coastal or shelf waters, although movements over deep waters are known.					NLAA	With mitigation, potential injury and/or mortality due to ship strikes, potential adverse effects from vessel underwater noise, ship spill and/or release of LNG at sea are expected to be minimal.
Sei whale *Balaenoptera borealis*	E	E			Sei whales are found a great distance from shore in temperate waters and do not appear to approach coastal areas.	Coos				NLAA	With mitigation, potential injury and/or mortality due to ship strikes, potential adverse effects from vessel underwater noise, ship spill and/or release of LNG at sea are expected to be minimal.
Sperm whale *Physeter macrocephalus*	E	E			Primarily inhabit deep water.	Coos				NLAA	With mitigation, potential injury and/or mortality due to ship strikes, potential adverse effects from vessel underwater noise, ship spill and/or release of LNG at sea are expected to be minimal.
Steller sea lion *Eumatopias jubatus* Eastern DPS			SEN		Marine habitats include coastal waters near shore and over the continental slope; sometimes rivers are ascended in pursuit of prey. The most commonly used terrestrial habitat types are rookeries and haulouts. Rookeries are areas where adults congregate for breeding and pupping. These habitats generally occur on beaches of remote islands with difficult access for humans and other mammalian predators.	Coos	CB-S			MIIH	With mitigation, potential injury and/or mortality due to ship strikes, potential adverse effects from vessel underwater noise, ship spill and/or release of LNG at sea are expected to be minimal.
Birds											
Marbled murrelet *Brachyramphus marmoratus*	T/CH	T			Nesting sites almost exclusively within old-growth coniferous forests, usually Douglas-fir stands in Oregon. Uncommon to rare year-round resident on the Oregon coast.	Coos Douglas	CB-D MD-S RO-D		Occupied stands, federally-designated critical habitat, and documented birds within project area.	LAA	Disturbance, loss of habitat, and habitat fragmentation.
Short-tailed albatross *Phoebastria (Diomedea) Albatrus* Pacific Coast Population	E	E			Nests on flat or sloped sites with sparse or full vegetation on isolated windswept offshore islands with limited human access.				Off the Oregon coast in the vicinity of Coos Bay.	NLAA	Does not breed in project vicinity; individuals expected to avoid LNG marine traffic.
Western snowy plover *Charadrius alexandrinus*	T/CH	T			Year-round, uncommon resident of the North Spit. Nests on sand spits near river outlets and on level sandy beaches.	Coos Douglas	CB-D		Coos Bay and Estuary; nest 0.4mi S of MP 1.54 on spoils pile (1990); PV (T25S,R13W,S35; 1997): 2.2mi SW of MP 6.47. Project is 2.6 mi NE of Critical Habitat, and 1.1 mi NE of the largest and most consistent nesting area on the Oregon Coast.	NLAA	With mitigation, potential increase in predation and disturbance would be minimal.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Red-necked grebe *Podiceps grisegena*		SC	SEN	SEN	Breeds in lakes and ponds, mostly in forested areas. Winter habitat consists of estuaries and protected waters along the coast.	Coos Douglas Jackson Klamath	CB-D LV-S	UMP-D F-W-D	MD (T38S,R4E; Historical) Modoc Point BBS (16.3 mi)	MIIH	Disturbance and modification of foraging habitat.
Horned grebe *Podiceps auritus*			SEN	SEN	Open water surrounded with emergent vegetation.	Coos Douglas Jackson Klamath	CB-D LV-D	F-W-D UMP-D	On Merril BBS (centerline), Ingalls BBS (41.9 mi), Dorris BBS (3.5 mi), Macdoel BBS (10,9 mi), Iron Gate BBS (19.7 mi), Modoc Point BBS (16.3 mi).	MIIH	Loss and modification of habitat, disturbance.
American white pelican *Pelecanus erythrorhynchos*		SV	SEN	SEN	Inland lakes and marshes during breeding season. Nests on predator-free islands. May occur on most bodies of water during nonbreeding.	Jackson Klamath	LV-D	F-W-D	Klamath Lake (T37S, R6E; Historical). On Iron Gate BBS (19.7), Clear Lake Reservoir BBS (20.4 mi), Modoc Point BBS (16.3 mi), Bly BBS (31 mi), Merril BBS (on ROW), Dorris BBS (3.5 mi), MacDoel BBS (10.9 mi).	MIIH	Disturbance.
California Brown Pelican *Pelecanus occidentalis californicus*		E	SEN		Marine nearshore habitats in bays, sounds, and estuarine tidal river mouths.	Coos Douglas	CB-D		Coos Bay Estuary (T2S,R13W; 1983), Coos Bay CBC (1992-2011), Coos Bay and Estuary below RM 6 to open ocean – feeding and roosting.	MIIH	In-water work period will avoid and minimize potential effects; potential disturbance not likely to exceed existing disturbance.
Western least bittern *Ixobrychus exilis hesperis*			STR	STR	Breeds in freshwater cattail (*Typha* spp.) and bulrush marshes east of the Cascades.	Klamath	LV-D	F-W-D	Rogue River (T36,R1W; Historical)	MIIH	Disturbance.
Snowy egret *Egretta thula*		SV	SEN		Marshy areas, especially in Coos Bay in the winter. Cattail and bulrush marshes in breeding seasons.	Klamath	CB-D LV-D		Documented foraging near Coos Bay. On Clear Lake Reservoir BBS (20.4 mi), Dorris BBS (3.5 mi)	MIIH	Potential disturbance and habitat loss.
White-faced ibis *Plegadis chihi*	SOC				Breeds in interior freshwater marshes. Nests among emergent hardstem bulrush. Feeds in marshes, meadows, edges of bonds, pastures, and irrigated alfalfa fields.	Klamath			On Clear Lake Reservoir BBS (20.4 mi), Modoc Point BBS (16.3 mi), Merrrill BBS (on ROW), Chinchalo BBS (37.6 mi), Dorris BBS (3.5 mi), MacDoel BBS (10.9 mi).	MIIH	Potential disturbance.
Greater sandhill crane *Grus canadensis tabida*		SV			Nests in marshes and wet meadows or in drier grasslands and pastures.	Jackson Klamath			RRS (T36S,R4E,S30; 1990): 2.7mi NE of MP 157.53, Modoc Point BBS (16.3 mi), Bly BBS (31 mi), Merrrill BBS (on ROW), Chinchalo BBS (37.6 mi), Ingalls BBS (41.9 mi), Dorris BBS (3.5 mi), MacDoel BBS (10.9 mi), Clear Lake Reservoir BBS (20.4 mi).	MIIH	Potential disturbance.
Canadian sandhill crane *Grus canadensis rowani*			STR		Spring and fall migrant in western (Willamette Valley) Oregon, utilizes Sauvie Island and Ridgefield NWR, WA.	Jackson	LV-D			MIIH	Potential disturbance.
Trumpeter swan *Cygnus buccinator*			SEN		Nests on the shores of large inland lakes and marshes. Species has a limited range within Oregon.	Klamath	LV-S			NI	Does not occur in Project vicinity.
Aleutian Canada Goose *Branta canadadnsis leucopareia*			SEN		Migrates along the entire Oregon coast to California wintering grounds, also winters in Oregon. Forages in pastures. During migration, may be seen in the Willamette Valley or Goat Rock (Oregon Islands National Wildlife Refuge). Some winter exclusively in the Semidi Islands, near Pacific City. In the spring, several thousand congregate in the Langlois area of southern coastal Oregon.	Coos	CB-D			MIIH	Disturbance and potential effects to coastal wintering grounds.
Dusky Canada goose *Branta canadensis occidentalis*			SEN		Breeds in freshwater marshes with tall shrub cover. Terrestrial habitats include cropland, hedgerow and grasslands.	Coos Douglas	CB-S		Klamath Lake (T38S,R9E; Historical). Primary wintering grounds are within Willamette Valley Refuges, and range does not extend south into the Project area.	NI	Does not occur in Project vicinity.
Harlequin duck *Histrionicus histrionicus*	SOC		SEN	SEN	Breeds along low-gradient, fast-flowing reaches of mountain streams in forested areas. Uses swift waters and rapids during other seasons.	Coos Douglas Klamath	CB-D RO-D	UMP-D RRS-D	Coos Bay CBC (1993-2011).	MIIH	Modification of habitat and disturbance.
Bufflehead *Bucephala albeola*				SEN	Near mountain lakes surrounded by open woodlands containing snags. Nests in aspen (*Populus tremuloides*), ponderosa pine, or Douglas-fir.	Coos Douglas Jackson Klamath		F-W-D UMP-D	On Dorris BBS (3.5 mi), Clear Lake Reservoir BBS (20.4 mi), Crowder Flat BBS (31.7 mi), Modoc Point BBS (16.3 mi), Lapham Reservoir BBS 25 mi), Dorris BBS (3.5 mi), Coos Bay CBC (1992-2011).	MIIH	Disturbance.
Yellow rail *Coturnicops noveboracensis*	SOC	SC	SEN	SEN	Freshwater and coastal estuary marshes. Requires areas with shallow water and vegetative cover.	Klamath	LV-D	F-W-D UMP-S	Klamath Lake (T38S,R7E; Historical), On Chinchalo BBS (37.6 mi).	NI	Does not currently occur in Project vicinity.
Black oystercatcher *Haematopus bachmani*	SOC				Intertidal environment. Nests either on offshore islands or rocky shorelines and cliffs.	Coos			Coos Bay CBC (1992-2011)	MIIH	Potential for displacement if species is present.
Upland sandpiper *Bartramia longicauda*	SOC	SC		SEN	Nests in dry or wet meadows and grasslands, often with a fringe of trees in the middle of sagebrush or lodgepole pine communities.	Klamath		F-W-D		MIIH	Modification of habitat and disturbance.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Long-billed curlew *Numenius americanus*		SV			Nests in open grasslands, prairies, and meadows, often near scattered shrubs and usually near water or wet meadows.	Klamath			On Chinchalo BBS (37.6 mi), Ingalls BBS (41.9 mi), Dorris BBS (3.5 mi), Mcdoel BBS (10.9 mi), Merrilll BBS (centerline).	MIIH	Modification of habitat and disturbance.
Franklin's gull *Larus pipixcan*			SEN		Seacoasts, bays, estuaries, lakes, marshes, and irrigated croplands.	Klamath	LV-D		On Dorris BBS (3.5 mi), Mcdoel BBS (10.9 mi), Modoc Point BBS (16.3 mi).	MIIH	Potential disturbance.
Black tern *Chlidonias niger*	SOC				Nests in or on emergent vegetation in alkaline lakes and freshwater marshes or in marshy areas along rivers or ponds. Forages near nest.	Jackson Klamath			On Mcdoel BBS (10.9 mi), Clear Lake Reservoir BBS (20.4 mi), Crowder Flat BBS (31.7 mil.), Modoc Point BBS (16.3 mi).	MIIH	Potential disturbance.
Rhinoceros auklet *Cerorhinca monocerata*		SV			Offshore islands and coast headlands with well-developed soils. Forages ocean-wide.	Coos Douglas			On Coos Bay CBC, Coquille CBC.	MIIH	Disturbance.
Cassin's auklet *Ptychoramphus aleuticus*		SV			Breeds on offshore islands. Forages in the marine environment.	Coos			On Coos Bay CBC.	MIIH	Disturbance.
Tufted puffin *Fratercula cirrhata*		SV			Burrows on slopes or turf-covered headlands of offshore islands and coastal bluffs. May nest in rock crevices. Forages in the marine environment.	Coos			On Coos Bay CBC (2006).	MIIH	Disturbance.
White-tailed kite *Elanus leucurus*			SEN		Lower-elevation grasslands, agricultural areas, meadows, oak and riparian woodlands, marshes, and wetlands. Requires trees or tall shrubs for nesting.	Coos Douglas Jackson	CB-D MD-D RO-D		On Umpqua BBS (18.4 mi), Emigrant Lake BBS (7.7 mi).	MIIH	Disturbance.
Bald eagle *Haliaeetus leucocephalus*			SEN	SEN	Nests and roosts along coasts, rivers, bays, and lakes with large trees (e.g., pine, spruce, cottonwood [*Populus* spp.], oak).	Coos Douglas Jackson Klamath	CB-D LV-D MD-D RO-D	UMP-D RRS-D F-W-D	F-W (T37S,R6E; 1993), MD (T40S,R7E; 1982), (T40S,R8E; 1971), MD (T31S,R4W; 2006), LV (T41S,R7E; 2006), MD (T38S,R3E; 2006), (T28S,R14W; 2006), LV (T40S,R7E; 2006), LV (T40S,R13E; 2006), (T39S,R7E; 2006), T(37S,R7E; 2006), RB (T25S,R4W; 2011), RRS (T36S,R3E; 2006), (T26S,R14W; 2006), MD (T38S,R3E; 2007), (T27S,R6W; 2011), (T24S,R13W; 2006), (T27S,R13W; 2006), (T23S,R13W; 2002), (T37S,R7E; 2006), (T39S,R8E; 2006), F-W (T37S,R5E; 2006), (T37S,R9E; 2006), (T38S,R10E; 2006), (T38S,R8E; 2006), (T38S,R8E; 2006), MD (T34S,R1E; 2006), MD (T36S,R1E; 2006), (T23S,R12W; 2006), (T39S,R7E; 2006), (T39S,R10E; 2006), LV (T40S,R13E; 1984), (T24S,R12W; 2006), (T37S,R7E; 2006), (T37S,R7E; 2006), (T38S,R8E; 2006), MD (T33S,R1E; 2006), (T39S,R8E; 2006), (T35S,R1W; 2006), RRS (T37S,R4E; 2006), MD (T38S,R4E; 2006), LV (T40S,R11E; 2006), CB (T28S,R10W; 2003), LV (T38S,R6E; 2006), MD (T34S,R3E; 2006), (T40S,R8E; 2006), LV (T40S,R11E; 2006), (T25S,R11W; 2006), (T36S,R2W; 2001), (T38S,R8E; 2006), (T40S,R7E; 2005), T38S,R9E; 2006), LV (T41S,R7E; 2006), F-W (T38S,R5E; 2006), RB (T26S,R4W; 1996), (T36S,R6E; 2006), LV (T39S,R10E; 2005) (T40S,R12E; 2006).	MIIH	Disturbance, loss or modification of habitat.

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Common Name and/or Scientific Name	Status [a]				Expected Habitat	Documented or Suspected Occurrence [b]				Effect of Impact [d]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Northern goshawk *Accipiter gentilis*	SOC	SV			Coniferous forests, sometimes in aspen groves on desert mountain ranges. Prefers large patches of late-successional forests with large trees and canopy closure.	Coos Douglas Jackson Klamath			CB (1998): 0.6 mile NE of MP 29.84; MD (T32S,R1W,S33; 2001): 2.3mi E of MP 114.31; MD (T35S,R1E,S3; 1996): 1.1mi W of MP 134.1; MD (T35S,R1E,S23; 1997): 0.7mi SW of MP 136.94; PV (T35S,R2E,S30; 1995): 0.3mi SW of MP 138.79; MD (T35S,R2E,S21; 1997): 1.4mi NE of MP 139.7; MD (T36S,R2E,S11; 1999): 2.3mi E of MP 143.68; PV (T36S,R2E,S12; 1998): 2.3mi NE of MP 145.65; MD (T36S,R2E,S12; 1996): 2.8 and 2.9 mi NE of MP 145.65; MD (T36S,R2E,S25; 1998): 1.3mi NE of MP 148.93.; F-W (T38S,R5E,S9; 1993-1996): 0.5-1.1mi SW of MP 170.06; PV (T38S,R5E,S10; 1996): 0.5mi SW of MP 170.36; F-W (T37S,R5E,S32; 1995): 0.2mi NE of MP 168.35; F-W (T37S,R5E,S33; 1995): 0.6mi NE of MP 168.35; F-W (T37S,R5E,S28; 1994): 0.9mi NE of MP 168.35; F-W (T38S,R5E,S7; 1993): 1.6mi SW of MP 168.88; F-W (T38S,R5E,S8; 1994-2006): 1.1-2.0mi SW of MP 169.56; LV (T38S,R5E,S17; 1998): 2.3mi SW of MP 169.56; LV (T38S,R5E,S20; 1998): 2.9mi SW of MP 169.56; LV (T38S,R5E,S21; 1996): 2.7mi SW of MP 171.20; F-W (T37S,R5E,S36; 1992-1997): 2.2mi NE of MP 171.44; F-W (T38S,R5E,S1; 1995): 1.6-1.9mi NE of MP 171.44; F-W (T38S,R5E,S11; 1995,1998): 0.1 and 0.3mi NE of MP 171.93; Buck Lake/PV (T38S,R5E,S14; 1995): 0.4mi SW of MP 172.69; Buck Lake/PV (T38S,R5E,S23; 1999): 0.9mi SW of MP 173.07; F-W (T38S,R5E,S35; 1998): 1.5mi SW of MP 174.65; LV (T38S,R5E,S35; 1993): 2.3mi SW of MP 174.65; LV (T38S,R5E,S25; 1998): 0.4 and 0.6mi SW of MP 174.65; LV (T38S,R6E,S29; 2005): 0.4 and 1.2 mi NE of MP 175.96; LV (T38S,R5E,S36; 1994): 1.4mi SW of MP 176.69; LV (T38S,R6E,S33; 1996-2003): several records 0.6mi - 1.3mi NE of MP 178.12; LV (T39S,R6E,S5; 1999): 0.7mi SW of MP 177.39; PV (T38S,R6E,S34; 1996): 0.9mi NE of MP 178.45; PV (T39S,R6E,S3; 1994): 0.6mi NE of MP 179.06; LV (T39S,R6E,S17; 1994,1997): 2.3mi and 2.4mi SW of MP 179.39; LV (T40S,R11E,S7; 1994): 2.8mi N of MP 215.90.	MIIH	Modification of habitat and disturbance. Injury or mortality if nest tree is felled.
Swainson's hawk *Buteo swainsoni*		SV			Grasslands, sagebrush flats, juniper woodlands, larger meadows, and grasslands with forested mountains. Requires trees for nesting.	Jackson			Not documented in ORBIC within 25 mi. On Ingalls BBS (41.9 mi), Dorris BBS (3.5 mi), Mcdoel BBS (10.9 mi), Medicine Mountain BBS (28.5 mi), Iron Gate BBS (19.7).	MIIH	Minor potential for disturbance if present.
Merlin *Falco columbarius*			STR		Nests in open coniferous woodlands, forests, and savannahs. Forages over a variety of habitats such as marshes, prairies, and woodland openings. Usually found close to water.	Coos Jackson Klamath	RO-D		Documented perched near Coos Bay. On Lapham Reservoir BBS (25.3 mi)	MIIH	Modification of habitat and disturbance.
American peregrine falcon *Falco peregrinus anatum*		SV	SEN	SEN	Typically nests on cliffs overlooking fairly open areas with an ample food supply, such as along coasts, lakes, and marshes, but may nest on buildings or in stick nests constructed by other raptors.	Coos Douglas Jackson Klamath	CB-D LV-D MD-D RO-D	RRS-D UMP-D F-W-D	Nest sites: CB (T28S,R10W,S19; 2003): 0.8mi NE of MP 33.88; UMP (T32S,R2W,S35; 2003): 0.2mi SW of MP 112.64; PV (T33S,R2W,S36; 2003): 2.2mi SW of MP 119.54; PV (T36S,R3E,S30; 2003): 1.8mi N of MP 152.15. Several documentations within Coos Bay area – foraging, flying, roosting.	MIIH	Disturbance.
Arctic peregrine falcon *Falco peregrinus tundrius*		SV			Migratory habitat on coast – cliffs or bluffs near large bodies of water or open fields for hunting.	Coos Douglas				NI	Not documented in vicinity of Project.
Greater sage-grouse *Centrocercus urophasianus*	C	SV	SEN	SEN	Big sagebrush, preferring areas where big sagebrush cover is 15-50%. Leks in open areas.	Klamath	LV-D	F-W-D	Clear Lake Reservoir BBS (20.4 mi).	MIIH	Modification of habitat and disturbance.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Mountain quail *Oreortyx pictus*	SOC				High elevation; prefers open forests and woodlands with ample undergrowth of brushy vegetation. Also inhabits thickets of chaparral and riparian woodland, meadow edges in forests, and brushy regrowth.	Coos Douglas Jackson Klamath			PV (1993): 1.5 mi E of MP13.61; PV (1997): 1.8 mi NE of MP 28.86; CB (1998): 2.0, 2.1, 2.4 mi NE of MP 28.86; CB (1999): 1.1 mi NE of MP 32.35; CB (T28S,R10W,S28; 1996): 0.03 mi W of MP 37.16; MD (T34S,R1W,S17; 1994): 2.0mi SW of MP 121.85; LV (T38S,R5E,S15; 2005): 1.0 and 1.1 mi SW of MP 172.53; LV (T38S,R5E,S36; 2000): 1.5mi SW of MP 175.89; LV (T39S,R6E,S5; 2000): 0.7mi SW of MP 177.61; PV (T39S,R6E,S24; 2005): 0.3mi SW of MP 182.52; PV (T40S,R7E,S6; 2000): 2.4mi S of MP 184.3; PV (T40S,R8E,S7; 2003): 1.8mi SW of MP 192.59; LV (T40S,R8E,S17; 2002): 2.9mi S of MP 192.59.	MIIH	Modification of habitat and disturbance.
Band-tailed pigeon *Patagioenas fasciata*	SOC				Coniferous or mixed-deciduous forests. Forests and woodlands containing oaks. In western Oregon, uses dense coniferous forests.	Coos Douglas Jackson			PV (1997): 1.8 mi NE of MP 28.86; CB (1998): 2.0, 2.1, 2.2 and 2.5 mi NE of MP 28.86; CB (T28,R11,S35; 1994): 1.6 mi SW of MP 33.77; CB (T28,R10,S9; 1995): 2.9 mile NE of MP 34.45; CB (T28S,R9W,S19; 1993): 2.09mi NE of MP 39.56.	MIIH	Modification of habitat and disturbance.
Yellow-billed cuckoo *Coccyzus americanus* Western DPS	T	SC	SEN		Thick closed-canopy riparian forests with an understory of dense brush usually composed of various species of willows (*Salix* spp.) and cottonwoods.	Klamath	LV-S			NE	No current locations in Klamath County; no habitat left in county.
Northern spotted owl *Strix occidentalis caurina*	T/CH	T			Closely associated with old-growth coniferous forests or mature forests with old-growth characteristics such as standing snags, closed canopy, and downed logs.	Coos Douglas Jackson Klamath	CB-D LV-D MD-D RO-D	RRS-D UMP-D FW-D	Multiple locations along route within 3 mi of route. Designated critical habitat within project area.	LAA	Disturbance, habitat loss or modification, and habitat fragmentation.
Flammulated owl *Otus flammeolus*		SC			Open forests with ponderosa pine. Roosts in large trees adjacent to grasslands.	Douglas Jackson Klamath	MD-D		MD (T33S,R1W,S31; 2002): 1.9mi W of MP 121.25; MD (T34S,R1W,S1; 2003): 0.7mi NE of MP 124.32; MD (T35S,R2E,S27; 1996): 1.7mi NE of MP 140.45; PV (T36S,R2E,S2; 1994): 2.6mi E of MP 141.89; MD (T37S,R3E,S5; 1997): 0.3mi S of MP 153.35.	MIIH	Modification of habitat, disturbance, and potential for injury or death if roosting or nesting in fell tree or snag.
Western burrowing owl *Athene cunicularia hypugea*	SOC	SC			Open deserts, grasslands, fields, pastures, and sagebrush steppe.	Douglas Jackson Klamath				MIIH	Disturbance.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Great gray owl *Strix nebulosa*		SV	S&M-C	S&M-C	Forages over open areas. Found in mixed coniferous, ponderosa pine, and lodgepole pine forests. Often in old-growth forests on north-facing slopes.	Douglas Jackson Klamath	RO-D MD-D	RRS-D	MP 136.58; MD (T35S,R1E,S13; 1997, 1998, 1999, 2003, 2004): 0.8mi NE of MP 136.83; PV (T35S,R1E,S13; 1998): 0.6mi NE of MP 136.83; MD (T35S,R2E,S18; 2001, 2003): 1.3mi NE of MP 136.83; MD/PV (T35S,R1E,S13; 1997): 0.2mi NE of MP 136.97; PV (T35S,R2E,S18; 2000, 2001): 1.1, 1.4, and 1.5mi NE of MP 138.44; MD (T35S,R2E,S18; 2005): 1.0mi NE of MP 138.44; MD (T35S,R2E,S17; 2001): 1.5mi NE of MP 138.44; MD (T35S,R2E,S19; 1999): 0.8mi NE of MP 138.44; MD (T35S,R2E,S21; 1997): 1.6mi NE of MP 139.7; MD (T35S,R2E,S23; 1995): 2.8mi NE of MP 140.45; MD (T35S,R2E,S27; 1998): 1.6mi NE of MP 140.45; MD (T36S,R2E,S13; 1996-2005): 2.5 and 2.7 mi NE of MP 146.51; PV (T36S,R2E,S30; 1999): 2.3mi W of MP 147.46; MD (T37S,R2E,S1; 1992): 0.3mi S of MP 150.07; MD (T37S,R2E,S23; 1997): 2.9mi SW of MP 150.95; MD (T37S,R3E,S18; 1997): 1.9mi S of MP 152.41; MD (T36S,R3E,S29; 2004-2006): 2.0 and 2.2 mi N of MP 153.24; MD (T37S,R3E,S8; 1998): 0.7mi S of MP 153.35; MD (T37S,R3E,S17; 1998): 1.6-2.3 mi S of MP 153.24; MD (T37S,R3E,S20; 1998): 2.7-2.9 mi S of MP 153.24; RRS (T37S,R3E,S25; 1997): 2.0mi SW of MP 159.95; RRS (T37S,R3E,S21; 1998): 2.3mi SW of MP 154.73; RRS (T36S,R4E,S30; 1998): 2.8mi N of MP 158.76; F-W (T38S,R5E,S7; 1998): 1.9 and 2.1 mi SW of MP 168.78; LV (T38S,R6E,S19; 1998): 0.6mi NE of MP 174.12; LV (T38S,R5E,S35; 1997): 2.2mi SW of MP 174.65; LV (T38S,R5E,S25; 2004): 0.8mi SW of MP 174.65; LV (T38S,R6E,S29; 2005): 0.6mi NE of MP 175.57; LV (T39S,R6E,S7; 1994, 1997): 2.0 and 2.3 mi SW of MP 177.39.	MIIH	Disturbance, loss or modification of habitat, and potential for injury or death if roosting or nesting in fell tree or snag.
Black Swift *Cypseloides niger*			SEN	SEN	Nests next to or behind waterfalls, wet cliffs, sea caves; nests in small colonies.	Coos Douglas	CB-D	UMP-D	(T32S, R3E, 2003): 14.3 mi NE of MP 131.16.	NI	No suitable habitat in Project area.
Acorn woodpecker *Melanerpes formicivorus*	SOC				White oak communities; other coniferous and broad-leaved trees usually present.	Coos Douglas Jackson Klamath			On Umpqua BBS (18.4 mi), Days Creek BBS (3.7 mi), Darby BBS (centerline), Emigrant Lake BBS 7.7 mi), Sams Valley BBS (centerline), Prospect BBS (centerline), MacDoel BBS (10.9 mi).	MIIH	Disturbance.
White-headed woodpecker *Picoides albolarvatus*	SOC	SC	SEN	SEN	Ponderosa pine or pine-mixed conifer forests. Requires large trees for foraging and snags for nesting.	Douglas Jackson Klamath	LV-D MD-D	UMP-D RRS-D F-W-D	LV (T38S,R5E,S35; 1999): 2.1mi SW of MP 174.65, Modoc Point BBS (16.3 mi), Bly BBS (31 mi), Lapham Reservoir BBS (25 mi), Picture Flat BBS (39 mi), Chinchalo BBS (37.6 mi).	MIIH	Modification of habitat, disturbance, and potential for injury or death if roosting/nesting in fell tree or snag.
Lewis' woodpecker *Melanerpes lewis*	SOC	SC	SEN	SEN	Open forests at lower elevations. Nests in white oak woodlands, ponderosa pine woodlands, mixed oak-pine woodlands, and cottonwood riparian woodlands in eastern Oregon.	Douglas Jackson Klamath	MD-D RO-D	UMP-D RRS-D F-W-D	PV (T36S,R2E,S7; 1995): 1.1mi SW of MP 142.54, Modoc Point BBS (16.3 mi), Lapham Reservoir BBS (25 mi), Merrill BBS (centerline), MacDoel BBS (10.9 mi), Clear Lake Reservoir BBS (20.4 mi).	MIIH	Modification of habitat, disturbance, and potential for injury or death if roosting/nesting in fell tree or snag.
Olive-sided flycatcher *Contopus cooperi*	SOC	SV			Coniferous forests with uneven canopy. Prefers open forests but occupies a variety of forest types.	Coos Douglas Jackson Klamath			PV (T27S,R11W,S34; 1997): 1.8 mi NE of MP 28.86; CB (T27S,R11W,S35; 1998): 2.0, 2.4, and 2.5 mi NE of MP 28.86; PV (1992): 3.0 mi W of MP 33.77; LV (TT38S,R5E,S26; 1994): 1.9mi SW of MP 174.65; LV (T38S,R5E,S34; 1994): 2.8mi SW of MP 174.65.	MIIH	Potential disturbance and habitat modification.
Willow flycatcher *Empidonax traillii adastus*	SOC	SV			Willows at the edges of streams flowing through meadows and marshes. Also breeds in thickets along edges of forest clearings and brushy vegetation near water.	Jackson Klamath			PV (T27S,R11W,S34; 1997): 1.8 mi NE of MP 28.86; CB (T27S,R11W,S35; 1998): 2.2 and 2.4 mi NE of MP 28.86; LV (T38S,R5E,S34; 1994): 2.5mi SW of MP 174.65; LV (T38S,R5E,S35; 1994): 2.0 and 2.1mi SW of MP 174.65.	MIIH	Potential disturbance and habitat modification.
Little willow flycatcher *Empidonax traillii brewsteri*		SV			Willows at the edges of streams flowing through meadows and marshes. Also breeds in thickets along edges of forest clearings and brushy vegetation near water.	Coos Douglas Jackson				NI	Not documented in Project vicinity.
Streaked horned lark *Eremophila alpestris strigata*	T/CH	SC	SEN		Expanses of thinly vegetated land, including fields, prairies, dunes, upper beaches, airports, and similar areas with low/sparse grassy vegetation.	Douglas Jackson	CB-D MD-N		Documented on the North Spit in 2005, approximately 1 mile SW of Project.	NLAA	Potential for disturbance if species is present.

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Purple martin *Progne subis*	SOC	SC	SEN	SEN	Nests in tree cavities and nest boxes with open areas for foraging. May use open forests.	Coos Douglas Jackson Klamath	CB-D MD-S RO-D	UMP-S RRS-S F-W-S	Haynes Inlet and Coos Bay (arrive in April), Catching Slough (nest boxes; 1985), Days Creek BBS (3.7 mi), Glasgow BBS (centerline), Selma BBS (32.8 mi), Modoc Point BBS (16.3 mi), Clear Lake Reservoir BBS (20.4 mi).	MIIH	Modification of habitat, disturbance, and potential for injury or death if roosting/nesting in fell tree or snag.
Northern waterthrush *Seiurus noveboracensis*				SEN	Nests in cool, wooded swamps, ponds, slow-moving rivers; thickets of bogs, and rivers bordered with willow.	Jackson		RRS-D		NI	Extremely rare in Oregon, limited habitat in survey area.
Slender-billed nuthatch *Sitta carolinensis aculeata*[3]		SV			Western Oregon lowlands including oak and mixed forests, nut orchards, and suburban Willamette Valley.	Douglas Jackson Klamath				NI	Not documented in Project vicinity.
Western bluebird *Sialia mexicana*		SV			Variety of habitat types with nest holes or nest boxes. In western Oregon, breeds in clearcuts, riparian woodlands, and open oak-ponderosa pine woodlands. In eastern Oregon, utilizes agricultural areas and open ponderosa pine, Douglas-fir and juniper woodlands.	Coos Douglas Jackson Klamath			CB (T27S,R11W,S35; 1998): 2.4 mi NE of MP 28.86, Modoc Point BBS (16.3 mi), Merrill BBS (centerline), Picture Flat BBS (39 mi), Ingalls BBS (41.9 mi), MacDoel BBS (10.9 mi), Hackamore BBS (34.7 mi), Clear Lake Reservoir BBS (20.4 mi), Iron Gate Reservoir BBS (19.7 mi).	MIIH	Potential for disturbance if species is present.
Yellow-breasted chat *Icteria virens*	SOC				Brushy areas in riparian woodlands. Also uses tangles of brush in deciduous or mixed deciduous-coniferous woodlands.	Coos Douglas Jackson Klamath			On Modoc Point BBS (16.3 mi E) and Iron Gate BBS (19.7 mi S).	MIIH	Potential for disturbance if species is present.
Grasshopper sparrow *Ammodramus savannarum*		SV		SEN	Short grasslands with few scattered shrubs, prefers bunchgrass grasslands on the north slopes of hills with scattered shrubs or uses cultivated grasslands and pastures.	Douglas Jackson			(T36S, R1W; Historical): 10.3 mi W of MP 145.59, Merrill BBS (centerline), MacDoel BBS (10.9 mi).	MIIH	Potential disturbance and habitat modification.
Oregon vesper sparrow *Pooecetes gramineus affinis*[3]	SOC	SC	SEN		Grassy foothills west of Cascades in the Umpqua and Rogue river valleys.	Coos Douglas Jackson	CB-D RO-D			MIIH	Disturbance and potential for loss of ground nests.
Tricolored blackbird *Agelaius tricolor*	SOC		SEN	SEN	Breeds in freshwater marshes with emergent vegetation or thickets of shrubs. May breed in Himalayan blackberry (*Rubus armeniacus*) near wetlands.	Jackson Klamath	MD-D LV-D	RR-D	ST (T39S,R8E,S26; 1980): 1.0mi SE of MP 196.17, PV (T41S,R12E,S15; 2000): 1.8mi W of MP 229.39, Modoc Point BBS (16.3 mi), Merrill BBS (centerline), Ingalls BBS (41.9 mi), Dorris BBS (3.5 mi), MacDoel BBS (10.9 mi), Hackamore BBS (34.7 mi), Iron Gate Reservoir BBS (19.7 mi).	MIIH	Disturbance.
Reptiles											
Green sea turtle *Chelonia mydas*	T	E			Oceanic beaches for nesting, convergence zones in the open ocean, and benthic feeding grounds in coastal areas. Occasional sightings off the coasts of Washington and Oregon; most commonly occur from San Diego to the south.					NLAA	With mitigation, potential for injury or mortality due to ship-strikes and potential adverse effects from a carrier spill is low.
Leatherback sea turtle *Dermochelys coriacea*	E	E			Open ocean and coastal waters; widespread.					NLAA	With mitigation, potential for injury or mortality due to ship-strikes and potential adverse effects from a carrier spill is low.
Loggerhead sea turtle *Caretta caretta*	E	T			Oceanic beaches for nesting, open ocean, and nearshore coastal areas. Occasional sightings off the coasts of Washington and Oregon; most occur off the California coast.					NLAA	With mitigation, potential for injury or mortality due to ship-strikes and potential adverse effects from a carrier spill is low.
Olive Ridley sea turtle *Lepidochelys olivacea*	T	T			Primarily open ocean, but known to inhabit coastal areas, including bays and estuaries. Primarily tropical species but occasionally occurring off the Oregon and Washington coasts.					NLAA	With mitigation, potential for injury or mortality due to ship-strikes and potential adverse effects from a carrier spill is low.

TABLE O-3

Special Status Marine Mammal and Terrestrial Wildlife Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a]				Expected Habitat	Documented or Suspected Occurrence [b]				Effect of Impact [d]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Western pond turtle *Actinemys marmorata* (formerly Northwestern/North Pacific/Pacific Pond Turtle, *Emys/Actinemys marmorata marmorata)*	SOC	SC	SEN	SEN	Rivers, creeks, small lakes, ponds, marshes, irrigation ditches, and reservoirs. Nests on sandy banks near water.	Coos Douglas Jackson Klamath	CB-D LV-D MD-D RO-D	F-W-D RRS-D UMP-D	Ross Slough (T26S,R12W,S6; 1993): 1.2mi W of MP 9.25; Jerusalem Creek/CB (T27S,R11W,S31; 1993): 0.8mi W of MP 26.64; Middle Fork Coquille River (T29S,R8W,S7, 17, and 18; 1994): 0.3 mi NW and 0.4mi SE of MP 49.97; PV (T28S,R7W,S31; 1993): 1.4mi NE of MP 55.92; Olalla Creek (T29S,R7W,S4; 1995): 0.2mi NW of MP 59.5; Ben Irving Reservoir/RO (T29S,R7W,S17, 18, 19, and 20; 1993): 1.2mi S of MP 57.13; South Umpqua River (T28S,R6W,S21, 29, and 33; 1995); East Willis Creek (T29SR6W,S15;1995): 1.2mi SW of MP 67.47; South Umpqua River (T29SR5W,S7 and T29S,R6W,S11; 1998): 0.2mi S of MP 68.99 and 0.7mi SE of MP 70.43; South Umpqua River (T30S,R3W,S26, 28, and 33; 1997): 1.23mi W and 0.9mi NE of MP 94.55; UMP (T31S,R2W,S28; 1993): 1.8mi NE of MP 105.24; UMP (T32S,R2W,S29: 1989): 1.5mi SW of MP 109.68; Rogue River/PV (T34S,R1W,S3): within ROW at MP 122.67; BLM (T37S,R2E,S5; 1993): 2.7mi SW of MP 148.2; Klamath River (T39S,R8E,S31; 1991): 0.9mi SW of MP 191.31; Klamath River (T39S,R8E,S34, 35; 1991): 0.8mi SE of MP 195.02; ST/Klamath River (T39S,R9E,S18 and 19; 1991): 0.3mi S of and at MP 199.5.	MIIH	Modification of habitat, disturbance, potential for injury or death.
Northern sagebrush lizard *Sceloporus graciosus graciosus*	SOC				Sagebrush habitats; also in chaparral, juniper woodlands, and coniferous forests.	Klamath				NI	Not documented in Project vicinity.
California mountain kingsnake *Lampropeltis zonata*	SOC	SV			Pine forests, oak woodland, and chaparral valleys. In, under, or near rotting logs in open wooded areas near streams.	Coos Douglas Jackson			MD (T35S,R2E,S33; 1997): 0.7mi E of MP 140.75.	MIIH	Potential disturbance and habitat modification.
Common kingsnake *Lampropeltis getula*	SOC	SV			Thick vegetation along waterbodies, but ranges into farmland, chaparral, and deciduous and mixed coniferous woodlands in the Rogue and Umpqua river valleys.	Douglas Jackson Klamath		RRS-S UMP-S	MD (T35S,R2E,S32; 1991): 0.5mi E of MP 141.58.	MIIH	Potential disturbance and habitat modification.
Amphibians											
Oregon slender salamander *Batrachoseps wrighti*[3]	SOC	SV		SEN	Under bark or moss in mature and second-growth Douglas-fir forests. Also under rocks or logs in stands of moist hardwood forests within coniferous forests.	Douglas Klamath				NI	Outside of known range.
Shasta salamander *Hydromantes shastae*			S&M-A	S&M-A	Found mainly in limestone outcrops. Often occurs in cool, wet ravines and valleys in both forested and non-forested areas; usually in moist limestone fissures or caves. Eggs are laid in late summer in a cluster of 9-12 eggs. No aquatic larval stage.					NI	Not documented in Project vicinity.
Del Norte salamander *Plethodon elongatus*	SOC	SV	S&M-D	S&M-D	Moist, rocky areas within forests. Occasionally in decaying logs and under forest floor litter.	Coos Douglas Jackson			MD (T34S, R7W, 1992): 71 mi S of MP 51.47.	NI	Outside of known range.
Larch Mountain salamander *Plethodon larselli*			S&M-A	S&M-A	Most often inhabits steep forested or non-forested slopes associated with rocky substrates where spaces exist between the rock and soil. Breeds mainly in the fall, eggs are laid in late winter-early spring and hatch in about four months. Average clutch size of seven.					NI	Not documented in Project vicinity.
Siskiyou Mountains salamander *Plethodon stormi*	SOC	SV	SEN S&M - C	SEN S&M- C	Loose rock rubble or talus on north-facing slopes or in dense wooded areas.	Jackson	MD-D	RRS-D		NI	Outside of known range.
Van Dyke's salamander *Plethodon vandykei*			S&M-A	S&M-A	Streams and seeps; also upland forest, talus, lakeshores, and cave entrances. Abundant in old forest stands with complex structure and moderate to high levels of woody debris and colluvial rock.					NI	Not documented in Project vicinity.
Southern torrent salamander *Rhyacotriton variegatus*	SOC	SV			Shallow, cold waters of perennial, high-gradient streams within humid coniferous forests. Adults occupy splash zones or areas with overflowing water. Larvae found in cobble or gravel beds flushed with water.	Coos Douglas			PV (T26S,R12W,S20; 1995): 1.5 mi E of MP 13.48; CB (T28S,R12W,S13; 1992): 2.7 mi SW of MP 28.05; CB (T28S,R11W,S11; 1998): 0.8 mile NE of MP 30.17; CB (T28S,R10W,S25; 1998): 0.53mi NE of MP 39.65.	MIIH	Modification of habitat and potential for injury or death.

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Common Name and/or Scientific Name	Status [a]				Expected Habitat	Documented or Suspected Occurrence [b]				Effect of Impact [d]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Clouded salamander *Aneides ferreus*		SV			Forest dweller found in moist areas, under logs and other debris.	Coos Douglas Jackson Klamath			CB (T28S,R10W,S5; 2003): 2.8 mi NE of MP 32.35; CB (T28,R11,S35; 1994): 1.9 mi SW of MP 33.77; CB (T29,R11,S2; 2000): 3.4 mi SW of MP 35.8; CB (T29,R10,S6; 1998): 2.3mi SW of 35.8; CB (T29S,R10W,S2; 1996): 1.3mi SW of MP 40.33; CB (T28S,R9W,S29; 1992): 1.7mi NE of MP 41.55; UMP (T31S,R3W,S33; 1994): 2.7mi W of MP 103.12; MD (T35S,R1E,S35; 1995): 2.5mi SW of MP 137.74.	MIIH	Modification of habitat and potential for injury or death.
Black salamander *Aneides flavipunctatus*		SV	SEN	SEN	Near streams, in talus slopes or under rocks and logs. Inhabits open woodlands, and mixed coniferous and mixed-coniferous-deciduous forests.	Jackson	MD-D	RRS-D		NI	Outside of known range.
California slender salamander *Batrachoseps attenuatus*		SV	SEN	SEN	Lower-elevation forests along the southern coast, including hardwood, redwood, and other coniferous forests. Also in open areas with scattered trees. Under rocks, logs, or other objects on the ground.	Coos Jackson	CB-D	RRS-D		NI	Outside of known range.
Western toad *Bufo boreas*		SV			Wide variety of habitats (desert, chaparral grassland, woodland, and forest) from sea level to above timberline.	Coos Douglas Jackson Klamath			Trail Creek/PV (T33S,R1W,S33; 1982): 0.2mi NE of MP 120.6; MD (T34S,R2W,S1; 1996): 2.9 mi SW of MP 121.25; F-W (T38S,R5E,S1; 1995): 1.4mi NE of MP 171.44; LV/PV (T38S,R6E,S34, 35; 1994): 1.0mi NE of MP 178.52.	MIIH	Modification of habitat and potential for injury or death.
Coastal tailed frog *Ascaphus truei*	SOC	SV			Cold, fast-flowing permanent streams, usually in forests. Sometimes in streams flowing through non-forested regions.	Coos Douglas Jackson Klamath			CB (T28,R11,S35; 1994): 1.7 and 1.9 mi SW of MP 33.77; CB (T28,R11,S36; 1994): 1.4 mi SW of MP 33.77; PV (T28,R10,S19; 1993): 0.3 mile NE of MP 34.45; CB (T29,R10,S6; 1997): 2.8mi SW of 35.8; PV (T29,R10,S6; 2001): 2.7mi SW of 35.8; CB (T29,R10,S7; 1998, 2000): 2.9mi SW of 35.8: PV (T20S,R10W,S2; 2001): 2 mi S of MP 40.33; CB (T29S,R9W,S5; 1994): 0.35mi NW of MP 44.73; CB (T29S,R9W,S9; 1995): 0.5mi S of MP 45.39.	MIIH	Modification of habitat and potential for injury or death.
Foothill yellow-legged frog *Rana boylii*	SOC	SC	SEN	SEN	Permanent streams in a variety of habitat types such as grassland, chaparral, coniferous or deciduous forests, and woodlands. Missing from much of their historic habitat.	Coos Douglas Jackson Klamath	CB-D MD-D RO-D	RRS-D UMP-D	CB (T29S,R10W,S2; 1995): 1.8mi SW of MP 40.33; Coffee Creek/PV (T30S,R2W,S19, 30; 1998): 1.9mi NE of MP 94.78; Trail Creek/PV (T33S,R1W,S17; 1998): 1.1mi E of MP 117.24); Indian Creek/MD (T34S,R1W,S23): 1.4mi SW of MP 127.31.	MIIH	Modification of habitat and potential for injury or death.
Cascades frog *Rana cascadae*	SOC	SV			Lakes, ponds, and small streams that run through meadows. Ranges from 2,600 feet to treeline.	Douglas Jackson Klamath			MD (T34S,R2W,S1; 1996): 2.7 and 2.9 mi SW of MP 121.25; PV (T39S,R6E,S6; 1994): 1.3mi SW of MP 177.39.	MIIH	Modification of habitat and potential for injury or death.
Northern leopard frog *Rana pipiens*		SC	SEN	SEN	Marshes, wet meadows, vegetated irrigation canals, ponds, and reservoirs. Prefers quiet or slow flowing waters.	Jackson Klamath	LV-S	F-W-S		NI	Outside of known range.
Northern red-legged frog *Rana aurora aurora*	SOC	SV			Streams, ponds, and marshes in wooded areas.	Coos Douglas Jackson Klamath			CB (T27S,R12W,S2&S12; 1990, 1992): 1.8 mi NE of MP 19.88; CB (T27S,R11W,S8; 1992): 2.0mi NE of MP 24.34; CB (T28S,R12W,S13; 1992): 2.7 mi SW of MP 28.05; PV (T31S,R2W,S34; 1991): 2.1mi NE of MP 105.63; UMP (T32S,R1W,S19; 1991): 2.6mi NE of MP 111.83.	MIIH	Modification of habitat and potential for injury or death.
Oregon spotted frog *Rana pretiosa*	T, PCH	SC		SEN	Margins of lakes, marshes, and pools in streams with aquatic vegetation. Higher elevations from the crest and east slope of Cascade Mountains.	Jackson Klamath		F-W-D RRS-S UMP-S	F-W/PV/West side of Buck Lake (1997): N and S of MP 172.1; LV (T38S,R5E,S23; 1997): 0.6-1.2 mi SW of MP 173.45.	NLAA	Suspended sediment from Project crossing at Spencer Creek is not expected to remain in the water column 6,400 feet downstream at Buck Lake where species occurs, and because Spencer Creek downstream of Buck Lake is separated from the right-of-way by Clover Creek Road. Conservation measures would limit potential effects due to acoustic shock, introduction of non-native species and/or disease, fuel and chemical spills, and herbicides.
Columbia spotted frog *Rana luteiventris*		C	SEN	SEN	Rarely far from permanent quiet water; usually at grassy/sedgy margins of streams, lakes, ponds, springs, and marshes; may disperse into forest, grassland, during wet weather.	Klamath	LV-D	F-W-S		NI	Outside of known range.

TABLE O-3

Special Status Marine Mammal and Terrestrial Wildlife Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a]				Expected Habitat	Documented or Suspected Occurrence [b]				Effect of Impact [d]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Invertebrates [e]											
Evening fieldslug *Deroceras hesperium*			SEN S&M-B	SEN S&M-B	Associated with wet meadows in forested habitats in a variety of low vegetation, litter, debris, and rocks.	Jackson Klamath	MD-D	F-W-D RRS-S	UMP: 3 live specimens observed in 2007 in UCSA 112.07-W; F-W: 1 observation adjacent to ROW near MP 171.08 (previous alignment did not affect site); see Survey and Manage stand-alone report for additional information.	MIIH	Modification of habitat and potential for injury or death.
Oregon shoulderband *Helminthoglypta hertleini*			SEN, S&M-B	S&M- B	Rocky areas, including talus deposits and outcrops generally within 98 feet of herbaceous vegetation and deciduous leaf litter; woody debris used as refugia.	Douglas Jackson	CB-S MD-D RO-D	RRS-D UMP-D	RO (1999): 0.9mi SE of MP 58.53; PV/RO (2006): 0.4mi and 0.6mi SE of MP 59.70; RO (T29S,R7W,S11; 1999-2006): many locations > 0.9mi SE of MP 60.35; RO (2007) 60 ft NW of ROW near MP 64.89, 2 observations within ROW near MP 75.92R, 2 observations within ROW/TEWA near MP 75.86; several documented occurrences >500ft. See Survey and Manage stand-alone report for additional information.	MIIH	Disturbance and potential modification of habitat.
Oregon megomphix *Megomphix hemphilli*			S&M-F	S&M-F	Species occurs at low to moderate elevations. Found within and under the mat of decaying leaves under big leaf maples (*Acer macrophyllum*), hazel bushes (*Corylus* spp.), and sword ferns (*Polystichum munitum*). Also found in leaf mold.	Coos, Douglas				NI	Not documented in Project vicinity.
Chace sideband *Monadenia chaceana*			SEN S&M-B	SEN S&M-B	Late-successional forest and open talus or rocky areas; associated with large woody debris in mesic, forested habitats; otherwise, moist, shaded rock surfaces.	Douglas Jackson	MD-D RO-D	Ump-DF-W-S RRS-D	RO (2006): 2.8mi SW of MP 81.31; RRS (1999): 0.6mi N of MP 161.45; F-W: ~0.3mi SW of MP 166.89; four documentations >500 ft from PCGP on BLM and NFS lands; see Survey and Manage stand-alone report for additional information..	MIIH	Modification of habitat and potential for injury or death.
Green sideband *Monadenia fidelis beryllica*			SEN	SEN	Generally inhabits deciduous stands (including alder [*Alnus* spp.]) and brush in wet, relatively undisturbed forest; low elevation; low coastal scrub.	Coos	CB-S RO-D	RRS-D		NI	Not documented in Project vicinity.
Traveling sideband *Monadenia fidelis celeuthia*			SEN	SEN	Dry basal talus and rock outcrops; oak/maple overstory; along spring run in rock and moist vegetation and moss; mixed conifer-hardwood forest.	Jackson	MD-D LV-D	F-W-D RRS-D	MD (T38,R3E; 2005), (T37S,R4W; 2005); observed at 14 locations during Project surveys within and outside of PCGP ROW, TEWAs, and UCSAs on RRS and UMP NFs between MP 154.9-175.3 and on MD and LV BLM Districts between MP 116.5-176.9.	MIIH	Modification of habitat and potential for injury or death.
Modoc sideband *Monadenia fidelis ssp. Nov.*			SEN	SEN	Talus and wetted rocky areas on lakeshore; mixed pine-Douglas fir forest or open grasslands; associated with seeps and springs in talus deposits.	Klamath	LV-D	F-W-D		NI	Not located during surveys.
Crater Lake tightcoil *Pristiloma arcticum crateris*			SEN S&M-B	SEN S&M-B	Mature conifer forests; perennially wet areas among rushes, mosses, and other surface vegetation or under rocks and woody debris within 30 feet of open water in wetlands, springs, seeps, and riparian areas.	Douglas Jackson	MD-S RO-D	F-W-D RRS-D UMP-D		NI	Not documented in Project vicinity.
Broadwhorl tightcoil *Pristiloma johnsoni*			STR	STR	Moist with coastal influence; abundant ground cover; conifer or hardwood overstory.	Douglas?	CB-S RO-D	RRS-S		NI	Not documented in Project vicinity.
Klamath taildropper *Prophysaon sp. Nov.*			STR	STR	Moist open areas (floodplains and spring margins) in ponderosa pine forest; elevation varies.	Douglas Jackson Klamath	CB-S RO-S	UMP-S RRS-D F-W-D	RRS (T38S,R4E; 2003): 4.1 mi S of MP 160.01; (T36S, R3E): 1.1 mi N of MP 157.0.	NI	Not documented in Project vicinity.
Siskiyou hesperian *Vespericola sierranas*			SEN	SEN	Terrestrial, usually found in perennially moist habitat such as springs, seeps and deep leaf litter along stream banks and under debris and rock. Prefers moist valley, ravine, gorge, or talus sites in areas not subject to flooding.	Jackson	MD-D RO-D	F-W-S RRS-D UMP-D	Observed at 22 locations during Project surveys within and outside of PCGP ROW, TEWAs, and UCSAs on RRS and WIN NFs between MP 110.18-164.69, and on MD and RO BLM Districts between MP 79.9-151.5.	MIIH	Modification of habitat and potential for injury or death.
Oregon giant earthworm *Driloleirus macelfreshi*			STR		Deep permanent burrows in fine-textured, compact, deep, little disturbed soils dominated by native forests		RO-S			NI	Not documented in Project vicinity.
Oregon cave amphipod *Stygobromus oregonensis (1)*				STR	In small cave near Roseburg, possibly extirpated.	Douglas		UMP-S	(T27S,R5W; 1967): 10.4 mi N of MP 75.23.	NI	Not documented in Project vicinity.
Franklin's bumblebee *Bombus franklini*	SOC		SEN	SEN	Grasslands associated with lakes, rivers, streams and seeps; 1400-4000 feet. Requires adequate supply of floral resources for continuous blooming throughout the flight season. Generalist forager. Eusocial bumblebee with a flight season from mid-May to the end of September.	Douglas Jackson	MD-S RO-S	RRS-D	(T27S,R5W; 1930): 7.8mi N of MP 69.7.	MIIH	Loss or modification of habitat.
Western bumblebee *Bombus occidentalis*			SEN	SEN	Prairie habitat in Oregon. Generalist pollinator; visits a wide range of plants. Queen emerges in late winter or early spring and starts new colony laying 8-16 eggs in first batch.	Coos Douglas Jackson Klamath	CB-S LV-S MD-D RO-S	F-W-D RRS-D		MIIH	Loss or modification of habitat.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c]		
Siskiyou short-horned grasshopper *Chloealtis aspasma*	SOC		SEN	SEN	Grassland/herbaceous habitats; associated with elderberry (*Sambucus* spp.).	Jackson	MD-D	RRS-D UMP-S	MD (T37S,R3E,S5; 1973): 0.1mi S of MP 153.49.	MIIH	Modification of habitat and potential for injury or death.
Siskiyou carabid gazelle beetle *Nebria gebleri siskiyouensis*	SOC				Unknown	Jackson				NI	Not documented in Project vicinity.
Siuslaw sand tiger beetle *Cicindela hirticollis siuslawensis*			SEN	SEN	Moist sand near the ocean, swales behind dunes, and upper beaches beyond high tides.	Coos	CB-D		Oregon Dunes (T23S, R13W, 2009): 8.7mi N of MP3.6.	NI	No suitable habitat in survey area or within 5 mi.
Cooley's lace bug *Acalypta cooleyi*			STR		Unknown.	Jackson	MD-D			NI	Not documented in Project vicinity.
Hairy shore bug *Saldula villosa*			SEN		Salt marsh species; may undergo submersion.	Coos	CB-D		Historical (1937) occurrence in Coos Bay, approximately 2.5 mi north of the Project.	NI	No recently documented occurrences in or near the Project area.
California shield-backed bug *Vanduzeeina borealis californica*			SEN	SEN	Tall grass prairies. Found in medium to high elevation natural balds and meadows.	Coos Douglas Klamath	CB-S LV-S RO-S	RRS-S UMP-S		NI	No suitable habitat in Project area.
Leona's little blue butterfly *Philotiella leona*				SEN	Mazama ash and pumice fields east of Crater Lake with sub-surface moisture and spurry buckwheat (*Eriogonum spergulinum reddingianum*) caterpillar host plant.	Klamath		F-W-D	Six-square-mile area near Sand Creek in Klamath County, approx. 9 mi E of Crater Lake National Park, and 40 mi NE of the Project.	NI	Does not occur in Project vicinity.
Gray-blue butterfly *Plebejus podarce (Agriades podarce)*			SEN	SEN	Subalpine meadows and marshy slopes with deep grasses and dense stands of false hellebore (*Veratrum viride*), eggs laid on host plant (shooting stars; *Dodecatheon* spp.).	Douglas Jackson Klamath	MD-D	F-W-D RRS-D UMP-D	F-WNF (T36S,R5E; 2010): 8.5mi N of MP 168.03.	MIIH	Modification of habitat and potential for injury or death.
Seaside Hoary elfin (previously Hoary elfin) *Callophrys polios maritima*			SEN	SEN	Maritime species found in close association with kinnikinnick (*Arctostaphylos uva-ursi*).		CB-S	RRS-S		NI	Does not occur in Project vicinity.
Johnson's hairstreak *Callophrys johnsoni (Mitoura johnsoni)*			SEN	SEN	Old-growth coniferous forests with red fir (*Abies magnifica*), western hemlock or grey pine (*Pinus sabiniana*) on which its parasitic host grows.	Coos Douglas Jackson Klamath	CB-D MD-D	F-W-D RRS-D UMP-D		MIIH	Modification of habitat and potential for injury or death.
Insular blue butterfly *Plebejus saepiolus littoralis*			SEN	SEN	Bogs, roadsides, stream edges, open fields, meadows, and open forests; hosts are clovers (*Trifolium* spp.).	Coos	CB-S	RRS-S		MIIH	Disturbance, potential modification of habitat
Yuma skipper *Ochlodes yuma*			SEN	SEN	Herbaceous wetland. Desert seeps and along streams, canals etc.	Klamath	LV-D			NI	Not documented in Project vicinity.
Mardon skipper butterfly *Polites mardon*			SEN	SEN	Small (0.5-10 acres) high-elevation (4,500-5,100 feet) grassy meadows within mixed conifer forests.	Jackson Klamath	CB-D MD-D	F-W-D RRS-D UMP-S	Howard Prairie, RRS (T37S,R4E; 2007 – All sites): 0.6mi SW of MP 159.95, 4.3mi SW of MP 159.95, 4.6mi SW of MP 164.22.	MIIH	Modification of habitat and potential for injury or death.
Coronis fritillary *Speyeria coronis coronis*			SEN	SEN	Mountain slopes, foothills, prairie valleys, chaparral, sagebrush, and forest openings; hosts are violets (*Viola* spp.).	Jackson	MD-D	RRS-D UMP-S		MIIH	Modification of habitat and potential for injury or death.

TABLE O-3

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		

a/ Status Key:
Federal Status: T = Threatened, E = Endangered, PT = Proposed Threatened, C = Candidate, SOC = Species of Concern; CH = Critical Habitat, PCH = Proposed Critical Habitat
State Status: T = Threatened, E = Endangered, C = Candidate, SC = Sensitive-Critical, SV = Sensitive-Vulnerable
BLM and Forest Service Status: SEN =Sensitive, STR = Strategic, S&M = Survey and Manage, letter after S&M = Survey and Manage Species Category (A – F)

b/ Occurrence Key:
BLM: CB = Coos Bay District, RO = Roseburg District, MD = Medford District, LV = Lakeview District
Forest Service: F-W = Fremont-Winema National Forest, RRS = Rogue River-Siskiyou National Forest, UMP = Umpqua National Forest

D = Documented occurrence: A species located on land administered by the BLM or the Forest Service based on historic or current known sites of a species reported by a credible source for which BLM and the Forest Service have knowledge of written, mapped or specimen documentation of the occurrence.
S = Suspected occurrence: Species is not documented on land administered by the BLM or the Forest Service, but may occur on the unit because: 1) BLM District or National Forest is considered to be within the species' range and 2) appropriate habitat is present or 3) known occurrence of the species (historic or current) in vicinity such that the species could occur on BLM or FS land.

c/ Pacific Connector Pipeline Project: mollusks and red tree vole documented within 500 feet of the proposed pipeline; all other species are documented within 3 mi of the proposed pipeline.

d/ Effect of Impact:
Species federally listed or proposed for listing:
NE = No Effect
NLAA = Not Likely to Adversely Affect
LAA = Likely to Adversely Affect

All other species:
NI = No Impact
MIIH = May Impact Individuals or Habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species

e/ Aquatic Invertebrates are included in table O-4 in appendix O.

References:
Species Status and Occurrence: FWS 2013g; ORBIC 2006a, 2006b, 2012, and 2013; Marshall et al. 2006; ISSSSP 2011; NSR 2012; ODFW 2008c, 2013d; BLM 2006a; Forest Service 2006b.
Expected Habitat: Adamus et al. 2001 ; Csuti et al. 2001 ; NatureServe 2013 ; ORBIC 2006b ; Gilligan et al. 1994 ; Kozloff 1976 ; ISSSSP 2014.

TABLE O-4

Special Status Fish Species and Aquatic Invertebrates That May Occur Near the JCE & PCGP Project

Common and/or Scientific Name	Status [a/]				Life History and Expected Habitat	Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forests Service	Waterbodies Crossed by Project/ Documentation in Vicinity of Project Area [c/]		
Nonanadromous Freshwater Fish											
Western Brook Lamprey *Lampetra richardsoni*		SC			Non-parasitic and nonanadromous. Ammocoetes in stream eddies with silt and/or sand substrates. Adults spawn over gravel late April - early June	Coos Douglas Jackson			Most perennial streams west of the Cascades.	MIIH	Potential disturbance or change to habitat.
Upper Klamath redband trout *Oncorhynchus mykiss newberrii*	SOC	SV		SEN	Highly erosive landscapes with high gradients, steep slopes, and high solar radiation; occupies remnant streams in seven Pleistocene lake beds in Oregon. Highly fragmented and isolated populations.	Klamath		F-W-D RRS-D	Spawning occurs in Spencer Creek from mouth to RM 12; most spawning occurs between Roads 100 and 110.	MIIH	Potential disturbance or change to habitat.
Umpqua chub *Oregonichthys kalawatseti*	SOC	SC	SEN	SEN	Endemic to the mainstem and South Umpqua River, resident species. Occupies habitats with higher current velocities; spawning occurs primarily in rocky areas.	Douglas	MD-D RO-D	UMP-D	Tenmile Creek (1971); endemic to Umpqua and South Umpqua rivers.	MIIH	Potential disturbance or change to habitat.
Millicoma dace *Rhinichthys cataractae ssp.*	SOC	SV	SEN		Endemic to Coos Basin, resident species. Prefers swift current associated with cobble and boulders and probably high velocity waters.	Coos Douglas	CB-D		South Fork Coos River.	MIIH	Potential disturbance or change to habitat.
Klamath largescale sucker *Catostomus snyderi*	SOC				Limited to Upper Klamath Basin and its tributaries. In rocky pools, runs of creeks, and small rivers (with moderate gradient), lakes and reservoirs Spawning usually occurs from late March to mid-April, and sometimes earlier in small tributary streams.	Klamath		F-W-D RRS-S	Upper Klamath Lake and tributaries.	MIIH	Potential disturbance or change to habitat.

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Anadromous and Marine Fish											
River lamprey *Lampetra ayresii*	SOC				Anadromous species; migrates to sea and returns to freshwater to spawn in the spring. Freshwater habitat includes rivers and creeks, with low to moderate gradients and pools and riffles. Marine habitats are near shore and estuarine habitats include bay/sound and river mouths and tidal rivers.	Coos Douglas			Coastal drainages.	MIIH	Potential disturbance or change to habitat.
Pacific lamprey *Lampetra tridentata*	SOC	SV			Anadromous species, spawning habitat is similar to salmonids including cool, flowing water and clean gravel. Rearing areas are slow-moving backwaters with fine sediment. Larvae spend several years in freshwater before transforming and migrating to the ocean.	Coos Douglas Jackson Klamath	CB-D LV-D MD-D RO-D		Coos Bay and coastal drainages.	MIIH	Potential disturbance or change to habitat.

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	Federal	State	BLM	Forest Service		County	BLM	Forests Service	Waterbodies Crossed by Project/ Documentation in Vicinity of Project Area [c/]		
Chinook salmon *Oncorhynchus tshawytscha* Oregon Coast ESU Coastal Spring SMU		SC			Anadromous species that rears in the Pacific Ocean for most of its life and spawns in freshwater streams. Most enter Oregon's coastal rivers April to December, but some start in February. Spawning generally occurs from August to early November for spring Chinook. Preferred spawning and rearing areas have a low gradient (<3%); adults often ascend to higher gradient reaches to find spawning areas. Spawns and rears in a range of sizes of streams and rivers, and often uses estuaries for rearing. Adults require deep pools within proximity to spawning areas where they hold and mature between migration and spawning.	Coos Douglas			North and South Umpqua Rivers, and Umpqua HUs.	MIIH	Potential disturbance or change to habitat.

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	Federal	State	BLM	Forest Service		County	BLM	Forests Service	Waterbodies Crossed by Project/ Documentation in Vicinity of Project Area [c/]		
Chinook salmon *Oncorhynchus tshawytscha* Southern Oregon and Northern California Coast ESU Rogue Spring SMU Rogue Fall SMU		SV	SEN	SEN	Anadromous species that rears in the Pacific Ocean for most of its life and spawns in freshwater streams. Most enter Oregon's coastal rivers April to December, but some start in February. Spawning generally occurs from October to early March. Preferred spawning and rearing areas have a low gradient (<3%); adults often ascend to higher gradient reaches to find spawning areas. Spawns and rears in a range of sizes of streams and rivers, and often uses estuaries for rearing. Adults require deep pools within proximity to spawning areas where they hold and mature between migration and spawning.	Jackson	CB-D MD-D	RRS-D	Rogue River and tributaries (spawning and rearing).	MIIH	Potential disturbance or change to habitat.
Chum salmon *Oncorhynchus keta* Pacific Coast ESU Coastal SMU		SC	SEN	SEN	Anadromous species that rears in the Pacific Ocean for most of its life and spawns in freshwater streams in the fall. Utilizes low gradient, gravel-rich, barrier-free freshwater habitats and productive estuaries. Juveniles migrate to estuarine environments after emergence.	Coos Douglas	CB-D RO-D	UMP-I RRS-I	Unknown.	NI	Does not occur in Project vicinity.
Steelhead *Oncorhynchus mykiss* Klamath Mountains Province ESU Rogue Summer SMU		SV	SEN		Anadromous species; juveniles rear in freshwater streams 1-4 years. Adults live in marine environment prior to spawning in winter or spring. May spawn more than once.	Jackson	CB-D MD-D		Upper Rogue River.	MIIH	Potential disturbance or change to habitat

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	Federal	State	BLM	Forest Service		County	BLM	Forests Service	Waterbodies Crossed by Project/ Documentation in Vicinity of Project Area [c/]		
Steelhead *Oncorhynchus mykiss* Oregon Coast ESU Coastal Winter SMU	SOC	SV	SEN	SEN	Anadromous species; juveniles rear in freshwater streams 1-4 years. Adults live in marine environment prior to spawning mostly in winter or spring. May spawn more than once.	Coos Douglas	CB-D MD-D RO-D	UMP-D RRS-D	Coos, Coquille, South Umpqua, and Umpqua HUs.	MIIH	Potential disturbance or change to habitat.
Coho salmon *Oncorhynchus kisutch* Southern Oregon/Northern California Coast ESU Rogue (and Klamath) SMU	T/CH	SV			Juvenile summer and winter rearing and spawning often located in small headwater streams. Juvenile and adult migration corridors, as well as spawning areas are found in tributaries, mainstream reaches, and estuarine zones. Growth and development of adults occurs primarily in near- and off-shore marine waters. Spawning occurs late summer to mid-winter, and juvenile migration occurs in spring.	Jackson	CB-D MD-D	RRS-D	Klamath River, Rogue River; Upper Rogue HU.	LAA	Potential disturbance or change to habitat.
Coho salmon *Oncorhynchus kisutch* Oregon Coast ESU Coastal SMU	T/CH	SV			Juvenile summer and winter rearing and spawning often located in small headwater streams. Juvenile and adult migration corridors, as well as spawning areas are found in tributaries, mainstream reaches, and estuarine zones. Growth and development of adults occurs primarily in near- and off-shore marine waters. Spawning occurs November to March, and juvenile migration occurs in spring.	Coos Douglas	CB-D RO-D MD-D	UMP-D RRS-D	Coos Bay, Coquille River, South Umpqua River; South Umpqua Sub-basin HU, and Coos Sub-basin HU.	LAA	Potential disturbance or change to habitat.

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Eulachon *Thaleichthys pacificus* Southern DPS	T/CH				Rivers that are glacier-fed and/or have peak spring freshets are used for spawning. Adults spend 3 to 5 years in saltwater before returning to freshwater to spawn from late winter through early summer, with specific timing dependent on geographic region. Adults are thought to imprint on estuaries, which are also used by juveniles before dispersing through shallow nearshore areas to deeper areas over the continental shelf.	Coos Douglas			Pacific Ocean and Coos Bay.	NLAA	Presence in Coos Bay is rare. With mitigation, chance of adverse impacts is remote.
Green sturgeon *Acipenser medirostris* Southern DPS	T				Spawns in deep pools in large, turbulent river mainstems, generally from March through July. Utilizes marine waters and estuaries.	Coos Douglas	CB-D	RRS-I	Pacific Ocean and Coos Bay estuary to head of tide.	NLAA	Potential disturbance or change to habitat, potential mortality (subadults).
Cowcod *Sebastes levis*	SOC				Marine environments; 68-1200 feet depths; soft and hard bottoms, canyons.	Coos				NI	Not documented in Project vicinity.
Aquatic Invertebrates											
Great Basin ramshorn *Helisoma newberryi newberryi*				SEN	Larger lakes, slow rivers, larger spring sources, and spring-fed creeks; burrows in soft mud.	Klamath		F-W-S	Klamath River (T38S R9E, 1997) 3.6 mi N of MP 200.06.	NI	Not documented in Project vicinity.
Montane peaclam *Pisidium ulttramontanum*			SEN	SEN	Associated with open water lake, river, and stream habitat. Freshwater, herbaceous wetlands, and shallow water; benthic species. Occurs in streams, lakes or pools that are spring-influenced, and prefers sand or gravel substrates. Often occurs on roots of *Salicornia* species.	Klamath	MD-S	F-W-D	PV (T40S,R11E,S25; no date): approximately 0.2mi S of MP 221.83; Lost Sub-basin.	MIIH	Potential disturbance, mortality, and loss or modification of habitat.

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California floater mussel *Anodonta californiensis*	SOC		STR	STR	Low elevation lakes and lake-like streams with shallow water. Shallow muddy or sandy habitats in larger rivers, reservoirs, and lakes. Reaches maturity within 4 to 5 years with a lifespan of 10 to 15 years.	Coos Klamath		UMP-S RRS-S F-W-D	MP 17.24-20.96 (Coquille River historic population); Coos, Coquille, and Upper Klamath sub-basins.	MIIH	Potential disturbance, mortality, and loss or modification of habitat.
Western ridged mussel *Gonidea angulata*			SEN	SEN	Creeks and rivers with varying substrates in Pacific drainages, rarely found in lakes or reservoirs.	Coos Douglas Klamath	CB-S RO-D LV-S	F-W-D RRS-S UMP-S	South Umpqua River, Middle Fork Coquille River, and Lost River near Merrill.	MIIH	Potential disturbance, mortality, and loss or modification of habitat.
Pinto abalone *Haliotis kamtschatkana*	SOC				Typically in low intertidal zone. Feeds mostly on kelp and drift algae. Spawns April to June.	Coos			Rare in Coos Bay.	MIIH	Potential for disturbance and habitat modification if species is present.
Newcomb's littorine snail *Littorina subrotundata*	SOC		SEN	SEN	Inhabits salt marshes at the edge of bays and estuaries on glasswort/pickleweed; tolerant of fresh and saltwater. Cold, clear, well-oxygenated water on a various types of sand bottoms. Found in upper intertidal zones. Eggs are laid in moist locations in June or July and hatchlings emerge beginning in mid-July through early August.	Coos	CB-D		Historical occurrence on the North Spit, approximately 1 mile SW of the Project.	MIIH	Potential disturbance, mortality, and loss or modification of habitat.
Fall Creek pebblesnail *Fluminicola sp. Nov.*			STR		Large cold springs and outflows including medium-sized creeks; gravel/cobble substrate.	Jackson Klamath	MD-D		Upper Klamath Sub-basin.	NI	Not documented in Project vicinity.
Keene Creek pebblesnail *Fluminicola sp. Nov.*			STR	STR	Small to medium sized springs and spring-influenced creeks.	Jackson Klamath	MD-D LV-D	RRS-D F-W-S	Upper Rogue and Upper Klamath sub-basins.	NI	Not documented in Project vicinity.

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Fredenburg pebblesnail *Fluminicola sp. Nov.*			STR S&M-A	S&M-A	Freshwater in Middle Rogue and Upper Klamath sub-basins; possibly extirpated. Found in narrow and shallow small, cold spring runs, on cobbles and gravel.	Jackson Klamath	MD-D		Upper Klamath sub-basin.	NI	Not documented in Project vicinity.
Toothed pebblesnail *Fluminicola sp. Nov.*			STR		Very large, cold springs and their outflow with exceptionally good water quality and gravel or boulder substrates.	Jackson	MD-D		Upper Rogue and Upper Klamath sub-basins.	NI	Not documented in Project vicinity.
Klamath Rim pebblesnail *Fluminicola sp. Nov.*			STR S&M-A	S&M-A	Gravel or boulder substrates with flowing water (cold, oligotrohpic water with high dissolved oxygen); rarely found in springs, avoids dense macrophyte beds.	Klamath	MD-S	RRS-D F-W-S	Upper Klamath Sub-basin.	NI	Not documented in Project vicinity.
Turban pebblesnail *Fluminicola turbinformis*				SEN	Found to date only in one, large oligotrophic spring complex with very cold water, in semi-arid sage scrub. Abundant *Rorippa* and *Mimulus* flora present. Substrate is mud, basalt gravel, bedrock and cobble, with bedrock predominate in area of occurrence.	Klamath		F-W-D		NI	Not documented in or near Project area.
Casebeer pebblesnail *Fluminicola sp. Nov.*			STR	STR	Freshwater.	Klamath	LV-S	F-W-S	Lost Sub-basin.	MIIH	Potential mortality and loss or modification of habitat.
Crooked Creek pebblesnail *Fluminicola sp. Nov*.				STR	Freshwater.	Klamath		F-W-D		NI	Not documented in or near Project area.
Lake of the Woods pebblesnail *Fluminicola sp. Nov.*			STR	STR	Freshwater.	Klamath	LV-D	F-W-D RRS-D	F-W NF: within ROW near MP 171.05.	MIIH	Potential mortality and loss or modification of habitat.
Lost River pebblesnail *Flumunicola sp. Nov.*				STR	Occurs in cold, swift-flowing freshwater in large spring-fed creeks, often near shore. Substrates usually sand-cobble. Periphyton and perilithon grazer.	Klamath		F-W-S	Lost Sub-basin.	MIIH	Potential mortality and loss or modification of habitat.

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Tigerlily pebblesnail *Fluminicola sp. Nov.*			STR	STR	Freshwater in Upper Klamath sub-basins; possibly extirpated.	Klamath	LV-S	F-W-D		NI	Not documented in or near Project area.
Odessa pebblesnail *Flumunicola sp. Nov.*				STR	Freshwater.	Klamath		F-W-D		NI	Not documented in or near Project area.
Ouxy Spring pebblesnail *Flumunicola sp. Nov.*				STR	Freshwater in Upper Klamath Sub-basins, possibly extirpated	Klamath		F-W-D		NI	Not documented in or near Project area.
Wood River pebblesnail *Flumunicola sp. Nov.*				STR	Freshwater.	Klamath		F-W-D		NI	Not documented in or near Project area.
Tall pebblesnail *Flumunicola sp. Nov.*				STR	Freshwater in Upper Klamath sub-basins; possibly extirpated. Springs and spring runs; substrates include mud, silt, sand to gravel, cobble, and boulders.	Klamath		F-W-S		NI	Not documented in or near Project area.
Klamath Lake springsnail *Pyrgulopsis sp. Nov*				STR	Freshwater.	Klamath		F-W-D	Lost Sub-basin.	MIIH	Potential mortality and loss or modification of habitat.
Lost River springsnail *Pyrgulopsis sp. Nov*			STR	STR	Freshwater.	Klamath	LV-S	F-W-S	Lost Sub-basin.	MIIH	Potential mortality and loss or modification of habitat.
Pristine springsnail *Pristinicola hemphilla*			STR	STR	Inhabits freshwater springs, spring outflow channels, and spring-influenced stream reaches with cobble substrates, slow to moderate flows, and shallow, cold, clear waters that are relatively undisturbed.	Jackson	MD-D	RRS-D		NI	Not documented in or near Project area.
Archimedes springsnail *Pyrgulopsis archimedis*				SEN	Freshwater in Upper Klamath and Lost River sub-basins, possibly extirpated. Prefers gravel-boulder basalt and pumice substrates. Completely aquatic with a lifespan of 1 year.	Klamath		F-W-D	Lost Sub-basin.	MIIH	Potential mortality and loss or modification of habitat.
Crooked Creek springsnail *Pyrgulopsis intermedia*			SEN		Freshwater, possibly extirpated. . Clear, cold springs, spring-influenced creeks with gravel-boulder substrates.	Klamath	LV-S			NI	Not anticipated to occur in watersheds crossed by the Project.

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Jackson Lake springsnail *Pyrgulopsis robusta*			SEN	SEN	Freshwater, possibly extirpated. Cold water habitats, predominantly large springs and spring-influenced portions of streams, lakes, and rivers. Found on a variety of substrates. Semelparous; lays eggs on hard substrates. Emergence of young snails in summer and fall. Lifespan of approximately 1 year.	Klamath	LV-S			NI	Not anticipated to occur in watersheds crossed by the Project.
Lined rams-horn *Vorticifex effusa diagonalis*			SEN	SEN	Freshwater; possibly extirpated. Large streams, spring-influenced lakes, and highly oxygenated cold water on boulder-gravel substrate. Semelparous with a lifespan of 1-2 years. Eggs are laid from spring to fall; they attach to plants, stones, or other objects. No larval stage. Not active in the winter.	Klamath		F-W-D		MIIH	Potential loss or modification of habitat.
Klamath rams-horn *Vorticifex klamathensis klamathensis*				STR	Freshwater, possibly extirpated in Upper Klamath Lake and Lost sub-basins. Spring-fed lakes and spring-influenced streams, but not springs. Very cold, highly oxygenated water with boulder-gravel substrate. Semelparous with a lifespan of 1-2 years. Lays eggs from spring to fall. Hatches as young snails.	Klamath		F-W-D	Lost Sub-basin.	MIIH	Potential mortality and loss or modification of habitat.
Sinitsin rams-horn *Vorticifex klamathensis sinitsini*				STR	Freshwater; possibly extirpated in Upper Klamath Lake sub-basins, springs and spring runs, substrates include mud, silt, sand, gravel, cobble, and boulders. Hermaphroditic and capable of self-fertilization. Semelparous with a lifespan of 1 year.	Klamath		F-W-S		NI	Not documented in or near Project area.

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Robust walker *Pomatiopsis binneyi*			SEN	SEN	Freshwater; possibly extirpated Coos Sub-basin. Seeps, rivulets, shallow mud banks and marsh seepages leading into shallow streams. Semi-aquatic.	Coos	CB-S	RRS-D		NI	Not documented in or near Project area.
Pacific walker *Pomatiopsis californica*			SEN	SEN	Freshwater; possibly extirpated from Coos Sub-basin. Semi-aquatic; inhabits wet leaf litter and vegetation adjacent to flowing or standing water in humid, shaded areas.	Coos	CB-D	RRS-S	Coos Subbasin.	MIIH	Potential mortality and loss or modification of habitat.
Marsh walker *Pomatiopsis chacei*			STR	STR	Freshwater, shaded, swampy sites, margins of seeps, springs, and stable streams with gravel substrate.	Coos	CB-S	RRS-S		NI	Not documented in or near Project area.
Scale lanx *Lanx kalmathensis*			SEN	SEN	Spring-influenced portions of large lakes and streams or limnocrene springs with boulder-cobble substrates and well-oxygenated, cold water.	Klamath	MD-S	F-W-D RRS-S	Lost and Upper Klamath sub-basins.	NI	Not documented in or near Project area.
Rotund lanx *Lanx subrotunda*			SEN	SEN	Found in unpolluted rivers and large streams at low to moderate elevations, in highly oxygenated, swift-flowing, cold water on stable cobble, boulder, or bedrock substrates.	Coos Douglas	CB-S RO-D	F-W-D UMP-D	Distribution includes portions of the North Umpqua River below the confluence with Little River, all of Little River, portions of the South Umpqua River and major tributaries above Roseburg, and Cow Creek.	NI	Not documented in or near Project area.

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Highcap lanx *Lanx alta*			SEN	SEN	Freshwater in Middle Rogue and Upper Klamath sub-basins; possibly extirpated. Larger tributaries and outcrops, on upper surfaces of bedrock and bedrock outcrops. Cold, fast-flowing, highly oxygenated, clear water. Semelparous with a lifespan of 1 to 2 years. Eggs are laid from spring to fall. No larval stage. Feeds through scraping.	Jackson Klamath	MD-D	F-W-D RRS-D		NI	No suitable habitat in Project area.
Denning's agapetus caddisfly *Agapetus denningi*	SOC		STR	STR	Creeks; possibly extirpated. Streams with cobble, boulder, or bedrock substrates free of fine sediment. Streams often have an open mixed deciduous-coniferous canopy. Larvae are aquatic and feed by scraping periphyton and fine detritus from rock and wood. Univoltine, from egg development through 5 larval instars, pupate and emerge as adults in one year. Feeds through scraping.	Jackson	MD-S	RRS		NI	Not documented in or near Project area.
Cascades apatanian caddisfly *Apatania tavala*	SOC				Streams with low to medium current and cobbles or coarse substrate at 4000-6000 feet in elevation. Various degrees of shading required, not present in clearcuts.	Douglas Klamath				NI	Not documented in or near Project area.
Mt. Hood primitive brachycentrid caddisfly *Eobrachycentrus gelidae*	SOC				Very cold streams. Larvae are found on moss on submerged rocks or along edges in small streams. Adults crawl onto sunny snow banks.	Douglas	CB-S			NI	Not documented in or near Project area.

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Green Springs Mountain farulan caddisfly *Farula davisi*	SOC		STR	STR	Not well studied. Probably uses small streams or seeps, maybe marshes. Associated with exposed bedrock having thin streams passing over the bedrock. Univoltine; larvae pupate in aggregations on the underside of rocks and logs.	Jackson	MD-D	RRS-S	Upper Klamath Sub-basin.	MIIH	Potential mortality and loss or modification of habitat.
Tombstone Prairie farulan caddisfly *Farula reapiri*	SOC				Larvae found in small, cold, spring-fed streams shaded by old growth. Stream mosses abundant, large amounts of woody debris present.	Douglas				NI	Not documented in or near Project area.
Sagehen Creek goeracean caddisfly *Goeracea oregona*	SOC				Creeks or springs.	Douglas Jackson				NI	Not documented in or near Project area.
Schuh's homoplectran caddisfly *Homoplectra schuhi*	SOC			STR	Spring seepage areas in montane forested areas as well as adjacent herbaceous and shrub vegetation. Substrates of unconsolidated coarse particulate organic matter, moss, and gravel with subsurface water flows at moderate velocities.	Jackson Klamath		F-W-S RRS-S	LV (T40S,R6E,S13; 1963): S of MP 184.24; Lost and Upper Klamath sub-basins.	MIIH	Potential mortality and loss or modification of habitat.
A caddisfly (no common name) *Moselyana comosa*			STR	STR	Creeks or springs, forested seeps, particularly subalpine forest seeps.	Douglas Jackson	CB-S MD-S	F-W-S RRS-D UMP-S		NI	Not documented in or near Project area.
A caddisfly (no common name) *Namamyia plutonis*			SEN	SEN	Open water lake, river, and stream habitats. Tends to be found associated with creeks or springs in densely forested old growth or mature forest watersheds. Larvae found in areas of coarse gravel mixed with silt and organic sediment.	Jackson	CB-S	F-W-S RRS-D UMP-S		MIIH	Potential disturbance and modification of habitat.

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Common and/or Scientific Name	Status [a/]				Life History and Expected Habitat	Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forests Service	Waterbodies Crossed by Project/ Documentation in Vicinity of Project Area [c/]		
A caddisfly (no common name) *Rhyacophila chandleri*			SEN	SEN	Very cold larger spring-fed creeks or springs, often with cobble and boulder substrate with high sand/gravel embedding.	Douglas	CB-S		South Umpqua Sub-basin.	MIIH	Potential mortality and loss or modification of habitat.
Haddock's Rhyacophilan caddisfly *Rhyacophila haddocki*			SEN	SEN	Creeks or springs, clear mountain streams, sometimes prefers riffles. In order to develop, larvae and pupae require cool, well-aerated microsites free of excessive fine sediments. Pupae are found on the underside of cobbles at base of riffles, cascades, or bedrock chutes.	Douglas	CB-S	RRS-D		NI	Not documented in or near Project area; extremely restricted range.

a/ Status Key:
Federal Status: T = Threatened, CH = Critical Habitat, SOC = Species of Concern
State Status: SC = Sensitive-Critical, SV = Sensitive-Vulnerable
BLM and Forest Service Status: SEN = Sensitive Species, STR = Strategic Species, S&M = Survey and Manage, letter after S&M = Survey and Manage Species Category (A – F)

b/ Occurrence Key:
BLM: CB = Coos Bay District, RO = Roseburg District, MD = Medford District, LV = Lakeview District
Forest Service: F-W = Fremont-Winema National Forest, RRS = Rogue River-Siskiyou National Forest, UMP = Umpqua National Forest
D = Documented occurrence: A species located on land administered by the BLM or the Forest Service based on historic or current known sites of a species reported by a credible source for which BLM and the Forest Service hasve knowledge of written, mapped or specimen documentation of the occurrence.
S = Suspected occurrence: Species is not documented on land administered by the BLM or the Forest Service, but may occur on the unit because: 1) BLM District or National Forest is considered to be within the species' range and 2) appropriate habitat is present or 3) known occurrence of the species (historic or current) in vicinity such that the species could occur on BLM or FS land.
I = Forest Service Actions Influence Downstream

c/ Documentation within Project Area: Aquatic invertebrates documented within 500 feet of the proposed Pacific Connector Pipeline Project alignment.

d/ Effect of Impact:
Species federally listed or proposed for listing:
NE = No Effect
NLAA = Not Likely to Adversely Affect
LAA = Likely to Adversely Affect
All other species:
NI = No Impact
MIIH = May Impact Individuals or Habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species

TABLE O-4

Special Status Fish Species and Aquatic Invertebrates That May Occur Near the JCE & PCGP Project

Common and/or Scientific Name	Status [a/]				Life History and Expected Habitat	Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forests Service	Waterbodies Crossed by Project/ Documentation in Vicinity of Project Area [c/]		

Species Fish Type Abbreviations:

SMU Species Management Unit (Oregon State Designation only)
ESU Evolutionarily Significant Unit (NMFS designation)
DPS Distinct Population Segment (NMFS and FWS designations)

References:
Status and Occurrence References: FWS 2013e, ORBIC 2012; ISSSSP 2011, Kostow 1995, ODFW 2008c, ODFW 2014a.
Life History and Expected Habitat References: Kostow 1995, NatureServe 2013, ODFW 2005, Laufle et al. 1986, Pauley et al. 1986, NMFS 2012, ISSSSP 2014.
Waterbodies Crossed: ORBIC 2012, Kostow 1995.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Bryophytes											
Aloina bifrons			STR		Arid shrub-steppe (sagebrush) and grassland habitat below 4,000 feet. A component of biological soil crusts.		LV-S			NI	Not documented in Project vicinity.
Tiny Notchwort *Anastrophyllum minutum*			SEN	SEN	On peaty soil >5,500 feet. In the *Tsuga mertensiana* zone, typically associated with ledges or at the base of cliffs.	Jackson	MD-S	UMP-S RRS-S FW-S		NI	Not documented in Project vicinity.
Broad-leaved lantern moss *Andreaea schofieldiana*			SEN	SEN	Forms mats on dry and exposed to moist, shaded igneous rocks, montane to subalpine.		CB-S MD-D	UMP-S RRS-D		NI	No suitable habitat in Project area.
Anoectangium aestivum			STR		Moist cliffs, humid cliff crevices, and overhanding rocks, from near sea-level to subalpine, mostly in coastal areas.	Jackson	MD-D			NI	Not documented in Project vicinity.
Anomobryum julaceum (filiforme)			STR	STR	Damp outcrops, earth cliff crevices, cliff crevices, tussock tundra with seeps and late snow melt areas, granitic outcrops.	Klamath	MD-S	UMP-S RRS-S FW-D		NI	Not documented in Project vicinity.
Spidery threadwort *Blepharostoma arachnoideum*			SEN	SEN	Old growth forests, in mesic habitats, where it most often grows on rotten logs.	Douglas		UMP-D		NI	Not documented in Project vicinity.
Giant fourpoint *Barbilophozia lycopodioides*			SEN	SEN	Forming mats on peaty soil on damp ledges of rock outcrops and cliffs at higher elevations (known sites in OR and WA: 3,400-7,500 feet).			FW-S		NI	Not documented in Project vicinity.
Brotherella roelli			S&M - E	S&M - E	Rotten wood and bark in cool to moist mixed deciduous and conifer forest, usually at low elevations along valley margins.					NI	Not documented in Project vicinity.
Bruchia bolanderi			STR	STR	Montane meadows and streambanks, disturbed soil.	Klamath	LV-S	RRS-D FW-D		NI	Not documented in Project vicinity.
Bryoerythrophyllum columbianum			STR		Arid shrub-steppe (sagebrush) and grassland habitat below 4,000 feet. A component of biological soil crusts		LV-S			NI	Not documented in Project vicinity.
Beautiful bryum *Bryum calobryoides*			SEN	SEN	Rock outcrops and shallow soil	Jackson	RO-S MD-D	UMP-S RRS-D		NI	Not documented in Project vicinity.
Buxbaumia aphylla			STR	STR	Soil and shallow soil over rock.	Douglas Klamath	CB-S MD-S	UMP-D RRS-S FW-D		NI	Not documented in Project vicinity.
Buxabaumia viridis			S&M-D	S&M-D	Grows on rotten stumps and logs, on mineral or organic soils, at middle elevations under cool, shaded humid conditions.	Coos Douglas Jackson	CB-D RO-D MD-D	UMP-D RRS-D FW-D	MD BLM (2001, 2002): 60' E of TEWA 115.81-N and 150 W of TEWA 115.83-W near MP 115.84; 1 site in TEWA 119.50-W near MP 119.54; none observed by Pacific Connector survey efforts. See the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Bog pouchwort *Calypogeia sphagnicola*			SEN	SEN	Sphagnum containing wetlands.	Coos Douglas	CB-D MD-D	UMP-D RRS-D		NI	Not documented in Project vicinity.
Campylopodiella flagellacea			STR		In California, collected on a seeping metamorphic rock road bank. (Habitat info on the Jackson Co. population is not available.)	Jackson	MD-D			NI	Not documented in Project vicinity.
Campylopus schmidii			SEN	SEN	Nutrient-poor sandy substrates near the coast. Grows on shaded to exposed sand around the edges of vernal pools. Also seen on exposed seasonally flooded sand on deflation plains.		CB-S RO-D			NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Campylopus subulatus			STR		Low-elevation species with suboceanic tendency. In California, found in an oak woodland, Douglas-fir forest and on sand dunes with Pinus contorta from 80-200 m.	Douglas Jackson	CB-S MD-D RO-D			NI	Not documented in Project vicinity.
Spiny threadwort *Cephaloziella spinigera*			SEN	SEN	Wetlands containing Sphagnum.	Klamath	CB-S RO-S MD-D	UMP-S RRS-D FW-D		NI	Not documented in Project vicinity.
Chiloscyphus gemmiparus			STR	STR	On rocks in cold water streams.	Klamath	MD-S	UMP-S RRS-D FW-S		NI	Not documented in Project vicinity.
Racomitrium moss *Codriophorus depressus* (formerly *Racomitrium depressum)*			SEN	SEN	On rocks in montane streams.	Jackson	CB-S RO-S MD-D	UMP-S RRS-S FW-S		NI	Not documented in Project vicinity.
Codriophorus ryszardii			STR	STR	Forming mats on shaded, moist rocks and cliffs along shady streams or in forests, often in the splash zone, but never aquatic. Elevations for known sites in OR and WA: 1,000-6,000 feet.		CB-S	UMP-S RRS-S		NI	Not documented in Project vicinity.
Cryptomitrium tenerum			SEN	SEN	Forms small to locally extensive mats on bare, usually shaded and humid soil on hillsides, rock outcrops, and streambanks. In OR, between sea level and 1,000 feet. Root balls and cutbanks are favored habitat in forests.		CB-S	RRS-D		NI	Not documented in Project vicinity.
Didymodon norrisii			STR	STR	Occurs on rock, outcrops, calcareous and volcanic boulders, fields, and cliffs in runoff areas, in low to moderate elevations (200-1,500 m).	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Diplophyllum albicans			S&M-D	S&M-D						NI	Not documented in Project vicinity.
Diplophyllum plicatum			STR S&M - B	STR S&M - B	Moist cool forests on bark, rotting wood, humus and soil.	Coos Douglas	CB-D RO-S MD-D	RRS-S		NI	Not documented in Project vicinity.
Encalypta brevicolla var. crumiana			S&M - B	S&M - B		Jackson	MD-S	UMP-S		NI	Not documented in Project vicinity.
White-mouthed Extinguisher-moss *Encalypta brevicollis*			SEN	SEN	Deep, rocky ravine.	Coos	CB-S MD-S	RRS-D UMP-S		NI	Not documented in Project vicinity.
Candle snuffer moss *Encalypta brevipes*			SEN	SEN	Soil on ledges and in crevices on cliffs, reported from both igneous and siliceous substrates.		CB-S	UMP-S RRS-D		NI	Not documented in Project vicinity.
Entosthodon californicus			STR		Clay or fine sandy soil in disturbed areas such as ditches, roadsides, vernal pools and seasonally flooded areas at moderate elevations. Often mixed in with grass.	Jackson	MD-D			NI	Not documented in Project vicinity.
Banded cord-moss *Entosthodon fascicularis*			SEN	SEN	Seasonally wet, exposed soil in seeps or along intermittent streams. Usually hidden among grasses, other mosses, and litter. Known habitats: grassland, oak savanna, grassy balds, and rock outcrops. In OR, known at elevations below 3,000 feet.		CB-S RO-S MD-S	UMP-S RRS-S		NI	Not documented in Project vicinity.
Ephemerum crassinervium			SEN		Bare soil, high light levels, and seasonal moisture.	Jackson	MD-D			NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Grimmia anomala			STR	STR	On rock, mid to moderately high elevation.	Jackson Klamath	RO-S MD-D LV-S	UMP-S RRS-D FW-D		NI	Not documented in Project vicinity.
Braided frostwort *Gymnomitrion concinnatum*			SEN	SEN	On peaty soil of cliffs and rock outcrops, full exposure or shaded. In OR and WA, it has only been found in subalpine parkland areas.		CB-S RO-S MD-S	UMP-S		NI	Not documented in Project vicinity.
Haplomitrium hookeri			SEN		Growing on soil in full sun, intermixed with other liverworts and hornworts.		CB-S			NI	Not documented in Project vicinity.
Great mountain flapwort *Harpanthus flotovianus*			SEN	SEN	Wet places, often with sphagnum.	Klamath		UMP-S RRS-D FW-D		NI	Not documented in Project vicinity.
Blandow's feather moss *Helodium blandowii*			SEN	SEN	Montane fens, usually with calcareous ground water.	Douglas Jackson Klamath	RO-S MD-S	UMP-D RRS-D FW-D		NI	Not documented in Project vicinity.
Herbertus aduncus			S&M - B	S&M - B	Although often an epiphyte in the northern part of its range, this species is found only on cliffs in Oregon. Its primary associates are mosses and other liverworts. It is found in cool, moist sites in a variety of forest types.					NI	Not documented in Project vicinity.
Hygrohypnum alpinum			STR	STR	A higher elevation species that depends on cold, clean swiftly running mountain streams.	Jackson	MD-S	UMP-S RRS-D		NI	Not documented in Project vicinity.
Iwatsukiella leucotricha			S&M - B	S&M - B	In OR and WA, appears to be restricted to forests along maritime fog-drenched coastal ridges that usually have older *Abies* species present. OR elevations: 2,700-2,900 feet.					NI	Not documented in Project vicinity.
Jamesoniella autumnalis var. heterostipa				STR	Reportedly an obligate aquatic taxon growing over rocks in moving water or forming sometimes extensive, loose mats in lakes.			UMP-S		NI	Not documented in Project vicinity.
Kurzia makinoana			STR S&M - B	STR S&M - B	In old growth forests. Occurs on rocky cliffs and ledges, soil banks and cuts and on decayed wood, rarely on the base of trees, in shaded moist sites or in bogs. Located in humic soils at lower elevations, especially stream terraces, often with liverworts.	Coos	CB-D RO	RRS-S		NI	Not documented in Project vicinity.
Limbella fryei	SOC	C	SEN		On wet rotting wood, leaf litter and lower trunks of tall shrubs in coastal shrub swamps.	Coos Douglas	CB-D			NI	Not documented in Project vicinity.
Gillman's pawwort *Lophozia gillmanii*			SEN	SEN	Found on peaty soil, usually associated with cliffs or ledges. It is an obligate calciphile.			UMP-S FW-S		NI	Not documented in Project vicinity.
Lophozia laxa			SEN		Restricted to well-developed hummocks of Sphagnum in fens and bogs along the coast and in the Cascade Range. Grows in full sun to partial shade. Elevation ranges from sea level to 5,000 feet.		CB-S			NI	Not documented in Project vicinity.
Marsupella emarginata var. aquatica			S&M - B	SEN S&M - B	Old growth forests. Grows in robust colonies attached to submerged rocks in partially shaded cold, flowing, cold perennial stream habitats. Known occurrence at Waldo Lake, Willamette National Forest in the Oregon Cascades.		RO	UMP-S		NI	Not documented in Project vicinity.
Meesia moss *Meesia uliginosa*			SEN	SEN	Wet places, marshes and fens.	Jackson	RO-S MD-D	UMP-S RRS-D FW-D		NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Metzgeria violacea			SEN		Forming mats or mixed with other bryophytes on trunks of trees and shrubs in coastal rainforest. Usually in cool, moist riparian areas or shaded north-facing talus slopes and outcrops.		CB-D		CB: observed ~ 200' NE of ROW near MP 17.44	NI	The single site observed during surveys will be avoided.
Orthodontium gracile			S&M - B	SEN S&M - B	Occurs in old-growth or secondary growth redwood. May be found on the lower bark of trunks, below tree wounds, or downed redwood logs. Typically on redwood bark that has been burned or charred.		RO	RRS-D		NI	Not documented in Project vicinity.
Translucent orthodontium *Orthodontium pellucens*			SEN	SEN	Forming dense cushions or mats on stumps, rotten logs and bark of living redwood trees, confined to redwood groves near the Pacific Ocean. Sometimes on charred wood, or below gaping wounds in trees. In OR, restricted to *Sequoia sempervirens* in extreme SW corner of the state.		MD-S	RRS-D		NI	No suitable habitat in Project area.
Orthotrichum bolanderi			STR	STR	Dry igneous and sedimentary rocks and faces of cliffs in areas with a Mediterranean climate. Elevations probably mostly below 3,000 feet.		CB-S RO-S MD-D	RRS-S		NI	Not documented in Project vicinity.
Orthotrichum euryphyllum			STR	STR	On basalt rocks and outcrops around springs and streambeds. Primarily in dry *Juniperus occidentalis*, *Pinus ponderosa*, and *Artemisia tridentata* associations.		MD-D LV-S	FW-S		NI	Not documented in Project vicinity.
Orthotrichum hallii			STR		On rocks, usually limestone or calcareous sandstone. Occasionally it is found on granite, quartzite or basalt.	Jackson	MD-D			NI	Not documented in Project vicinity.
Tuberous hornwort *Phymatoceros phymatodes*			SEN	SEN	On bare, mineral soil which remains moist until late spring or summer. From near sea level to 650 m (2,100 feet) elevation	Douglas	CB-D RO-S MD-S	RRS-S		NI	Not documented in Project vicinity.
Plagiothecium piliferum			STR	STR	On trees trunks, especially on *Alnus rubra*, moist humid cliffs, and rocks along streams.	Douglas	MD-D	UMP-D		NI	Not documented in Project vicinity.
Pohlia cardotii				STR	On wet soil or along snowmelt streamlets in subalpine and alpine habitats. Elevations range from 6,000-8,000 feet.			RRS-S FW-S		NI	Not documented in Project vicinity.
Pohlia obtusifolia			STR		On moist rich soil in snowmelt areas within the alpine zone.	Jackson	MD-D			NI	Not documented in Project vicinity.
Pohlia sphagnicola			STR	STR	Among the tightly-packed heads of *Sphagnum fuscum* and *Sphagnum capillifolium*, on top of hummocks in coastal and montane bogs and fens.		CB-S	UMP-S		NI	Not documented in Project vicinity.
Pohlia tundrae				STR	Wet acid soil or along snowmelt streamlets in subalpine and alpine habitats. Elevations range from 6,000-8,000 feet.			UMP-S FW-S		NI	Not documented in Project vicinity.
Polytrichum sexangulare				STR	Damp gravelly soil and rocks next to snow-melt streams and areas with late summer snow melt in alpine to subalpine areas. (Note: this is info for *P. sexangulare* var. *vulcanicum*.)			UMP-S FW-S		NI	Not documented in Project vicinity.
Dwarf rock haircap *Polytrichum sphaerothecium*				SEN				UMP-S FW-S		NI	Not documented in Project vicinity.
Polytrichum strictum			STR	STR	Organic soils, particularly on top of Sphagnum hummocks, in coastal and montane bogs and fens.		CB-S	UMP-S		NI	Not documented in Project vicinity.
Bolander's scalemoss *Porella bolanderi*			SEN	SEN	On a variety of rock types (siliceous, calcareous, and metamorphic) and trunks of *Quercus*, *Umbellularia*, and *Acer* macrophyllum. In the Pacific Northwest, known elevations range from 500-3,000 feet.		CB-S RO-D MD-D	UMP-S RRS-D		NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Blunt water moss *Pseudocalliergon trifarium* (formerly *Calliergon trifarium)*			SEN	SEN	Calcareous fens.	Klamath		RRS-S FW-D		NI	No suitable habitat in Project area.
Ptychostomum cyclophyllum			STR	STR	Wet soil at both low and high elevations.		MD-D	RRS-D		NI	Not documented in Project vicinity.
Racomitrium aquaticum			S&M - B	S&M - B	Forms mats on shaded, moist rocks and cliffs along shady streams or in forests, often in the splash zone, but never aquatic.		CB-S			NI	Not documented in Project vicinity.
Rhizomnium nudum			S&M - B	S&M - B	On moist organic soil, or among rocks or on rotten logs in mid to high elevations.	Douglas	CB-S	UMP-D RRS-S FW-S		NI	Not documented in Project vicinity.
Scapania obscura				STR	On peaty soil close to streams below cold water springs and in snow melt seepage channels. At least in this region, it grows in full sun.			UMP-S		NI	Not documented in Project vicinity.
Schistidium moss *Schistidium cinclidodonteum*			SEN	SEN	On wet or dry rocks or on soil in crevices of rocks and boulders, often along intermittent streams, at elevations of 5,000-11,000 feet.		MD-D	RRS-S FW-S		NI	Not documented in Project vicinity.
Schistidium tenerum			STR		On exposed, dry rock outcrops and on moist shaded soil in crevices on a rock outcrop.		MD-D			NI	Not documented in Project vicinity.
Schistostega pennata			SEN S&M - A	SEN S&M - A	Mineral soil in shaded pockets of overturned tree roots, often with shallow pools of standing water at the base of the root wad; attached to rock or mineral soil around the entrance to caves, old cellars, and animal burrows. Microhabitat requirements include dense shade, high humidity, and some source of reflection of light (i.e., a pool of water)	Douglas Klamath	CB-S RO-S	UMP-D RRS-S FW-S		NI	Not documented in Project vicinity.
Alpine masterwort *Schofieldia monticola*				SEN	Terrestrial, on peaty soil under heather or beside small streams; strictly subalpine-alpine.			UMP-S		NI	Not documented in Project vicinity.
Scouleria marginata			STR	STR	On rocks in streams, often submerged part of the year.	Douglas Jackson	CB-S RO-D MD-D	UMP-D RRS-S		NI	Not documented in Project vicinity.
Purple-vased stink moss *Splachnum ampullaceum*			SEN	SEN	On old dung of herbivores.	Klamath		UMP-S RRS-S FW-D		NI	Not documented in Project vicinity.
Tetraphis geniculata			SEN S&M - A	SEN S&M - A	A moss that occurs in moist, coniferous forests with down logs; on the cut or broken ends or lower half of large (usually over 15" dbh), decay class 3, 4, and 5 rotted logs, or stumps, and occasionally on peaty banks in moist coniferous forests from sea level to subalpine elevations.		CB-S RO-S	UMP-S		NI	Not documented in Project vicinity.
Thamnobryum neckeroides			STR	STR	Found on both rocks and trees, often in shaded, damp locations in mixed Doug-fir/western hemlock forest with Acer macrophyllum.	Klamath	MD-S	UMP-D RRS-S FW-D		NI	Not documented in Project vicinity.
Tomentypnum moss *Tomentypnum nitens*			SEN	SEN	Medium to rich montane fens where it favors slightly elevated sites such as logs, stumps, or hummocks formed by *Vacccinium uliginosum* and *Betula glandulosa*. Elevations range from 5,000 to 6,000 feet.		RO-S MD-S	UMP-D RRS-D FW-D		NI	Not documented in Project vicinity.
Tortella fragilis			STR	STR	A calciphile that grows on rock or occasionally on dry soil in exposed locations.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Tortella tortuosa var. tortuosa			STR		A calciphile that grows on rock or occasionally on dry soil in exposed locations.		MD-D			NI	Not documented in Project vicinity.
Mucronleaf tortula moss *Tortula mucronifolia*			SEN	SEN	On soil or rock.	Jackson	RO-S MD-D LV-S	RRS-D		NI	Not documented in Project vicinity.
Asano's trematodon moss *Trematodon asanoi*			SEN	SEN	On moist bare soil along the edges of trails, streams and ponds in the subalpine zone. Soils usually have some organic content and are irrigated by meltwater from late-season snowbeds.		RO-S	UMP-S FW-S		NI	Not documented in Project vicinity.
Trichostomum tenuirostre var. tenuirostre			STR	STR			MD-D	RRS-S		NI	Not documented in Project vicinity.
Triquetrella californica			STR		On exposed to shaded soil, rocks, sand, or gravel in dry or moist situations. Reported from trails, roadsides, picnic areas, playgrounds, and rock outcrops from sea level to about 1,600 feet elevation, within 10 miles of the coast.		CB-S	RRS-S		NI	Not documented in Project vicinity.
Tritomaria exsectiformis			S&M - B	SEN S&M - B	Occurs in shady, cool, moist sites such as wet banks of riparian areas, spring heads, decaying logs and associated humus. Also on cliffs, ledges, and rock crevices covered with thin peaty acidic soils. In Oregon, it mostly occurs in peaty soils of mid-elevation coldwater streams.	Douglas Klamath	RO	UMP-D RRS-S FW-D		NI	Not documented in Project vicinity.
Tritomaria quinquedentata			S&M - B	S&M - B	Restricted to organic substrates where perpetually shady, cool, and moist.					NI	Not documented in Project vicinity.
Fungi											
Acanthophysium farlowii			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Albatrellus avellaneus			SEN S&M-B	SEN S&M-B	Presumed mycorrhizal with pine trees, known from Shore Acres in Coos County, in T26S, R14W, Sec. 17 SWNE along Cape Arago area.	Coos	CB-S	RRS-D		NI	Not documented in Project vicinity.
Albatrellus caeruleoporus			STR S&M-B	STR S&M-B	Old growth forest, ranging from near sea level to montane.	Coos	CB-D	UMP-D RRS-S		NI	Not documented in Project vicinity.
Albatrellus dispansus				STR				RRS-D	RRS: Pacific Connector survey efforts documented 7 observations, of which 2 are in the ROW or UCSA and 4 are within 300 meters of the Pacific Connector Pipeline Project.	MIIH	Potential removal of individuals within ROW; direct and indirect habitat effects.
Albatrellus ellisii			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-S LV	UMP-D RRS-D FW-D	Observed in UMP, RRS, and FW; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Albatrellus flettii			S&M-B	S&M-B		Douglas Jackson Klamath	MD-S	UMP-D RRS-D	RRS (2011): 1 site 26' NE of TEWA 162.48-N near MP 162.48	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Alpova olivaceotinctus			STR S&M-B	STR S&M-B	Associated with true fir, Douglas-fir, madrone, ponderosa pine, and black oak	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Amanita novinupta			STR		Unknown.	Coos	CB-S			NI	Not documented in Project vicinity.
Arcangeliella camphorata			SEN S&M-B	SEN S&M-B	Forms sporocarps beneath soil surface associated with various *Pinaceae* spp., particularly *Pseudotsuga menziesii* and *Tsuga heterophylla* from 600 ft. to 2,800 ft. elevation.	Coos	CB-D MD-S	RRS-D		NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Arcangeliella crassa			STR S&M-B	STR S&M-B	Associated with pines, especially Douglas-fir and western hemlock, two known sites from So. Fork Camas area and Wasson Lake road area; CR & WC Ecoregions.	Coos Douglas	CB-D	UMP-S RRS-S FW-D	Observed > 100 feet from ROW in FW; the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Arcangeliella lactarioides			S&M-B	STR S&M-B	Forms sporocarps beneath the soil surface associated with various Pinaceae spp., particularly *Abies magnifica* and *Pinus ponderosa* above 1,650 m elevation.			RRS-S		NI	Not documented in Project vicinity.
Arrhenia lobata				STR	On moss in wet sites, alpine sites or bogs or fens, often around the margins of pools.			FW-D		NI	Not documented in Project vicinity.
Asterophora lycoperdoides			S&M-B	S&M-B			CB-D			NI	Not documented in Project vicinity.
Asterophora parasitica			S&M-B	S&M-B			CB-S MD-D			NI	Not documented in Project vicinity.
Baeospora myriadophylla			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Balsamia alba			STR	STR			MD-D	UMP-S RRS-S		NI	Not documented in Project vicinity.
Balsamia nigrens			STR S&M-B	STR S&M-B	Likely associated with mature stands. Forms sporocarps beneath the soil surface associated with various Pinaceae spp., particularly *Pinus jeffreyi* and *Pseudotsuga menziesii* and at low to mid elevation. (Note: has also been called *B. nigra*.)	Jackson	CB-S MD-D	RRS-D		NI	Not documented in Project vicinity.
Boletus haematinus			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Boletus pulcherrimus			SEN S&M-B	SEN S&M-B	West side Cascades, sporocarps usually solitary in association with mixed conifer (grand fir, Douglas-fir) and hardwoods (tanoak) in coastal forests.	Jackson	CB-S MD-D LV	UMP-D RRS-D FW-D	Observed in RRS and FW; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Bondarzewia mesenterica			S&M-B	S&M-B	Found in late successional coniferous forests, occasionally mixed with hardwoods; sporocarps have been associated with stumps or snags.	Douglas Jackson Klamath	CB-D RO-D MD-D LV-D	UMP-D RRS-D	RO BLM (2010): 2 sites documented in project area; UMP NF (2010). 6 sites documented in project area; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Brauniellula albipes			STR	STR			MD-S	RRS-S		NI	Not documented in Project vicinity.
Bridgeoporus nobilissimus			SEN S&M-A	S&M-A	On large, dying and dead noble fir and Pacific silver fir in late-successional old-growth forests and on remnant stumps and snags in young and mature second-growth forests in the Pacific silver fir and western hemlock zones in western Washington and Oregon.		RO-S			NI	Not documented in Project vicinity.
Cantharellus subalbidus			S&M-D	S&M-D	Grows as single or gregarious sporocarps in coniferous forests but also in mixed hardwood/conifer woods often associated with but not limited to pines, Douglas-fir, and Pacific madrone.	Coos Douglas Jackson Klamath	CB-D RO-D MD-D LV-D	UMP-D RRS-D FW-D	RO BLM (2010, 2011): 2 sites documented; RRS (2010): one site documented F-W (2000): one site; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Catathelasma ventricosa			S&M-B	S&M-B			CB-S			NI	Not documented in Project vicinity.
Cazia flexiascus			STR	STR	Unknown.	Douglas	RO-S MD-D	UMP-S RRS-S		NI	Not documented in Project vicinity.
Chalciporus piperatus (Boletus piperatus)			S&M-D	S&M-D			CB-S			NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Chamonixia caespitosa			SEN S&M-B	SEN S&M-B	Forms sporocarps beneath the soil surface associated with various *Pinaceae* spp., particularly *Abies amabilis* and *Tsuga* sp. at high elevation and *Picea sitchensis, Pseudotsuga menziesii,* and *Tsuga heterophylla* in coastal forests.		CB-S MD-S	RRS-D		NI	Not documented in Project vicinity.
Choiromyces alveolatus			STR S&M-B	STR S&M-B	Forms sporocarps beneath the soil surface associated with various *Pinaceae* spp., particularly *Abies* spp., shorepine, Douglas-fir, western hemlock, and mountain hemlock above 1,300 meters.	DouglasJackson	RO-S MD-D CB-S	UMP-D RRS-D FW-D	Observed in FW; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; remaining sites may not provide a reasonable assurance of species persistence. MIIH determination is dependent on Forest Service-recommended route modifications that avoid impacts to species.
Choiromyces venosus			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Chroogomphus loculatus			S&M-B	STR S&M-B				UMP-S		NI	Not documented in Project vicinity.
Chromosera cyanophylla			S&M-B	S&M-B	Grows in clusters attached to or under the bark of conifer logs or as solitary to scattered or caespitose (growing in small dense clumps or tufts) on exposed rotted coniferous fir or pine wood.	Douglas Jackson Klamath	RO-D MD-D LV-D	UMP-D RRS-D FW-D	RO BLM (2010, 2011): MD BLM (2010): UMP (2010): RRS (2010): FW (2011); see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Chrysomphalina grossula			STR, S&M-B	STR, S&M-B	Coniferous debris, mixed forests and parks.			UMP-S		NI	Not documented in Project vicinity.
Clavariadelphus ligula			S&M-B	S&M-B			CB-D LV MD-D	UMP-D	UMP (2010): 112 ft W of ROW (adj. to UCSA 98.46-W) near MP 100.40; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Clavariadelphus occidentalis			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D RO-D		Observed in CB and RO; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Clavariadelphus sachalinensis			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		RO-D LV MD-D	UMP-D RRS-D	Observed in RO, UMP, and RRS; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Clavariadelphus subfastigiatus			STR S&M-B	STR S&M-B	On soil or duff, under mixed conifers.	Douglas Jackson	RO-D MD-D CB-S	UMP-D RRS-S		NI	Not documented in Project vicinity.
Clavariadelphus truncatus			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D RO-D LV MD-D	UMP-D RRS-D	Observed in RO, UMP, and RRS; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Clavulina castaneipes var. lignicola			STR S&M-B	S&M-B	Associated with late successional forests. On wood or bark.		CB-S			NI	Not documented in Project vicinity.
Climacocystis borealis			STR	STR			MD-S	RRS-D		NI	Not documented in Project vicinity.
Clitocybe senilis			S&M-B	S&M-B			CB-S			NI	Not documented in Project vicinity.
Clitocybe subditopoda			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Collybia bakerensis			S&M-B	S&M-B		Klamath		FW-D	FW (2000): in UCSA 168.77-W adj. to ROW near MP 168.78; not documented during Pacific Connector surveys (Unit A37).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Collybia [Dendrocollybia] racemosa			STR S&M-B	STR S&M-B	Gregarious, on rotting or mummified remnants of agarics, or seldom in nutrient-rich leaf mulch, in forests. Located in Soup Creek area under dense huckleberry in rotting leaf litter on steep slope.	Douglas Jackson	CB-D MD-D	RRS-D	Observed near CL at MP 112.98 in UMP; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Cordyceps capitata			S&M-B	S&M-B		Coos	CB-D			NI	Not documented in Project vicinity.
Cordyceps ophioglossoides			S&M-B	S&M-B			CB-S			NI	Not documented in Project vicinity.
*Cortinarius barlowensis (*syn. *Cortinarius azureus)*			SEN S&M-B	SEN S&M-B	Coastal to montane conifer forests up to at least 1,200 m elevation; late successional old-growth association; fruits in autumn.	Douglas	CB-S	UMP-D		NI	Not documented in Project vicinity.
Cortinarius boulderensis			S&M-B	S&M-B			MD			NI	Not documented in Project vicinity.
Cortinarius cyanites			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Cortinarius depauperatus (Cortinarius spilomeus)			STR S&M-B	S&M-B	Moist conifer forests.		CB-S			NI	Not documented in Project vicinity.
Cortinarius magnivelatus			STR S&M-B	STR S&M-B	Montane coniferous forests.		MD-S	FW-D		NI	Not documented in Project vicinity.
Cortinarius olympianus			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D MD-D	RRS-D	Observed in RRS; see the Survey and Manage Report (appendix K of this EIS). .	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Cortinarius speciosissimus			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Cortinarius tabularis			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Cortinarius umidicola			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Cortinarius valgus			S&M-B	S&M-B			MD			NI	Not documented in Project vicinity.
Cortinarius variipes			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Cortinarius verrucisporus			S&M-B	STR S&M-B	Associated with *Abies magnifica*.	Klamath		RRS-S FW-D		NI	Not documented in Project vicinity.
Cortinarius wiebeae			S&M-B	STR S&M-B	Montane coniferous forests.			FW-S		NI	Not documented in Project vicinity.
Craterellus tubaeformis			S&M-D	S&M-D	Grows in wet soil, often near springs, seeps, along streams or in bogs under conifers. It is also found on rotten logs.	Coos Douglas Jackson	CB-D RO-D MD-D	UMP-D	CB BLM (2010, 2011): RO BLM (2006, 2010): UMP (2006, 2010): see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Cudonia monticola			S&M-B	S&M-B			CB-D	UMP-D		NI	Not documented in Project vicinity.
Cyphellosterium laeve			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Dermocybe humboldtensis			SEN S&M-B	SEN S&M-B	Stabilized dunes on roots of pine and huckleberry species and conglomerate rock and gravelly loam soil with Douglas-fir and ponderosa pine	Douglas	CB-S RO-D MD-S	UMP-S RRS-S		NI	Not documented in Project vicinity.
Destuntzia fusca			S&M-B	STR S&M-B	Forms sporocarps beneath the soil associated with *Lithocarpus densiflorus*, *Pseudotsuga menziesii* & *Tsuga heterophylla*, below 1,000 m elevation.			UMP-S RRS-S		NI	Not documented in Project vicinity.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Destuntzia rubra			S&M-B	STR S&M-B	In association with the roots of *Abies grandis, Arbutus menziesii, Lithocarpus densiflora, Pseudotsuga menziesii,* and *Sequoia sempervirens* at below 650 m elevation.			UMP-S RRS-S		NI	Not documented in Project vicinity.
Dichostereum boreale			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Elaphomyces anthracinus			S&M-B	STR S&M-B	Forms sporocarps beneath the soil surface associated with the roots of Pinus ponderosa in Oregon.			FW-S		NI	Not documented in Project vicinity.
Elaphomyces decipiens			STR	STR			MD-S	RRS-S		NI	Not documented in Project vicinity.
Elaphomyces reticulatus			STR	STR			MD-S	RRS-D		NI	Not documented in Project vicinity.
Elaphomyces subviscidus			STR S&M-B	STR S&M-B	Forms sporocarps beneath the soil surface associated with the roots of *Pinus contorta* and *Tsuga mertensiana* at high elevation (2,200 m).		MD-S CB-S	RRS-S FW-S		NI	Not documented in Project vicinity.
Endogone acrogena			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Endogone oregonensis			STR S&M-B	S&M-B	Roots of Sitka spruce, Douglas-fir, and western hemlock, below 350 m elevation, known from Cascade Head, Lincoln County and on Roseburg BLM.	Douglas	CB-S RO-D			NI	Not documented in Project vicinity.
Entoloma nitidum			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Fayodia bisphaerigera (Fayodia gracilipes)			S&M-B	S&M-B			CB-S			NI	Not documented in Project vicinity.
Fevansia aurantiaca			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Galerina atkinsoniana			S&M-B	S&M-B			MD			NI	Not documented in Project vicinity.
Galerina cerina			S&M-B	S&M-B			CB			NI	Not documented in Project vicinity.
Galerina heterocystis			S&M-E	S&M-E			CB-S MD			NI	Not documented in Project vicinity.
Galerina sphagnicola			S&M-E	S&M-E						NI	Not documented in Project vicinity.
Galerina vitaeformis			S&M-B	S&M-B	Found mostly on soil in association with a variety of mosses but also on moss-covered logs.	Douglas	CB-D RO-D	UMP-D RRS-D	RO BLM (2010): UMP (2010): RRS (2010); see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Gastroboletus imbellus			S&M-B	STR S&M-B	Occurs in Pacific Silver Fir (50%) and Mountain Hemlock (50%) series at elevations of 2,528-5,169 feet. Associated with roots of grand fir, subalpine fir and mountain hemlock.			UMP-S		NI	Not documented in Project vicinity.
Gastroboletus ruber			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Gastroboletus subalpinus			S&M-B	S&M-B				FW-D	FW: 129 ft S of ROW near MP 172.48	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Gastroboletus turbinatus			S&M-B	S&M-B			CB-S MD			NI	Not documented in Project vicinity.
Gastroboletus vividus			SEN S&M-B	SEN S&M-B	Associated with *Abies magnifica* and *Tsuga mertensiana*.		MD-S	UMP-S RRS-D FW-S		NI	Not documented in Project vicinity.
Gastrosuillus amaranthii			S&M-E	S&M-E						NI	Not documented in Project vicinity.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Gastrosuillus umbrinus			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Gautieria magnicellaris			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Gautieria otthii			STR S&M-B	S&M-B	Forms sporocarps beneath the soil surface associated with the roots of *Pinus ponderosa* and other *Pinaceae* between 800 m and 1,650 m elevation.		MD-S CB-S			NI	Not documented in Project vicinity.
Gelatinodiscus flavidus			S&M-B	S&M-B			MD-D			NI	Not documented in Project vicinity.
Glomus pubescens			STR		Hypogenous fungi in coniferous forests.	Coos Douglas	CB-S RO-S			NI	Not documented in Project vicinity.
Glomus radiatum			STR S&M-B	STR S&M-B	Forms sporocarps beneath the soil surface associated with the roots of *Chamaecyparis nootkatensis* and *Sequoia sempervirens* below 1,650 m elevation.		CB-S	RRS-S		NI	Not documented in Project vicinity.
Gomphus bonarii			S&M-B	S&M-B			MD-S	UMP-D RRS FW-D		NI	Not documented in Project vicinity.
Gomphus clavatus			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		MD	UMP-D	Observed in UMP; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Gomphus kauffmanii			STR S&M-B	STR S&M-B	Deep humus under pine and spruce species, closely gregarious	Coos Douglas Jackson	CB-D RO-D MD-D	UMP-D RRS-D FW-D	Observed in RRS and FW; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Gymnomyces fragrans			SEN	SEN			MD-S	UMP-S RRS-D		NI	Not documented in Project vicinity.
Gymnomyces abietis			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).			RRS-D	Observed in RRS; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; remaining sites may not provide a reasonable assurance of species persistence. MIIH determination is dependent on Forest Service-recommended route modifications that avoid impacts to species.
Gymnomyces monosporus			STR		Unknown.	Douglas	CB-S RO-D MD-S			NI	Not documented in Project vicinity.
Gymnomyces nondistincta			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Gymnopilus punctifolius			S&M-B	S&M-B			MD			NI	Not documented in Project vicinity.
Gyromitra esculenta			S&M-F	S&M-F		Coos Douglas Jackson Klamath	CB-D RO-D MD-D LV-D	UMP-D RRS-D	Observed in RO BLM (2010, 2011), UMP (2010), and RRS (2010)	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Gyromitra infula			S&M-B	S&M-B	Found in coniferous and hardwood forests, in disturbed and undisturbed sites, and sites with charred or uncharred woody debris.	Coos Douglas Klamath	CB-D RO-D MD-D LV-D	UMP-D RRS-D	Observed in RO BLM (2010, 2011), UMP (2010, 2011): RRS (2010); see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Gyromitra melaleucoides			S&M-B	S&M-B	Grows on or adjacent to well-decayed wood in moist coniferous forests.	Douglas Jackson Klamath	RO-D MD-D LV-D	UMP-D RRS-D FW-D	Observed in RO BLM (2010), UMP (2010, 2011), RRS (2010, 2011), FW (2011); see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Gyromitra montana			S&M-F	S&M-F		Jackson Klamath	RO-D MD-D LV-D	UMP-D RRS-D FW-D	Observed in RO BLM (2010), UMP (2011), RRS (2010, 2011), and FW (2011).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Hebeloma olympianum			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Helvella crassitunicata			SEN S&M-B	S&M-B	Scattered or gregarious on soil along trails in montane regions with *Abies* spp.		RO-S MD-S			NI	Not documented in Project vicinity.
Helvella elastica			S&M-B	S&M-B			CB-S MD-D			NI	Not documented in Project vicinity.
Helvella maculata			S&M-B	S&M-B	Found at low to mid elevations under mixed conifers or hardwoods; sporocarps are scattered to gregarious. It is not restricted to old growth and has been found in a wide variety of habitats including suburban habitats and rotation age conifer stands.	Coos Douglas Jackson	CB-D RO-D MD-D	UMP-D	Observed in UMP (2010): 1 site 71' N of MP 105.07; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Hydnotrya inordinata			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Hydnotrya subnix			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Hydnum umbilicatum			S&M-B	S&M-B	Grows as solitary or gregarious, on ground in duff of coniferous forests.	Coos Douglas Jackson	CB-D RO-D MD-D	UMP-D	Observed in CB BLM (2010): RO BLM (2010, 2011) and UMP (2010, 2011); see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Hydropus marginellus (Mycena marginella)			STR S&M-B	STR S&M-B	Conifer wood, *Abies*, *Pinus*.		CB- D	RRS-S		NI	Not documented in Project vicinity.
Hygrophorus albicarneus			STR		Unknown.	Klamath	RO-S MD-S			NI	Not documented in Project vicinity.
Hygrophorus caeruleus			S&M-B	SEN S&M-B	Occurs in soil in association with roots of *Pinaceae* spp. near melting snowbanks.			UMP-D RRS-D FW-D	Observed in RRS and FW; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Hygrophorus karstenii			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Hygrophorus vernalis			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Hypomyces luteovirens			S&M-B	S&M-B			CB-S			NI	Not documented in Project vicinity.
Leptonia occidentalis var. occidentalis			STR				MD-S			NI	Not documented in Project vicinity.
Leptonia subeuchroa				STR				RRS-S		NI	Not documented in Project vicinity.
Leptonia violaceonigra			STR	STR			MD-D	RRS-S	Observed in RRS within the ROW near MP 162.49.	MIIH	Removal of or damage to individuals.
Leucogaster citrinus			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-S MD-D	RRS-S UMP-D	Observed in UMP; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Leucogaster microsporus			S&M-B	S&M-B			CB-S			NI	Not documented in Project vicinity.
Leucogaster odoratus				STR				UMP-S RRS-S		NI	Not documented in Project vicinity.
Macowanites chlorinosmus			STR S&M-B	S&M-B	Found in association with the roots *of Picea sitchensis* and *Tsuga heterophylla* below 200 m elevation.		CB-S			NI	Not documented in Project vicinity.
Macowanites lymanensis			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Macowanites mollis			S&M-B	S&M-B						NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Marasmius applanatipes			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Martellia fragrans			S&M-B	S&M-B			MD			NI	Not documented in Project vicinity.
Martellia idahoensis			S&M-B	S&M-B			CB-S			NI	Not documented in Project vicinity.
Mycena hudsoniana			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Mycena monticola			S&M-B	S&M-B		Douglas Klamath	RO-D MD-D LV-D			NI	Not documented in Project vicinity.
Mycena overholtsii			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).			FW-D	Observed in FW; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Mycena quinaultensis			STR S&M-B	STR S&M-B	Found in gregarious, caespitose clusters on senescent conifer needles or uncommonly on decayed wood in conifer forests.		CB-S RO-S MD-S	UMP-S RRS-S		NI	Not documented in Project vicinity.
Mycena tenax			STR S&M-B	STR S&M-B	Densely gregarious in duff under fir, Douglas-fir, spruce, and redwood trees, known from several coastal sites in Douglas, Lane, and Lincoln Counties; fruits in spring and autumn.	Douglas	CB-S	UMP-S RRS-D		NI	Not documented in Project vicinity.
Mythicomyces corneipes			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Neolentinus adhaerens			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Neolentinus kauffmanii			S&M-B	S&M-B			CB-S	FW-D		NI	Not documented in Project vicinity.
Neournula pouchetii			S&M-B	S&M-B	Inhabits coniferous forest stands ranging from early seral stages (35 years old) to old growth more than 200 years old.	Coos Douglas	CB-D RO-D MD-D	UMP-D	Observed in RO BLM (2010, 2011): and UMP (2010, 2011) ; see the Survey and Manage Report (appendix K of this EIS)	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Nivatogastrium nubigenum			S&M-B	S&M-B			MD	FW-D	Observed in FW (2000); see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Nolanea verna var. isodiametrica			STR		Mainly under conifers.	Douglas	RO-S MD-D			NI	Not documented in Project vicinity.
Octaviania cyanescens			S&M-B	STR S&M-B	Found with *Tsuga mertensiana* at 1,900 m elevation.			UMP-S		NI	Not documented in Project vicinity.
Octavianina macrospora			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Octavianina papyracea			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Otidea leporina			S&M-B	S&M-B			CB-D MD-D			NI	Not documented in Project vicinity.
Otidea onotica			S&M-F	S&M-F		Coos Douglas Jackson Klamath	CB-D RO-D MD-D LV-D	UMP-D	Observed in RO BLM (2010, 2011) and UMP (2010).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Otidea smithii			STR S&M-B	STR S&M-B	On exposed soil, moss, litter or humus under Douglas fir, western hemlock, ponderosa pine, bigleaf maple, Oregon white oak and black cottonwood.		CB-S RO-D MD-S	RRS-D		NI	Not documented in Project vicinity.
Phaeocollybia attenuata			S&M-D	S&M-D	See the Survey and Manage Report (appendix K of this EIS).		CB-D RO-D MD		Observed in CB and RO; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Phaeocollybia californica			STR S&M-B	STR S&M-B	Roots of Sitka spruce, Pacific silver fir and western hemlock	Douglas	CB-D RO-D MD-D	RRS-D		NI	Not documented in Project vicinity.
Phaeocollybia dissiliens			STR S&M-B	S&M-B	On soil, litter and humus is association with roots of Pacific fir, Sitka spruce, Douglas fir and western hemlock principally in Western Hemlock series (67%) at elevations of 313-2,431 feet.		CB-D RO-S MD-D			NI	Not documented in Project vicinity.
Phaeocollybia fallax			S&M-D	S&M-D			CB-D MD		Observed in CB (1999); site delineated within ROW and TEWA near MP 36.18 – majority of site SW of project; not observed during Pacific Connector survey efforts from 2010 through 2012.	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Phaeocollybia gregaria			SEN S&M-B	S&M-B	Associated with the roots of Sitka spruce and Douglas-fir in Sitka spruce (50%) and western hemlock (50%) series at elevations of 477-1,486 feet.		CB-S RO-S			NI	Not documented in Project vicinity.
Phaeocollybia kauffmanii			S&M-D	S&M-D	See the Survey and Manage Report (appendix K of this EIS).		CB-D MD-D		Observed in CB; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Phaeocollybia lilacifolia			STR				CB-D			NI	Not documented in Project vicinity.
Phaeocollybia olivacea			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D MD-D	RRS-D	Observed in CB; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Phaeocollybia oregonensis			SEN S&M-B	S&M-B	On soil in association with roots of Douglas-fir, western hemlock and Pacific silver fir, primarily in western hemlock series (75%) at elevations of 826-3,817 feet.		CB-D RO-S MD-S			NI	Not documented in Project vicinity.
Phaeocollybia piceae			S&M-B	S&M-B	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 at low to medium elevations along the Pacific Coast and approximately 80 miles inland throughout its range.		CB-D MD-D		Not observed during Project surveys; however, agency databases indicate there is a site in the vicinity of the Project documented in 2012 near MP 21.5 in CB. See the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Phaeocollybia pseudofestiva			STR S&M-B	STR S&M-B	Associated with *Pinaceae*, mixed conifers, and hardwoods; fruits in October - January and April – July.	Coos Douglas	CB-D RO-S MD-D	RRS-S		NI	Not documented in Project vicinity.
Phaeocollybia radicata			STR	STR	Conifer forest: Douglas-fir, salal, sword-fern.	Coos	CB-D	RRS-S		NI	Not documented in Project vicinity.
Phaeocollybia scatesiae			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D		Observed in CB; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Phaeocollybia sipei			S&M-B	S&M-B	Occurs in humus, litter, or soil in coniferous and mixed hardwood-coniferous forests at elevations ranging between approximately 350 and 3,550 feet. Found associated with the roots of western hemlock, Douglas-fir, Sitka spruce, Pacific silver fir, and red fir.		CB RO		Not observed during Project surveys; however, agency databases indicate there is a site in the vicinity of the Project documented in 2012 near MP 21.3 in CB. See the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Phaeocollybia spadicea			S&M-B	S&M-B	Occurs in humus litter or soil in coniferous or mixed hardwood-coniferous forests in coastal and inland regions at elevations up to about 3,200 feet. Found associated with hemlock, Douglas-fir, spruce, fir, and pine trees.		CB-D MD		Not observed during Project surveys; however, agency databases indicate there is a site in the vicinity of the Project documented in 2012 near MP 21.5 in CB. See the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Phellodon atratus (Phellodon atratum)			S&M-B	S&M-B			CB-S			NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Pholiota albivelata			S&M-B	S&M-B			CB-S			NI	Not documented in Project vicinity.
Pithya vulgaris			S&M-D	S&M-D	Grows on wet, dead, usually broken and detached branch tips and twigs of fir and redwood in montane habitats often near snowbanks.	Douglas	RO-D MD-D	UMP-D RRS-D	Observed in UMP (2010): and RRS (2010, 2011); see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Plectania melastoma			S&M-F	S&M-F		Coos Douglas	CB-D RO-D MD-D	UMP-D	Observed in UMP (2010, 2011).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Plectania milleri			S&M-B	S&M-B	Mossy bank, under mixed conifers, on conifer duff.	Jackson Klamath	MD-D LV-D	UMP-D RRS-D	Observed in UMP (2010, 2011): and RRS (2011): ; see the Survey and Manage Report (appendix K of this EIS)	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Podostroma alutaceum			STR S&M-B	STR S&M-B	Conifer forests.		CB-S	UMP-S RRS-S		NI	Not documented in Project vicinity.
Polyozellus multiplex			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-S MD-D	RRS-D	Observed in ROW near MP 162.44 in RRS; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Psathyrella quercicola			STR	STR	Unknown.	Jackson	RO-S MD-S	RRS-S		NI	Not documented in Project vicinity.
Pseudaleuria quinaultiana			STR S&M-B	S&M-B	Occurs on disturbed microsites (trail sides, recent windthrow mounds) in low elevation old-growth forest that includes *Picea sitchensis, Pseudotsuga menziesii,* and *Tsuga heterophylla.*		CB-S			NI	Not documented in Project vicinity.
Pseudorhizina californica (formerly Gyromitra californica)			S&M-B, SEN	S&M-B, SEN	Forest edges, disturbed sites.	Douglas Jackson Klamath	RO-S MD-S	UMP-D RRS-D FW-D		NI	Not documented in Project vicinity.
Ramaria abietina			STR S&M-B	STR S&M-B	In duff under conifers, especially Monterey cypress and Coast Redwood; from late fall to late winter.	Douglas	RO-D MD-D CB-S	UMP-S RRS-D		NI	Not documented in Project vicinity.
Ramaria amyloidea			SEN S&M-B	SEN S&M-B	In humus or soil under *Abies* ssp., Douglas-fir, and western hemlock from September to October.	Douglas	RO-S	UMP-D RRS-S		NI	Not documented in Project vicinity.
Ramaria araiospora (var. araiospora or var. rubella)			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D	UMP-D	Observed in CB and UMP; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Ramaria aurantiisiccescens			S&M-B	S&M-B			CB-D MD-D	UMP-D FW-D		NI	Not documented in Project vicinity.
Ramaria botrytis var. aurantiramosa			STR S&M-B	STR S&M-B	Form coralloid sporocarps in humus or soil that mature above the surface of the ground.	Douglas Klamath	RO-S	UMP-D RRS-S FW-D		NI	Not documented in Project vicinity.
Ramaria celerivirescens			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D MD		Observed in CB; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Ramaria claviramulata			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Ramaria concolor f. marrii			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Ramaria concolor f. tsugina			STR S&M-B	S&M-B	In humus or soil under *Abies* ssp., Douglas-fir, and western hemlock in October.	Coos	CB-S RO-S			NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Ramaria conjunctipes var. sparsiramosa			STR S&M-B	STR S&M-B	On ground in moist conifer forests in fall.	Coos	CB-D RO-D MD-S	UMP-S RRS-S		NI	Not documented in Project vicinity.
Ramaria coulterae			STR S&M-B	STR S&M-B	Unknown; fruits spring-early summer.	Jackson Klamath	RO-S MD-D	RRS-S FW-D		NI	Not documented in Project vicinity.
Ramaria cyaneigranosa			S&M-B	S&M-B			CB-D MD-D			NI	Not documented in Project vicinity.
Ramaria gelatiniaurantia			STR S&M-B	STR S&M-B	Occurs on litter and soil, associated with *Pinaceae* spp.		CB-D RO-S	RRS-S		NI	Not documented in Project vicinity.
Ramaria gracilis			STR S&M-B	STR S&M-B	Fruits in humus or soil and matures above the surface of the ground. Associated with *Abies* spp., *Pseudotsuga menziesii*, and *Tsuga heterophylla*		CB-S MD-S	RRS-S		NI	Not documented in Project vicinity.
Ramaria hilaris var. olympiana			S&M-B	S&M-B			CB-D			NI	Not documented in Project vicinity.
Ramaria largentii			STR S&M-B	STR S&M-B	In humus or soil under *Abies* ssp., Douglas-fir, western white pine, and western hemlock in October.	Jackson	CB-S RO-D MD-D	UMP-D RRS-D FW-D		NI	Not documented in Project vicinity.
Ramaria lorithamnus			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Ramaria maculatipes			STR S&M-B	STR S&M-B	Fruits in humus or soil and matures above the surface of the ground. Associated with *Abies* spp., *Pseudotsuga menziesii*, and *Tsuga heterophylla*.		MD-D	UMP-S RRS-S FW-D		NI	Not documented in Project vicinity.
Ramaria rainierensis			STR S&M-B	STR S&M-B	In humus or soil under *Abies* ssp Douglas-fir and western hemlock in December and March.	Coos	CB-D MD-D	UMP-S RRS-S FW-D		NI	Not documented in Project vicinity.
Ramaria rubella var. blanda			SEN S&M-B	S&M-B	Fruits on wood in conifer forests.		RO-D CB-D			NI	Not documented in Project vicinity.
Ramaria rubribrunnescens			STR S&M-B	STR S&M-B	Terrestrial under *Pinaceae* ssp. in October and November.	Coos Douglas	CB-D RO-S MD-D	UMP-D RRS-S		NI	Not documented in Project vicinity.
Ramaria rubrievanescens (RARU5)			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D MD-D	UMP-D	Observed in UMP; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Ramaria rubripermanens (RARU6)			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D MD-D	UMP-D FW-D	Observed in UMP and FW; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Ramaria spinulosa var. diminutiva			SEN S&M-B	SEN S&M-B	Terrestrial under *Pinaceae* ssp. in October and November.	Douglas	CB-S RO-D MD-S	UMP-S RRS-S		NI	Not documented in Project vicinity.
Ramaria stuntzii			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D	UMP-D	Observed in UMP; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Ramaria suecica			STR S&M-B	STR S&M-B	On litter; fruits in autumn	Douglas	RO-D CB-S	UMP-S RRS-S		NI	Not documented in Project vicinity.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Ramaria thiersii			STR S&M-B	STR S&M-B	Terrestrial under *Pinaceae* ssp. in June.	Douglas Jackson Klamath	RO-S MD-D	UMP-S RRS-S FW-D		NI	Not documented in Project vicinity.
Ramaria verlotensis			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Rhizopogon abietis			STR S&M-B	STR S&M-B			MD-D CB-S	UMP-S RRS-S FW-D		NI	Not documented in Project vicinity.
Rhizopogon atroviolaceus			S&M-B	STR S&M-B				RRS-S FW-S		NI	Not documented in Project vicinity.
Rhizopogon bacillisporus			STR	STR			MD-D	RRS-S FW-D			
Rhizopogon brunneiniger			STR S&M-B	STR S&M-B	Associated with roots of various *Pinaceae* ssp. in low to high elevation conifer forests in September and October.	Douglas	CB-S RO-S MD-S	UMP-D RRS-D		NI	Not documented in Project vicinity.
Rhizopogon chamaleontinus			SEN S&M-B	SEN S&M-B	Found in association with the roots of Pseudotsuga menziesii and scattered Pinus lambertiana at 1,100 m elevation.		RO-S MD-S	RRS-D		NI	Not documented in Project vicinity.
Rhizopogon clavitisporus			STR	STR	Unknown.	Jackson	RO-S MD-S	RRS-S			
Rhizopogon ellipsosporus			SEN S&M-B	SEN S&M-B	Associated with roots of Douglas-fir and sugarpine in October.	Jackson	MD-D CB-S	RRS-D		NI	Not documented in Project vicinity.
Rhizopogon evadens var. subalpinus			S&M-B	S&M-B			LV	FW-D	FW: 1 site (1999) documented in TEWA 168.85-N; Pacific Connector Pipeline Project rerouted here to avoid HYCA and BOPU; see the Survey and Manage Report (appendix K of this EIS).	NI	The single site observed during surveys will be avoided.
Rhizopogon exiguus			SEN S&M-B	SEN S&M-B	Associated with the roots of *Pseudotsuga menziesii* and *Tsuga heterophylla* at 950 m elevation.		CB-S RO-S MD-D MD-S	UMP-S RRS-D		NI	Not documented in Project vicinity.
Rhizopogon flavofibrillosus			STR S&M-B	STR S&M-B	Associated with roots of various *Pinaceae* ssp. in mid to high elevation conifer forests from July through November.	Douglas	CB-S RO-D MD-S	UMP-S RRS-D FW-S		NI	Not documented in Project vicinity.
Rhizopogon inquinatus			S&M-B	SEN S&M-B	Found in association with the roots of *Pinus jeffreyi, Pseudotsuga menziesii* and *Tsuga heterophylla* from 500 to 1,400 m elevation.			UMP-S		NI	Not documented in Project vicinity.
Rhizopogon rogersii			STR	STR			MD-D	RRS-S		NI	Not documented in Project vicinity.
Rhizopogon semireticulatus			STR	STR	Under mixed conifers including *Pinus ponderosa, Pinus contorta, Pseudotsuga menziesii* , *Larix occidentalis, Abies lasiocarpa, Arbutus menziesii* and *Quercus* sp.	Douglas, Jackson	RO-D MD-S	RRS-D FW-S		NI	Not documented in Project vicinity.
Rhizopogon subclavitisporus			STR	STR	In duff under mixed conifers.		MD-D	RRS-S		NI	Not documented in Project vicinity.
Rhizopogon subpurpurascens				STR				RRS-D		NI	Not documented in Project vicinity.
Rhizopogon truncatus			S&M-D	S&M-D	See the Survey and Manage Report (appendix K of this EIS).		CB-S MD-D	UMP-D RRS-D	Observed in UMP and RRS; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.

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Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Rhizopogon variabilisporus			STR	STR	Unknown.	Jackson	RO-S MD-D	RRS-S FW-D		NI	Not documented in Project vicinity.
Rhodocybe speciosa			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Rickenella swartzii (Rickenella setipes)			STR S&M-B	STR S&M-B	Moist, shaded locations, typically in moss beds; known from coastal forests in the fall; locally abundant in small troops on or among mosses under hardwoods.	Coos Douglas	CB-D RO-S MD-D	RRS-S		NI	Not documented in Project vicinity.
Russula mustelina			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Sarcodon fuscoindicus			STR S&M-B	STR S&M-B	Found on soil; fruits in autumn and winter.	Douglas	CB-S RO-D MD-S	RRS-S		NI	Not documented in Project vicinity.
Sarcodon imbricatus			S&M-B	S&M-B	Solitary to gregarious on the ground, in the woods and described as scattered, or in arcs in mixed hardwood/conifer woods.	Douglas Jackson Klamath	CB-D RO-D MD-D LV-D	UMP-D RRS-D FW-D	Observed in RO BLM (2010): UMP (2010): RRS (2010, 2011): and FW (2010, 2011); see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Sarcosoma latahense			S&M-B	S&M-B		Coos Douglas	CB-D RO-D MD-D			NI	Not documented in Project vicinity.
Sarcosphaera coronaria			S&M-B	S&M-B	Grows on the ground in clusters, scattered, or solitary in duff, or beneath the ground surfaces in soil under coniferous forests.	Jackson Klamath	RO-D MD-D LV-D	UMP-D RRS-D FW-D	Observed in RO BLM (2011): UMP (2010, 2011), RRS (2010, 2011), and FW (2011); see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Sedecula pulvinata			S&M-B	STR S&M-B	Found in association with the roots of *Abies concolor, A. lasiocarpa, A. magnifica, Picea engelmannii,* and *Pinus contorta* above 2,000 m elevation.			RRS-D FW-D	Observed in RRS; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; remaining sites may not provide a reasonable assurance of species persistence. MIIH determination is dependent on Forest Service-recommended route modifications that avoid impacts to species.
Sowerbyella rhenana			S&M-B	S&M-B			CB-D MD-D			NI	Not documented in Project vicinity.
Sparassis crispa			S&M-D	S&M-D	See the Survey and Manage Report (appendix K of this EIS).		CB-D MD-D	UMP-D	Observed in UMP; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Spathularia flavida			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-S RO-D		Observed in RO; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Stagnicola perplexa			S&M-B	SEN S&M-B				UMP-S RRS-D		NI	Not documented in Project vicinity.
Stropharia albovelata (formerly Pholiota albivelata)			STR		Scattered under conifers on conifer litter from late April through early January.	Coos	CB-S			NI	Not documented in Project vicinity.
Thaxterogaster pavelekii			SEN S&M-B	S&M-B	Associated with roots of Sitka spruce and lodgepole pine in Sitka Spruce (63%) and Western Hemlock (37%) series at elevations of 17-588 feet.		CB-S			NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Tremiscus helvelloides			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-D RO-D MD-D	UMP-D	Observed in RO and UMP; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Tricholoma venenatum			S&M-B	S&M-B						NI	Not documented in Project vicinity.
Tricholomopsis fulvescens			S&M-B	STR S&M-B	Found solitary on decayed conifer wood above 1,000 m elevation.			UMP-S RRS-S		NI	Not documented in Project vicinity.
Tuber asa			STR S&M-B	S&M-B	Found in association with the roots of *Pseudotsuga menziesii* and *Tsuga heterophylla* at 170 to 500 m elevation in Oregon.		CB-S			NI	Not documented in Project vicinity.
Tuber pacificum			STR S&M-B	S&M-B	Low elevation moist coniferous forests.	Coos	CB-S			NI	Not documented in Project vicinity.
Tylopilus porphyrosporus (Tylopilus pseudoscaber)			S&M-D	S&M-D			CB-D			NI	Not documented in Project vicinity.
Urnula craterium			STR	STR	Moist ground in spring; fallen oak branches.	Jackson	MD-S	RRS-S			
Lichens											
Anaptychia crinalis			STR		Rangewide, on sheltered rock (often calcareous), bark and soil, from sea level to 9,000 ft elevation. In the Pacific Northwest, on bark (Picea, Pinus, Thuja) and wood in sand dunes and headlands along the immediate coast.		CB-D			NI	Not documented in Project vicinity.
Bryoria bicolor			STR		In the Pacific Northwest, on windswept, exposed trees along the immediate coast and over mossy rocks, heath, and bark of conifers on windswept and fog-drenched summits at highest elevations along the immediate coast. Rock types here are basalt.		CB-S			NI	Not documented in Project vicinity.
Horsehair lichen *Bryoria pseudocapillaris*			S&M-B	S&M-B	Grows on exposed or moderately exposed coastal trees, shrubs, and (once) on rock, primarily in late seral and old-growth shorepine scrub forests of dunes, marine terraces, and in Sitka spruce forests along the edges of coastal lagoons, estuaries, and headlands at or near sea level (0 - 75 m elevation; 0-250 ft.). Occurring in sites with moderated temperature and high humidity provided by frequent fog.		CB-D RO-S			NI	Not documented in Project vicinity.
Bryoria spiralifera			SEN S&M-B	S&M-B	Grows on exposed or moderately exposed coastal trees, shrubs, and (once) on rock, primarily in late seral and old-growth shorepine scrub forests of dunes, marine terraces, and in Sitka spruce forests along the edges of coastal lagoons, estuaries, and headlands at or near sea level (0 - 75 m elevation; 0-250 ft.). Occurring in sites with moderated temperature and high humidity provided by frequent fog.	Coos Douglas	CB-D RO-S			NI	Not documented in Project vicinity.
Bryoria subcana			SEN S&M-B	SEN S&M-B	Grows on conifer bark in forests of coastal bays, streams, dune forests, and high precipitation ridges within 30 mi (50 km) of the ocean. Inhabits areas of high humidity, mostly in late-seral to old-growth stands.	Coos Douglas	CB-D RO-S	RRS-S		NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Bryoria tortuosa			S&M-A/D	S&M-A/D	Frequently grows on oaks and pines (also on other trees and shrubs) in well-lit, open stands, within the relatively dry Douglas-fir Zone and Ponderosa Pine Zone east of the Cascade crest in Oregon and Washington, the low-elevation eastern Siskiyou Mountains, and in oak woodlands of the Willamette Valley.	Jackson	MD-D		Observed in MD BLM (2007); see Survey and Manage standalone document.	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Buellia oidalea			STR S&M-E	S&M-E	Bark of various shrubs, hardwoods, and conifers, maritime (< 1 km from coastline), known from Oregon Dunes NRA.	Douglas Jackson	CB-S MD-D			NI	Not documented in Project vicinity.
Calicium abietinum			S&M-B	S&M-B			CB-D			NI	Not documented in Project vicinity.
Calicium adspersum			SEN S&M-E	S&M-E	Highly textured bark on the boles of old growth conifer trees.	No Data	CB-S RO-S			NI	Not documented in Project vicinity.
Calicium glaucellum			S&M-F	S&M-F		Douglas Jackson	RO-S MD-S	UMP-D	RO BLM, MD BLM, and UMP N.F: occasional occurrences observed along the ROW during 2007/2008 surveys.	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Calicium viride			S&M-F	S&M-F		Douglas Jackson	CB-D RO-D MD-D	UMP-D	CB BLM, RO BLM, MD BLM, UMP N.F; commonly observed along the ROW during 2007/2008 surveys.	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Calicium quercinum			STR	STR	The single known occurrence in the Pacific Northwest is on bark of old *Quercus garryana* trunks in an open grove.		RO-S MD-S	UMP-S		NI	Not documented in Project vicinity.
Caloplaca stantonii			STR		On rocks near coast.	Coos	CB-S			NI	Not documented in Project vicinity.
Cetrelia cetrarioides			S&M-E	S&M-E			CB-D			NI	Not documented in Project vicinity.
Chaenotheca chrysocephala			S&M-B	S&M-B	Frequent on bark and wood of old conifers including *Abies* spp., *Picea* spp., *Pseudotsuga menziesii*, *Thuja plicata* and decorticated snags. Prefers semi-open forests at relatively low elevations (80-1,150 m) and is most abundant on conifer trunks in mixed forests and in edge habitats, also in relatively young stands.		CB-D RO-D MD-D		Observed in CB, RO, and MD; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Chaenotheca ferruginea			S&M-B	S&M-B	See the Survey and Manage Report (appendix K of this EIS).		CB-S RO-D		Observed in RO; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Chaenotheca furfuracea			S&M-F	S&M-F			CB-D RO-D		Observed in CB BLM on edge of ROW near MP 27.03; observed in RO BLM approx. 90' NE of ROW near MP 61.39 and in ROW near MP 75.66	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Chaenotheca subroscida			STR S&M-E	STR S&M-E	Restricted to bark of old trees with most known occurrences on conifers > 200 years old, occasionally found on younger trees southward in Klamath region, 7 sites found in Oregon.	Douglas Jackson	RO-D MD-D CB-S	UMP-D RRS-D FW-D	Observed in RO, RRS, and FW; see the Survey and Manage Report (appendix K of this EIS).	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Chaenothecopsis pusilla			S&M-E	S&M-E			CB-S			NI	Not documented in Project vicinity.
Cladidium bolanderi			SEN	SEN	On a variety of rock types (sandstone, chert, granite, serpentine) on coastal bluffs and coastal grasslands. Presumably nitrophilous because of its occurrence where birds roost. Elevations from sea level to 1,000 feet.		CB-S			NI	Not documented in Project vicinity.
Cladonia norvegica			S&M-B	S&M-B	Decaying wood and bark at the base of conifers in humid shady forests.		CB-D			NI	Not documented in Project vicinity.
Collema nigrescens			S&M-F	S&M-F	See the Survey and Manage Report (appendix K of this EIS).		RO-D MD-D		Observed in RO and MD; see the Survey and Manage Report (appendix K of this EIS).	NI	The single site observed during surveys will be avoided.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Collema undulatum var. granulosum			STR	STR	On periodically moistened calcareous rocks or on mosses over rocks, occasionally on soil. In Oregon it was found in full shade on a steep upper slope of exposed non-calcareous bedrock, with seeps providing lime to the rock surface.	Jackson	RO-S MD-D	UMP-S RRS-S		NI	Not documented in Project vicinity.
Dendriscocaulon intricatulum			S&M-B	S&M-B			MD-D		Observed in MD within TEWA 115.33-W near MP 115.49 and on edge of TEWA 133.40-N near MP 133.4; not S&M in Jackson County.	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Dermatocarpon luridum			S&M-B	S&M-B			CB-S	RRS-S UMP-D FW-S		NI	Not documented in Project vicinity.
Mouse ears *Erioderma sorediatum*			SEN		Humid sites on trees and shrubs near the coast.	Coos	CB-D			NI	Not documented in Project vicinity.
Fuscopannaria saubinetii (Panaria saubinetii)			S&M-F	S&M-F			CB-S		Documented at one site proposed for rock removal on Coos Bay BLM District Lands.	MIIH	Minimal disturbance at one site; however, site persistence would be maintained following project implementation.
Heterodermia japonica			STR		In the Pacific Northwest, currently known only from twigs of *Picea sitchensis* in old-growth, fog-drenched coastal headland forest.		CB-S			NI	Not documented in Project vicinity.
Heterodermia leucomelos			SEN	SEN	On mossy hardwoods or rock faces with some light.	Coos Douglas	CB-D	RRS-S		NI	Not documented in Project vicinity.
Heterodermia sitchensis			STR S&M-E	S&M-E	Restricted to the immediate coast. The north-facing, foreshore exposure in Oregon seems to indicate a requirement for high humidity.		CB-S			NI	Not documented in Project vicinity.
Hypogymnia duplicata			STR S&M-A	S&M-A	Mid-elevation moist western hemlock stands, old-growth Douglas-fir, mature western hemlock/Douglas-fir forest, moist Pacific silver fir or noble fir forests, Sitka spruce, riparian forest and later-successional forest, along ridgetops in Oregon Coast Range, also on red alder in sedge-sphagnum bogs in Oregon Coast Range. Elevation 330-1660m (1,100-5,450 ft.).		CB-S RO-S			NI	Not documented in Project vicinity.
Hypogymnia oceanica			S&M-F	S&M-F						NI	Not documented in Project vicinity.
Hypogymnia pulverata			SEN	SEN	The single known site in the Pacific Northwest is in coastal forest, where it was collected in litterfall from branches of Picea sitchensis near the top of a forested dune.		CB-S			NI	Not documented in Project vicinity.
Hypogymnia vittata			S&M-E	S&M-E						NI	Not documented in Project vicinity.
Hypogymnia subphysodes			STR		The single known site in the Pacific Northwest is in coastal sand dunes, where it was collected on branches of *Pinus contorta* in the *Pinus contorta/Arctostaphylos* plant association. Elsewhere in its range it occurs on dead wood, bark, twigs, and rocks.		CB-S			NI	Not documented in Project vicinity.
Hypotrachyna revoluta			SEN S&M-E	S&M-E	On rocks, trunks of alders growing on streambanks and lakesides.	Coos	CB-S			NI	Not documented in Project vicinity.
Treepelt lichen *Leioderma sorediatum*			SEN	SEN	On shrubs (huckleberry and manzanita) and mossy conifer branches in humid coastal forests.	Douglas	CB-S			NI	Not documented in Project vicinity.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Lecanora caesiorubella ssp. Merrillii			STR	STR	On bark of trees and shrubs, and on decaying wood (including redwood fenceposts) in dry, open deciduous or coniferous woodland, chaparral, and salt marsh from sea level to about 1500 ft elevation.		CB-S	RRS-D		NI	Not documented in Project vicinity.
Lecanora pringlei			STR	STR	Unknown.	Jackson Klamath	RO-S MD-D LV-S	UMP-S RRS-S FW-S		NI	Not documented in Project vicinity.
Leptogium burnetiae var. hirsutum			STR S&M-A	STR S&M-A	Usually on hardwood trunks and branches but also on decaying logs and rocks. In mesic open forests.	Jackson	MD-S	UMP-S RRS-S FW-S		NI	Not documented in Project vicinity.
Leptogium cyanescens			SEN S&M-A	SEN S&M-A	Occurs in mixed conifer and Douglas-fir stands, and in maple and willow thickets in both riparian and upland habitats.	Douglas Jackson	CB-S MD-D RO-D	RRS-S UMP-S FW-S		NI	Not documented in Project vicinity.
Leptogium platynum			STR		On soil or rock, usually near seeps or areas wet most of the year.	Coos	CB-D		CB (2007): In ROW near MP 40.20	MIIH	Removal of or damage to individuals.
Leptogium plicatile			STR		Moist, calcareous rocks or soil. In Oregon, it has been found on non-calcareous rocks with seeps providing lime to the rock surface, in a seasonally wet small meadow, low trees and brush providing 10% cover, at an elevation of about 200 m.		MD-D			NI	Not documented in Project vicinity.
Leptogium rivale			S&M-B	S&M-B			MD	UMP RRS FW		NI	Not documented in Project vicinity.
Leptogium teretiusculum			STR S&M-E	STR S&M-E	Usually on oaks in dry to mesic open mixed conifer forests.	Douglas Jackson	CB-S RO-D MD-D	UMP-S RRS-D	MD (2001) 328ft. SW of TEWA 115.33-W near MP 115.32.	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Lobaria linita			SEN S&M-A	SEN	On trees, shrubs, mossy rocks or alpine sod. Montane to alpine.	Douglas Jackson	CB-S RO-S MD-D	UMP-D RRS-S		NI	Not documented in Project vicinity.
Microcalicium arenarium			SEN S&M-B	S&M-B	Forms small colonies on free-living green algae or leprose lichens growing in drier microhabitats such as bark, wood, root, and rock faces that are sheltered from precipitation. In the Pacific Northwest, probably restricted to old-growth forests because its host species often appear only in forests older than 100 years. Known elevations are below 2,000 feet.		CB-S			NI	Not documented in Project vicinity.
Nephroma bellum			S&M- F	S&M-F						NI	Not documented in Project vicinity.
Nephroma isidiosum			S&M-E	S&M-E						NI	Not documented in Project vicinity.
Nephroma occultum			S&M-B	S&M-B	Found on branches of old-growth Douglas-fir, western hemlock, and Pacific silver fir; elevation 305-975 m (1,000-3,200 feet).		CB-S MD-S RO-D	RRS-D UMP-D		NI	Not documented in Project vicinity.
Niebla lichen *Niebla cephalota*			SEN S&M-A	S&M-A	Strictly a coastal species but may extend up to 15 miles inland where influenced by the coastal fog belt; occurs on exposed trees shrubs, and less often on rocks or bark; elevation <75 m (250 ft). Found on exposed Sitka's spruce, Hooker's willow, Monterey cypress, and shore pine in open forest, forest edges, and scrublands.	Coos	CB-D RO			NI	Not documented in Project vicinity.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Pannaria rubiginosa			SEN S&M-E	S&M-E	Low elevation coastal shrub thickets on wet deflation plains, mature Douglas-fir/western hemlock forest, and old growth conifer forest dominated by Douglas-fir, Sitka spruce, and western red cedar.	Coos Douglas	CB-S MD-S	RRS-S UMP-S		NI	Not documented in Project vicinity.
Peltigera pacifica			S&M-E	S&M-E	See the Survey and Manage Report (appendix K of this EIS).		CB-D RO-D MD-D	RRS-S UMP-D	Observed in RO; see Survey and Manage stand-alone document.	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Peltula euploca			STR	STR	On noncalcareous rock in open and very dry to damp.	Jackson Klamath	RO-S MD-D LV-D	RRS-S FW-S		NI	Not documented in Project vicinity.
Pilophorus nigricaulis			SEN		Grows primarily on volcanic rock substrates (basalt and andesite). Habitats have been described as lava flows, cliffs, rock outcrops, talus slopes, and large boulders.		RO-S			NI	Not documented in Project vicinity.
Platismatia lacunosa			S&M-C	S&M-C						NI	Not documented in Project vicinity.
Pseudocyphellaria mallota			SEN	SEN	Old conifers or understory hardwoods and shrubs in late successional forests.	Douglas		UMP-D		NI	Not documented in Project vicinity.
Pseudocyphellaria perpetua (Pseudocyphellaria sp. 1)			S&M-B	S&M-B	Oregon Coast on old growth conifer trees in western hemlock forests, sand late-seral Douglas-fir forests.		CB-D RO-S			NI	Not documented in Project vicinity.
Pseudocyphellaria rainierensis			S&M-A	S&M-A	Epiphyte primarily on conifer trees in cool, humid, old-growth to climax forests in the Western Hemlock or lower Pacific Silver Fir zones; elevation between 100 m to 1,220 m (330-4,000 ft).		CB-D RO-S	UMP-D		NI	Not documented in Project vicinity.
Pyrrhospora quernea			S&M-E	S&M-E		Coos Douglas				NI	Not documented in Project vicinity.
Ramalina pollinaria			SEN S&M-E	SEN S&M-E	Bark and wood, usually in low elevation swamps.	Coos Jackson?	CB-D	UMP-S RRS-S		NI	Not documented in Project vicinity.
Ramalina thrausta			S&M-A	S&M-A	Occurs more often on older trees and in older-aged stands, and in sheltered humid forests though it is found at timberline and on coastal cliffs in moist, sheltered habitats, most common along water or in coastal fog zones.		CB RO-D MD		Observed in RO BLM (2010); see Survey and Manage standalone document.	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Schaereria dolodes			STR	STR	On bark of conifers and decaying wood in mature, dry, open forests. Elevation ranges from about 1,500 feet at the northern edge of its range to 11,000 ft elevation at the southern end of its range.		CB-S RO-D MD-S	UMP-S RRS-S		NI	Not documented in Project vicinity.
Sclerophora peronella			STR				RO-D			NI	Not documented in Project vicinity.
Sigridea californica			STR	STR	On bark of trees and shrubs, and on decaying wood in dry, open deciduous or coniferous woodland and chaparral.		CB-S	RRS-S		NI	Not documented in Project vicinity.
Stenocybe clavata			S&M-E	S&M-E						NI	Not documented in Project vicinity.
Stereocaulon spathuliferum			SEN	SEN	On rock.	Not within counties affected by Project.	RO-S			NI	No suitable habitat in Project area.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Teloschistes flavicans			SEN S&M-A	S&M-A	Forested headlands and dunes of the coastal fog belt, especially on capes or peninsulas, at sites less than 200 m (600 ft) elevation. Found on oak, shore pine, Sitka spruce, shrubs, moss, and soil.	Coos	CB-D RO			NI	Not documented in Project vicinity.
Texosporium sancti-jacobi	SOC		SEN	SEN	Arid to semi-arid shrub-steppe, grassland or savannah communities up to 1,000 m in elevation. It requires natural openings or gaps in arid vegetation that are not maintained by fire.		LV-S	FW-S		NI	Not documented in Project vicinity.
Thelenella muscorum var. octospora			STR	STR	In the Pacific Northwest, a component of biological soil crusts in semi-arid shrub-steppe and grassland below elevations of 4,000 feet.		LV-S	FW-S		NI	Not documented in Project vicinity.
Thelomma mammosum			STR		On acidic rock near coast.	No Data	CB-S			NI	Not documented in Project vicinity.
Tholurna dissimilis (south of Columbia River)			S&M-B	S&M-B	On krummholz subalpine fir and Engleman spruce on windswept ridges in the upper montane and subalpine zones up to timberline. Elevation from just above sea level to 2,042 m (6,700 ft.), in old growth forests.		RO			NI	Not documented in Project vicinity.
Umbilicaria hirsuta			STR	STR	The single known population in Oregon occurs on the vertical face of an igneous rock outcrop (noncalcareous) with an intermittent seep, in partial shade.		RO-S MD-D	UMP-S RRS-S		NI	Not documented in Project vicinity.
Usnea hesperina			S&M-B	S&M-B			CB-S MD-S			NI	Not documented in Project vicinity.
Usnea longissima			S&M-A/F	S&M-A/F	Occurs in old-growth and late successional conifer stands, and in hardwood stands and lowland riparian woodland areas. It can also grow in clear-cut and other young stands where there is suitable substrate (i.e. conifers and hardwoods) for colonization.		CB-D MD-D RO-D	UMP-D	CB: 166' E of ROW near MP 16.92; 1 site observed 80' NE of ROW near MP 27.35 (2007); 1 site observed on edge of ROW near MP 27.43 (2007)	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Usnea rubicunda			STR	STR	On trees in open moist forests.	Coos	CB-D	UMP-D RRS-S FW-D		NI	Not documented in Project vicinity.
Vezdaea stipitata			STR	STR	Unknown.	Douglas	RO-D MD-S	UMP-S		NI	Not documented in Project vicinity.
Vascular Plants											
Pink sand verbena *Abronia umbellata ssp. breviflora*	SOC	E			Beaches and foredunes of the Pacific Coast. In Oregon and north, restricted to beaches, and rarely occurs in foredune environments. Occurs on fine sand between the high-tide line and the long-term driftwood zone. Occurs in areas of sand movement. Most populations occur on broad beaches and/or near the mouths of creeks or rivers.	Coos Douglas	CB-D			NI	Species does not occur within the Project area.
California maiden-hair *Adiantum jordanii*			SEN	SEN	Rocky areas in moist woods.	Coos Douglas	CB-D RO-D MD-D	UMP-S RRS-D FW-S		NI	Not documented in Project vicinity.
Cusick's giant-hyssop *Agastache cusickii*			SEN		Dry, rocky sites and often on talus slopes.		LV-D			NI	Not documented in Project vicinity.
Henderson's bentgrass *Agrostis hendersonii*	SOC		STR		Vernal pools, Agate Desert	Jackson	MD-S			NI	Not documented in Project vicinity.
Bolander onion *Allium bolanderi var. bolanderi*			STR	STR	Gravelly areas in forest openings.	Jackson?	MD-D	RRS-D		NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Geyer's onion *Allium geyeri var. geyeri*			SEN	SEN	Moist, open slopes, meadows, or stream banks in mountains.		LV-D			NI	Not documented in Project vicinity.
Peninsular onion *Allium peninsulare*			SEN	SEN	Dry open or wooded slopes and flats to 3000 ft; valley grassland, foothill woodlands; March through June.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Sanborn's Onion *Allium sanbornii var. sanbornii*			STR		Heavy serpentine clay; 700-1,400 m.	Jackson	MD-S			NI	Not documented in Project vicinity.
Long-stemmed androsace *Androsace elongata ssp. acuta*			STR		Found on slopes between 0 - 4000 feet within chapparral, foothill woodland, northern coastal scrub, coastal sage scrub.	Jackson	MD-S			NI	Not documented in Project vicinity.
Koehler's rockcress *Arabis koehleri var. koehleri*	SOC	C	SEN		Rocky cliff sites.	Douglas	RO-D			NI	Not documented in Project vicinity.
Rogue Canyon rockcress *Arabis modesta*	SOC		STR	STR	Known only from the Rogue River canyon near Galice, Josephine County.	Jackson	MD-D	RRS-D		NI	Not documented in Project vicinity.
Crater Lake rock-cress *Arabis suffrutescens var. horizontalis*	SOC	C		SEN	High elevation open sites with pumice. Known sites in Crater Lake NP.	Jackson		UMP-S RRS-S FW-D		NI	Not documented in Project vicinity.
Gasquet (hairy) manzanita *Arctostaphylos hispidula*	SOC		SEN	SEN	Rocky serpentine soils or sandstone, open forests.	Douglas	CB-D RO-S MD-S	RRS-D		NI	Outside of known (or probable) range
Shasta arnica *Arnica viscosa*			SEN	SEN	High elevation, open rocky sites; known in Deschutes, Klamath, Douglas Co, OR; In Fremont-Winema NF, found at a few sites in wilderness along the Cascade Crest and on Pelican Butte.	Douglas Klamath	MD-S	UMP-D RRS-S FW-D		NI	Not documented in Project vicinity.
Coastal sagewort *Artemisia pycnocephala*			SEN	SEN	Rocky or sandy soils, coastal strand.	Coos	CB-D			NI	No suitable habitat in Project area.
Grass-fern *Asplenium septentrionale*			SEN	SEN	Grows on shady, moist, north faces of large rocks; only known in North Umpqua.	Dougals Jackson Klamath	RO-S MD-S	UMP-D RRS-D FW-D		NI	Not documented in Project vicinity.
Applegate's milk-vetch *Astragalus applegatei*	E	E			Occurs in flat-lying, seasonally moist, strongly alkaline soils dominated by greasewood with sparse, native bunch grasses and patches of bare soil.	Klamath			Sites documented near ROW between MP 195.35 and 196.50. Historical documentation between MP 191.7 – 194.11.	LAA	Impacts to potential habitat that has not been surveyed; impacts to individuals if present.
California milk-vetch *Astragalus californicus*			SEN		Dry open areas in shrubland.	Jackson	MD-D			NI	Not documented in Project vicinity.
Gambel milk-vetch *Astragalus gambelianus*			SEN		Open grassy areas, shrublands.	Jackson	MD-D			NI	Not documented in Project vicinity.
Geyer's milk-vetch *Astragalus geyeri var. geyeri*			SEN		Chenopod scrub, Great Basin scrub		LV-S			NI	Not documented in Project vicinity.
Lemmon's milk *Astragalus lemmonii*			SEN	SEN	Great Basin scrub, meadows and seeps, marshes and swamps (lake shores). NOTE: According to 10/23/2012 plant meeting in Corvallis, *H. lemmonii* should be *H. cooperi* (*H. lemmonii* not in OR).	Klamath		FW-D		NI	Not documented in Project vicinity.
Peck's milk-vetch *Astragalus peckii*	SOC	T			Very dry sites, on loose, sandy soil or pumice. Often found in/along dry water courses, in sagebrush or rabbitbrush openings in lodgepole pine forests (in the south) or in western Juniper woodlands (in the north), occ. on barren flats.	Klamath	LV-S	FW-D		NI	Species has not been documented in Project vicinity and no suitable habitat is present in Project area.

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Bastard kentrophyta *Astragalus tegetarioides*		C	SEN	SEN	Dry sandy soil in Ponderosa pine forests (1,460-1,620 m).		LV-D			NI	Not documented in Project vicinity.
Marsh baccharis *Baccharis douglasii*			STR		Moist salt marshes, coastal strands, stream edges, hillsides, railroads; 0–1,200 m.		CB-S			NI	Not documented in Project vicinity.
Bensonia *Bensoniella oregana*	SOC	C	SEN	SEN	Wet meadows and moist streamside sites in pre-Cretaceous metasedimentary rock at elevations above 4,000 feet.	Coos Douglas	CB-D RO-D MD-D	RRS-D	One site located (2011) in RO BLM approximately 150' E of existing Signal Tree Road Quary (MP 47.00)	NI	The single site observed during surveys will be avoided.
Crenulate moonwort (Crenulate grape-fern) *Botrychium crenulatum*		C	SEN	SEN	Marshes, meadows above 4000 ft.	Douglas Jackson	LV-D	FW-S		NI	Not documented in Project vicinity.
Victorin's grape-fern *Botrychium minganense*			S&M-A	S&M-A	Various: old-growth forests and riparian zone (not wet soils), subalpine and lush meadows, mossy talus slopes under bigleaf maple, road cuts, shrub lands, and alder thickets.		RO-S	UMP-S		NI	Not documented in Project vicinity.
Mountain grape-fern *Botrychium montanum*			S&M-A	S&M-A	Occurs in dark coniferous forests, usually near swamps and streams from 1000-3000m (3300-9800 ft.) in elevation.		RO			NI	Not documented in Project vicinity.
Pumice grape-fern *Botrychium pumicola*		T			Loose volcanic soil, frost pockets and lodgepole pine basins (1,520-2,470 m).	Klamath	LV-S	UMP-S RRS-S FW-D		NI	Species has not been documented in Project vicinity and no suitable habitat is present in Project area.
Dwarf brodiaea *Brodiaea terrestris*			SEN	SEN	Grassland, open woodlands.	Coos	CB-D			NI	Not documented in Project vicinity.
Densetuft hairsedge *Bulbostylis capillaris*			STR		Lower montane coniferous forest, meadows and seeps, upper montane coniferous forest.		MD-S			NI	Not documented in Project vicinity.
Brewer's reedgrass *Calamagrostis breweri*			SEN	SEN	Restricted to subalpine habitats in a narrow elevation range in Oregon. Most populations in Oregon occur between 5,000-6,000 feet. Usually found in moist meadows with limited vegetative competition.			UMP-S		NI	Not documented in Project vicinity.
The dalles water-starwort *Callitriche fassettii*				STR	Forested wetlands.			FW-S		NI	Not documented in Project vicinity.
Winged water-starwort *Callitriche marginata*			SEN		Ponds, vernal pools.	Jackson	MD-D			NI	Not documented in Project vicinity.
Cox's (Crinite) mariposa-lily *Calochortus coxii*	SOC	E			Typically grows in serpentine grasslands and forest margins most often on shady, north-facing, mesic sites near ridgelines.	Douglas	RO-D MD-S		RO (T28S,R5W,S34,35; 1998, 2008–SBS resurvey): within construction right-of-way between MP 75.04-75.33; RO (T29S,R5W,S9,10,3;1992): 0.4 mi S of MP 73.98.	MIIH	Impacts to individuals and habitat.
Greene's mariposa-lily *Calochortus greenei*	SOC	C	SEN	SEN	Grows on dry, bushy hillsides in southern Jackson County.	Jackson Klamath	MD-D	FW-S		NI	Not documented in Project vicinity.
One-leaved mariposa-lily *Calochortus monophyllus*			SEN		Wooded slopes, clay loam soils.	Jackson Klamath	MD-D			NI	Not documented in Project vicinity.
Broad-fruit mariposa-lily *Calochortus nitidus*	SOC		SEN	SEN	Open rocky areas or dry meadows .	Jackson	MD-S			NI	Not documented in Project vicinity.
Shasta star-tulip *Calochortus nudus*			STR	STR	Moist grassy areas, meadows, lake and bog margins, 1,200-2,500 m.	Jackson	MD-S	RRS-S		NI	Not documented in Project vicinity.
Siskiyou mariposa lily *Calochortus persistens*	FC	C	SEN		Open rocky areas.	Jackson	MD-D			NI	Not documented in Project vicinity.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Umpqua mariposa-lily *Calochortus umpquaensis*	SOC	E			Transitional zone between forest and grassland, on serpentine soils (270-820 m).	Douglas Jackson	MD-S RO-D	UMP-D	No documentation within 0.1 mi (500ft) of Pacific Connector Pipeline Project; however, large populations have been documented 1.2+mi E of MP 99.55 on Umpqua National Forest.	MIIH	Although individuals were not documented within ROW during surveys, unoccupied suitable habitat would be impacted during Project construction.
Howell's camassia *Camassia howellii*	SOC	C	SEN	SEN	Grassy wet meadows, swampy ground, and transitional areas between wet meadows and coniferous woodlands.	Jackson	RO-S MD-D	RRS-D		NI	No suitable habitat in Project area.
Slender-flowered evening-primrose *Camissonia graciliflora*			SEN	SEN	Open rocky grassy and shrublands, usually clay soils.	Jackson	MD-D	RRS-D		NI	Not documented in Project vicinity.
Colville's toothwort *Cardamine nuttallii var. covilleana*			STR		Moist, shaded hillsides, wet, open pine forests.	Jackson	MD-D			NI	Not documented in Project vicinity.
Awned sedge *Carex atherodes*			STR		Wetlands, shallow water.	Klamath	LV-D			NI	Not documented in Project vicinity.
Short-stemmed sedge *Carex brevicaulis*			SEN	SEN	Rocky or sandy soils.	Coos Douglas	CB-D RO-S			NI	Not documented in Project vicinity.
Capitate sedge *Carex capitata*			SEN	SEN	Wet places.	Jackson Klamath	MD-D LV-S	RRS-D FW-D		NI	Not documented in Project vicinity.
Bristly sedge *Carex comosa*			SEN	SEN	Wet places.	Klamath	RO-S MD-D	RRS-S		NI	Not documented in Project vicinity.
Cordilleran sedge *Carex cordillerana*			SEN	SEN	Naturally disturbed, rocky slopes with organic layer and leaf litter in mesic mixed forests, or disturbed, open, grassy slopes; 500-2,400 m.			FW-D		NI	Not documented in Project vicinity.
Crawford's sedge *Carex crawfordii*			SEN	SEN	Moist or wet places.	Jackson	CB-D MD-S	UMP-S RRS-S		NI	Not documented in Project vicinity.
Dry-spike sedge *Carex davyi*				STR	Moist meadows, rocky slopes; 1,500-3,200 m; subalpine coniferous forest, upper montane coniferous forest.			FW-S		NI	Not documented in Project vicinity.
Lesser panicled sedge *Carex diandra*			SEN	SEN	Meadows.		LV-D	UMP-S FW-D		NI	Not documented in Project vicinity.
Needleleaf sedge *Carex duriuscula*				STR	Dry prairies, sagebrush grasslands, openings in dry forests.			FW-S		NI	Not documented in Project vicinity.
A sedge *Carex klamathensis*			SEN	SEN	Chaparral, cismontane woodland, meadows, and seeps.		MD-D	RRS-D		NI	Not documented in Project vicinity.
Slender sedge *Carex lasiocarpa var. americana*			SEN	SEN	Bogs, shallow water.	Klamath	LV-D	UMP-S FW-D		NI	Not documented in Project vicinity.
Bighead sedge *Carex macrocephala*			SEN	SEN	Sandy beaches, sand dunes.	Coos Douglas	CB-D			NI	Not documented in Project vicinity.
Spikenard sedge *Carex nardina*			SEN	SEN	Exposed arctic and alpine tundra, usually calcareous cliffs, rocky slopes, ridges, and summits; 50-3,300 m.	Douglas		UMP-D		NI	Not documented in Project vicinity.
Sierra nerved sedge *Carex nervina*			SEN	SEN	Moist to wet places.	Jackson	MD-S	RRS-D		NI	Not documented in Project vicinity.
Russet sedge *Carex saxatilis*				SEN	Fens, bogs, wet tundra, roadside ditches, shores of lakes, ponds, and slow moving streams, often in shallow water, 1-3,700 m.			FW-S		NI	Not documented in Project vicinity.
Dark alpine sedge *Carex subnigricans*			SEN	SEN	Moist rocky slopes, alpine meadows; above 2,500 m.		LV-S			NI	Not documented in Project vicinity.

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Native sedge *Carex vernacula*			SEN	SEN	Moist alpine tundra, moist forest openings just below treeline.		LV-S	UMP-S FW-D		NI	Not documented in Project vicinity.
Green-tinged paintbrush *Castilleja chlorotica*			SEN	SEN	Grows on dry gravelly or sandy slopes; Elevation 6000 - 8000 feet; late June through mid-August. Found in shrub openings on slopes and ridges.	Klamath	LV-S	FW-D		NI	No suitable habitat in Project area.
Mendocino coast indian paintbrush *Castilleja mendocinensis*			STR		Coastal bluff scrub, closed-cone coniferous forest, coastal dunes, coastal prairie, coastal scrub.		CB-S			NI	Not documented in Project vicinity.
Cliff paintbrush *Castilleja rupicola*	SOC				Inhabits rocky ridges, outcrops, and crevices, exposed slopes, dry to mesic cliffs, scree, and talus, with various aspects.	Douglas				NI	Not documented in Project vicinity.
Split-hair paintbrush *Castilleja schizotricha*				SEN	Decomposed granite or marble at high elevations.	Jackson		RRS-D		NI	No suitable habitat in Project area.
Desert chaenactis *Chaenactis xantiana*			SEN	SEN	Open, deep, loose sandy (rarely gravelly) soils, arid and semiarid shrublands, chaparral.		LV-D			NI	Not documented in Project vicinity.
Coville's lip-fern *Cheilanthes covillei*			SEN	SEN	Rock outcrops, cliffs.	Jackson	MD-D	RRS-D		NI	Not documented in Project vicinity.
Fee's lip-fern *Cheilanthes feei*			SEN	SEN	Calcareous cliffs and ledges, usually on limestone or sandstone; 100-3,800 m.		LV-S	FW-S		NI	Not documented in Project vicinity.
Coastal lip-fern *Cheilanthes intertexta*			SEN	SEN	Rock outcrops, cliffs.	Douglas Jackson	MD-D	RRS-S FW-S		NI	Not documented in Project vicinity.
Narrow-leaved amole *Chlorogalum angustifolium*			SEN	SEN	Clay soils in dry grassland.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Oregon timwort *Cicendia quadrangularis*			SEN	SEN	Openings.	Coos Douglas	CB-D RO-D	RRS-D		NI	Not documented in Project vicinity.
Bulb-bearing water-hemlock *Cicuta bulbifera*			STR	STR	Wetlands and lake and stream margins.	Klamath	LV-S	FW-S		NI	Not documented in Project vicinity.
Tall bugbane *Cimicifuga elata var. elata*		C				Douglas				NI	Not documented in Project vicinity.
Andrew's bead-lily *Clintonia andrewsiana*				STR	Moist, coastal redwood forests; 0--400 m.			RRS-S		NI	Not documented in Project vicinity.
Spoonwort *Cochlearia officinalis*			STR		Sea bird nesting areas on offshore rocks.	Coos	CB-S			NI	Not documented in Project vicinity.
Mt. Mazama collomia *Collomia mazama*			SEN	SEN	Dry woods at high elevations; July and August; True fir/lodgepole pine forest, meadows, and meadow edges; On Fremont-Winema NF, found in Lost Creek, Horse Creek, Rock Creek and Cherry Creek drainages, Klamath RD.	DouglasJacksonKlamath		UMP-D RRS-D FW-D		NI	Not documented in Project vicinity.
Spleenwort-leaved goldthread *Coptis asplenifolia*			S&M-A	S&M-A	Occurs in moist forests and bogs, at low to middle elevations, in areas with a strong maritime influence.		RO			NI	Not documented in Project vicinity.
Threeleaf goldthread *Coptis trifolia*			S&M-A	S&M-A	Associated with small wetland areas located within mature coniferous forests in the Western Hemlock Zone and Silver Fir Zone at an elevation of 1000-1160 m (3280-3800 feet) above sea level. Soils are poorly drained histosols.		RO			NI	Not documented in Project vicinity.

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Pt. Reyes bird's-beak *Cordylanthus maritimus ssp. palustris*	SOC	E			Inhabits salt marshes along the coast, sometimes growing just above tidewater in wet areas.	Coos	CB-D		No documentation within 0.1 mi (500ft) of Pacific Connector Pipeline Project; however, it has been documented on the shorelines of: Jordan Cove, 0.2 mi N of MP 0.76; Haynes Inlet 0.4 mi N of MP 1.37; Pony Slough 0.4 mi S of MP 1.37.	MIIH	Construction of the Project has the potential to impact individual plants found within and near the proposed Project (including both the LNG Project area and the pipeline), however, plants adjacent to the construction areas would be protected through the appropriate installation of safety and silt fence.
Coldwater corydalis *Corydalis aquae-gelidae*	SOC	C	S&M-C	S&M-C	Found in close proximity to seeps, springs, or streams with relatively cold water, a substrate of gravelly-sand, upper level canopy closure of 70% to 90%, and little herbaceous competition. Located in the Western Hemlock and Pacific Silver Fir Zones. Elevation range between 370-1310 m (1200-4260 ft.).		RO			NI	Not documented in Project vicinity.
Soleri's pygmy-weed *Crassula solierii*				STR	Vernal pools, shores of lakes and streams; 0-2,100 m. NOTE: Spelled *C. solieri* in numerous references.			FW-S		NI	Not documented in Project vicinity.
Seaside cryptantha *Cryptantha leiocarpa*			SEN		Coastal strand, northern coastal scrub.		CB-D			NI	Not documented in Project vicinity.
Milo baker's cryptantha *Cryptantha milobakeri*			SEN	SEN	Rocky or gravelly soils in conifer openings, chaparral or oak woodlands.	Jackson	MD-D	RRS-D		NI	Not documented in Project vicinity.
Baker's cypress *Cupressus bakeri*	SOC		SEN	SEN	Scattered on dry wooded slopes, usually in serpentine soil.	Jackson	MD-D	RRS-D		NI	Not documented in Project vicinity.
Snowline spring-parsley *Cymopterus nivalis*			SEN	SEN			LV-D			NI	Not documented in Project vicinity.
Short-pointed cyperus *Cyperus acuminatus*			SEN	SEN	Wet, low places in valley and lowlands, edges of tempory pools, ponds, streams, ditches.	Jackson	MD-S	RRS-S		NI	Not documented in Project vicinity.
Clustered lady's slipper *Cypripedium fasciculatum*	SOC	C	SEN S&M-C	SEN S&M-C	Perennial herbaceous plant, found on serpentine substrate and occurs in a variety of habitats, although primarily in older Douglas-fir forests on old stream terraces. The largest populations in southwestern Oregon tend to occur on moist stream terraces, but others inhabit dry rocky up-slope sites. Elevation ranges from 330-1155 m (1000-6400 ft.).	Douglas Jackson	RO-S MD-D CB-S LV-S	UMP-D RRS-D	Private (1994): 30ft. N of MP 104.10 in construction ROW.	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Mountain lady's slipper *Cypripedium montanum*			S&M-C	S&M-C	Inhabits a wide variety of substrates in wooded communities with 60-80 percent canopy closure. Generally found growing in mixed conifers and mixed evergreen/oak woodland plant communities. Elevation range: 495- 2146 m (1500- 6500 ft.).		MD-D RO-D LV-D	UMP RRS-D FW		MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Red larkspur *Delphinium nudicaule*			SEN	SEN	Rocky openings, often in talus on moist slopes.	Douglas Jackson	RO-S MD-D	RRS-D		NI	Not documented in Project vicinity.
Few-flowered bleedingheart *Dicentra pauciflora*			SEN	SEN	Openings in coniferous forests, in volcanic and granitic soils; 1,200-2,700 m.		MD-D	RRS-D		NI	Not documented in Project vicinity.
Howell's whitlow-grass *Draba howellii*		C	SEN	SEN	Rocky summits, cracks in granite walls, rock crevices; 1,900-2,700 m.		MD-D	RRS-D		NI	Not documented in Project vicinity.
Short seeded waterwort *Elatine brachysperma*			SEN	SEN	Occurs almost always under natural conditions in wetlands.		LV-D	UMP-S FW-S		NI	Not documented in Project vicinity.

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Bolander's spikerush *Eleocharis bolanderi*			SEN	SEN	Fresh, often summer-dry meadows, springs, seeps, stream margins; 1,000–3,400 m.	Klamath	LV-D	FW-D		NI	Not documented in Project vicinity.
Oregon willow herb *Epilobium oreganum*		C	SEN	SEN	Grows in bogs at low elevations. Known only from Josephine County.	Douglas	RO-S MD-D	RRS-D		NI	No suitable habitat in Project area.
Siskiyou willow herb *Epilobium siskiyouense*	SOC	C		SEN	Scree and talus on Serpentine ridges.	Jackson		RRS-D		NI	No suitable habitat in Project area.
Golden fleece *Ericameria arborescens*			SEN	SEN	Dry foothill slopes, in chaparral; 90–2,000 m.		CB-D MD-S	RRS-D		NI	Not documented in Project vicinity.
Siskiyou daisy *Erigeron cervinus*			SEN	SEN	Rocky streamsides.	Jackson	CB-S MD-D	RRS-D		NI	Not documented in Project vicinity.
Cliff (rock) daisy Erigeron petrophilus				SEN	Rocky foothills to montane forest.	Jackson		RRS-D		NI	Not documented in Project vicinity.
Cusick's buckwheat *Eriogonum cusickii*		C	SEN	SEN	Sandy, volcanic flats, mixed grassland and sagebrush communities, montane conifer woodlands; of conservation concern; 1,300-1,500 m.		LV-D			NI	Not documented in Project vicinity.
Lobb's buckwheat *Eriogonum lobbii*			SEN	SEN	Gravelly to rocky or talus slopes, mixed grassland, buckbrush, manzanita, and sagebrush communities, montane, subalpine, or alpine conifer woodlands.		MD-S	RRS-D		NI	Not documented in Project vicinity.
Del norte buckwheat *Eriogonum nudum var. paralinum*			STR		Sandy to gravelly flats, mesas, or coastal bluffs, mixed grassland and manzanita communities, oak and scattered conifer woodlands.		CB-S			NI	Not documented in Project vicinity.
Prostrate buckwheat *Eriogonum prociduum*	SOC	C	SEN	SEN	Areas of barren rocky or gravelly volcanic soils within juniper or sagebrush habitat.	Klamath	LV-D	FW-D		NI	Not documented in Project vicinity.
Green buckwheat *Eriogonum umbellatum var. glaberrimum*			SEN	SEN	Sandy to gravelly slopes, sagebrush communities, aspen and montane conifer woodlands; 1,600-2,300 m.		LV-D	FW-D		NI	Not documented in Project vicinity.
Russet cotton-grass *Eriophorum chamissonis*			SEN	SEN	Bogs along the coast.	Coos	CB-D			NI	No suitable habitat in Project area.
Large-leaved filaree *Erodium macrophyllum*			STR		Open sites grassland and shrubland.	Jackson	MD-S			NI	Not documented in Project vicinity.
Pacific wallflower *Erysimum menziesii ssp. Concinnum*			STR		Coastal bluff scrub, coastal dunes, coastal prairie.		CB-S			NI	Not documented in Project vicinity.
Howell's adder's tongue *Erythronium howellii*			SEN	SEN	Found in open woods primarily in the upper Illinois River basin, mostly in serpentine soil; April and May.	Jackson	MD-D	RRS-D		NI	Outside of known (or probable) range
Gold poppy *Eschscholzia caespitosa*			SEN	SEN	Grows on dry, brushy slopes and flat areas, mostly along roadsides; known in southern Douglas County; March through early June.	Douglas	RO-S MD-D	RRS-S		NI	No suitable habitat in Project area.
Wayside aster *Eucephalis vialis (Aster vialis)*	SOC	T	S&M-A	S&M-A	Areas of natural and man-made disturbance, edges and openings in woodlands and forests, both in second and old-growth, and shaded roadsides.	Douglas Jackson	CB-S RO-D MD-D	UMP-S RRS-D	Approx. 8 plants observed along EAR MP 79.42 in 2007 on RO BLM; see Survey and Manage Report in standalone document.	MIIH	Potential impacts to individuals or habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Umpqua swertia *Frasera umpquaensis*		C	SEN	SEN	Elevations 4500 - 6500 feet in conifer forests, in damp, shaded or sometimes open environments; June through August.	Douglas Jackson	RO-S MD-D	UMP-D RRS-D		NI	Not documented in Project vicinity.
Butte county fritillaria *Fritillaria eastwoodiae*			STR		Dry benches and slopes, sometimes on serpentine, in chaparral or beneath conifers; 500-1,500 m.	Jackson	MD-S			NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Gentner's fritillary *Fritillaria gentneri*	E	E			Often occupies grassland and chaparral habitats within, or on the edges of, dry open mixed woodland at elevations below 5,064 feet.	Douglas Jackson	MD-D	RRS-D	Sites documented in project area (2008, 2011): 2 plants 50' and 120' from EAR 128.05; one plant in TEWA (modified project to avoid) and other *Fritilleria* leaves; one plant adjacent to TEWA 128.01-W near MP 128.09; 2 plants located 1.2 mi SE of MP 134.43 (MD: T35S,R1E,S12; 2005).	LAA	Impacts to potential habitat that has not been surveyed; impacts to individuals if present.
Purdy's fritillary *Fritillaria purdyi*			STR		Dry hillsides, open woods and thickets (150-1,520 m).		MD-S			NI	Not documented in Project vicinity.
Boreal bedstraw *Galium kamtschaticum, West Cascades*			S&M-A	S&M-A	Inhabits moist, cold, coniferous forests, and mossy places throughout its range. Generally found underneath dense shrub cover.		RO			NI	Not documented in Project vicinity.
Warner mt. bedstraw *Galium serpenticum ssp. Warnerense*			SEN	SEN	Meadows in subalpine forest.		LV-D	FW-D		NI	Not documented in Project vicinity.
Newberry's gentian *Gentiana newberryi var. newberryi*			SEN	SEN	High alpine meadows of the Cascade Mountains ; wet meadows and meadow edges, generally 5,000' and above ; August and September, On Fremont-Winema NF found on Klamath RD.	Klamath		UMP-S RRS-S FW-D		NI	Not documented in Project vicinity.
Elegant gentian *Gentiana plurisetosa*			SEN	SEN	Meadows in lodgepole forest, red fir forest, or yellow pine forest.		MD-S	RRS-D		NI	Not documented in Project vicinity.
Waldo gentian *Gentiana setigera*		C	SEN	SEN	Meadows in yellow pine forest, red fir forest, wetland-riparian. Almost always under natural conditions in wetlands.		CB-D MD-D	RRS-D		NI	Not documented in Project vicinity.
Seaside gilia *Gilia millefoliata*			SEN	SEN	Stabiilized coastal dunes.	Coos Douglas	CB-D			NI	No suitable habitat in Project area.
Beautiful stickseed *Hackelia bella*			SEN	SEN	Forest openings, roadsides.	Jackson Klamath	MD-D	RRS-S		NI	Not documented in Project vicinity.
Salt heliotrope *Heliotropium curassavicum*			SEN	SEN	Moist to dry saline soils.	Klamath	LV-D	FW-S		NI	No suitable habitat in Project area.
Short-leaved evax *Hesperevax sparsiflora var. brevifolia*			STR		Sandy bluffs and flats.	Coos	CB-D MD-S			NI	Not documented in Project vicinity.
Shaggy hawkweed *Hieracium horridum*			SEN	SEN	Rocky places.	Jackson Klamath	MD-D	RRS-S		NI	Not documented in Project vicinity.
Shaggy horkelia *Horkelia congesta ssp. congesta*	SOC	C	SEN		Open dry ground and rocky flats.	Douglas Jackson	RO-D			NI	Not documented in vicinity of project.
Henderson's horkelia *Horkelia hendersonii*	SOC			SEN	Endemic to summits of a few granite peaks in southern Jackson County.	Jackson		RRS-D		NI	No suitable habitat in Project area.
Three-toothed horkelia *Horkelia tridentata ssp. tridentata*			SEN	SEN	Granitic soils.	Jackson	RO-S MD-D	RRS-D		NI	Not documented in Project vicinity.
Whorled marsh-pennywort *Hydrocotyle verticillata*			SEN		Swampy ground, lake margins.	Coos Douglas	CB-S			NI	Not documented in Project vicinity.
Cooper's goldflower *Hymenoxys lemmonii*			SEN		Roadsides, open areas, meadows, on slopes, along drainages and streams.		LV-D			NI	Not documented in Project vicinity.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
California globe-mallow *Iliamna latibracteata*			SEN	SEN	Grows in coastal ranges in Coos and Douglas counties; June and July.	Coos Douglas Jackson	CB-D RO-D MD-D	UMP-D RRS-D		NI	Not documented in Project vicinity.
Shelly's ivesia *Ivesia rhypara var. shellyi*			SEN		Found on either light colored ash-tuff or on outcrops of volcanic ash deposited with riverbed gravels. Habitat is very dry and relatively barren with no canopy cover.		LV-D			NI	Not documented in vicinity of project.
Shockley's ivesia *Ivesia shockleyi*			SEN	SEN	Subalpine forest, bristle-cone pine forest, alpine fell-fields.		LV-S	FW-D		NI	Not documented in Project vicinity.
Kellogg's rush *Juncus kelloggii*			STR		Swampy or sandy ground.	Klamath	MD-S			NI	Not documented in Project vicinity.
Fragrant kalmiopsis *Kalmiopsis fragrans*	SOC		SEN	SEN	Cliffs and rock outcrops, known only from North Umpqua River	Douglas	RO-S	UMP-D		NI	Not documented in Project vicinity.
Bush beardtongue *Keckiella lemmonii*			SEN	SEN	Rocky slopes, chaparral.	Jackson	MD-S	RRS-D		NI	Not documented in Project vicinity.
Large-flowered goldfields *Lasthenia macrantha ssp. Prisca*		C	SEN		Coastal bluffs, 0-500 m.		CB-D			NI	Not documented in Project vicinity.
Thin -leaved peavine *Lathyrus holochlorus*	SOC		SEN	SEN	Thickets and open woods, low elevations, fence rows.	Douglas	RO-S			NI	Not documented in Project vicinity.
Nevada peppergrass *Lepidium montanum var. nevadense*			STR		Sand dunes or deep sand.		LV-S			NI	Not documented in Project vicinity.
Columbia lewisia *Lewisia columbiana var. columbiana*			SEN	SEN	Reported on three mountains in the southeastern portion of Douglas County; May through July.	Douglas		UMP-D		NI	Not documented in Project vicinity.
Lee's lewisia *Lewisia leana*			SEN	SEN	Grows on high elevation serpentine ridges; late May through August.	Douglas Jackson	RO-S MD-D	UMP-S RRS-D		NI	Not documented in Project vicinity.
Kellogg's lily *Lilium kelloggii*	SOC		STR	STR	Grows on sandstone/sedimentary type of soil in dry wooded areas; June.	Klamath	CB-S MD-S	RRS-S		NI	Not documented in Project vicinity.
Western lily *Lilium occidentale*	E	E			Poorly drained, organic soils on the edges of coastal bogs (0-100 m) that are within 4 miles of the Pacific Coast.	Coos	CB-D			NLAA	Not documented in Project vicinity.
Bellinger's meadowfoam *Limnanthes floccosa ssp. bellingeriana*	SOC	C	SEN	SEN	Seasonally wet depressions above 2500 ft; seasonally wet meadows in Klamath County.	Jackson Klamath	MD-D	RRS-D	RRS: approx. 2,300 plants within 0.5 acre ~95-255' S of TEWA 154.09-W near MP 154.1; approximately 30,000 plants within 0.8 ac within and south of the ROW near MP 154.75 and TEWA 154.72-W; MD: 15 plants 173' NE of TEWA near MP 128.98	MIIH	Impacts to individuals and habitat; however, remaining sites would provide a reasonable assurance of species persistence.
Large-flowered meadowfoam *Limnanthes pumila ssp. grandiflora*	E/CH	E			Periphery of vernal pools at 1,230-1.310 feet, near the wetter, inner edges.	Jackson	MD-S		Documented in project area 0.05 mi N of Medford Industrial Park pipe storage yard; 0.06 mi W of Burrill Lumber pipe storage yard. Additional documentation within vernal pool fairy shrimp federally designated critical habitat (see above) but over 0.1 mi (500 ft) from Pacific Connector Pipeline Project area.	LAA	Indirect impacts to habitat and individuals due to potential disruption in hydrologic connection.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Dwarf wooly meadowfoam *Limnanthes floccosa ssp. pumila*	SOC	T			Small depressions in thin clay soil overlying old basalt at the edges of deep vernal pools which dry by mid-summer, generally in full sun.	Jackson	MD-D			NI	Not documented in Project vicinity.
Slender meadow-foam *Limnanthes gracilis ssp. gracilis*		C	SEN	SEN	Found in Douglas, Jackson, and Josephine counties in very wet areas (early spring) and often in serpentine soil; March through May. Vernal pools.	Douglas Jackson	RO-D MD-D	RRS-S		NI	Not documented in Project vicinity.
Western marsh-rosemary *Limonium californicum*			SEN		Coastal strands, salt marshes.	Coos	CB-D			NI	No suitable habitat in Project area.
Aristulate lipocarpha *Lipocarpha aristulata*			SEN	SEN	Wet soil at an elevation of 100 to 400 m. In Washington, has been found along shorelines and islands below high water on silty substrates.	Klamath	LV-S	FW-S		NI	Not documented in Project vicinity.
Cook's lomatium *Lomatium cookii*	E/CH	E			Margins of vernal pools in the Agate Desert, usually with native forbs and introduced annual grasses.	Jackson	MD-D	RRS-S	No documentation within 0.1 mi (500 ft) of Pacific Connector Pipeline Project; however, it has been documented within 1.0 mile of Medford Industrial Park, Burrill Lumber, Oregon Opportunities, Avenue C & 7th Street, Avenue F & 11th Street , and Rouge Aggregates pipe storage yards.	NLAA	Species not documented during surveys of suitable habitat.
Englemann's desert-parsley *Lomatium engelmannii*			SEN	SEN	Chaparral, red fir forest, yellow pine forest.		MD-S	RRS-D		NI	No suitable habitat in Project area.
Packard's lomatium *Lomatium packardiae*			STR				LV-S			NI	Not documented in Project vicinity.
Stipuled trefoil *Lotus stipularis*			SEN	SEN	Open forests, chaparral, disturbed sites.	Jackson	RO-S MD-D	RRS-D		NI	Not documented in Project vicinity.
Mt. Ashland lupine *Lupinus lepidus var. ashlandensis*	SOC	C		SEN	Sandy or gravelly soils at low to alpine elevations.	Jackson		RRS-D		NI	No suitable habitat in Project area.
Nevada lupine *Lupinus nevadensis*			SEN		Sagebrush scrub.		LV-D			NI	Not documented in Project vicinity.
Kincaid's lupine *Lupinus sulphureus var. kincaidii*	T/CH	T			Native grasslands and open oak woodlands at low elevations in the Willamette and Umpqua Valleys. Also known to occur on roadsides.	Douglas Jackson	RO-D	UMP-D	3 populations documented in project area (2007, 2008): MP 57.84-57.92, MP 59.60, and MP 96.5-96.9; it has been documented 1.5 NE of MP 56.06 (Private: T28S,R7W,S31; 1999); 2.2 mi SW of MP 96.11 (RO/Private:T31S,R3W,S4,5,8,9; 2003); 1.5 miE of MP 98.88 (UMP: T31S,R2W,S8; 1992).	LAA	Removal of plants and indirect impacts to habitat.
Tracy's lupine *Lupinus tracyi*			SEN	SEN	Dry open montane forest.	Douglas Jackson Klamath	MD-S	RRS-D		NI	Not documented in Project vicinity.
Bog club-moss *Lycopodiella inundata*			SEN	SEN	Bogs, muddy depressions, and pond margins. On Fremont-Winema NF one site in Yoss Creek drainage on Chiloquin RD.	Coos Douglas Klamath	CB-D	FW-D		NI	Not documented in Project vicinity.
Lyrate malacothrix *Malacothrix sonchoides*			SEN		Usually on dunes or in deep, fine sand in arroyos and on plains in Joshua tree woodlands, grasslands, Ephedra-Coleogyne associations; 300-2,100 m.		LV-D			NI	Not documented in Project vicinity.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
White meconella (fairypoppy) *Meconella oregana*	SOC	C	SEN	SEN	Grows in open areas that are wet in the spring at low elevations. Known from sites in the Willamette Valley and the Columbia Gorge.	Douglas Jackson	RO-S MD-D	RRS-S		NI	Not documented in Project vicinity.
Coast microseris *Microseris bigelovii*			SEN		Open sandy soil or sandy pockets on rocky headlands.	Coos	CB-D			NI	No suitable habitat in survey area.
Douglas' microseris *Microseris douglasii ssp. douglasii*			STR		Grassy flats and hillsides in heavy hard packed soil.	Jackson	MD-S			NI	Not documented in Project vicinity.
Detling's microseris *Microseris laciniata ssp. detlingii*	SOC				In moist rocky meadows, open grasslands, and in clay soils.	Jackson	MD-D	RRS-D	MD: observed in ROW near MP 129.26; approx. 85' N of TEWA near MP 131.38; approx. 142' W of ROW near MP 141.22; approx. 80' W of ROW near MP 141.53.	MIIH	Potential trampling, fragmentation, and habitat modification, although these impacts would be avoided and minimized through fencing off, marking, and not disturbing sensitive plants found along the right-of-way, restoring disturbed areas to their preexisting condition, and controlling for noxious weeds.
Bolander's monkeyflower *Mimulus bolanderi*			SEN	SEN	Openings in chaparral, burns and disturbed areas. Applegate Valley.	Jackson	MD-D	RRS-D		NI	Not documented in Project vicinity.
Congdon's monkeyflower *Mimulus congdonii*			SEN	SEN	Openings in oak woodland and chaparral. Applegate Valley.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Disappearing monkeyflower *Mimulus evanescens*	SOC	C	SEN	SEN	Vernally moist sites along perennial and intermittent streams; receding margins of lakes, ponds, and reservoirs within juniper/sagebrush habitats.	Klamath	LV-D	FW-D		NI	No suitable habitat in Project area.
Broad-toothed monkeyflower *Mimulus latidens*			SEN		Valley grassland, foothill woodland, wetland-riparian; 0-2,500 feet. Occurs almost always under natural conditions in wetlands.		LV-D			NI	Not documented in Project vicinity.
Tri-colored monkeyflower *Mimulus tricolor*			SEN	SEN	Grows at low elevations in clay soil, preferreing vernal pools; scattered in Klamath County; late May through June.	Klamath	LV-D	FW-D		NI	Not documented in Project vicinity.
Siskiyou monardella *Monardella purpurea*			STR	STR	Mixed evergreen forest, yellow pine forest.		CB-D MD-D	RRS-D		NI	Not documented in Project vicinity.
Howell's montia *Montia howellii*		C				Douglas				NI	Not documented in Project vicinity.
Annual dropseed *Muhlenbergia minutissima*				SEN	Pinyon-juniper woodland, sagebrush scrub, yellow pine forest, wetland-riparia; between 4,000 and 7,500 feet.			FW-S		NI	Not documented in Project vicinity.
Sessile mousetail *Myosurus sessilis*		C		STR	Vernal pools and alkalai flats; 10-1,600 m.			FW-S		NI	Not documented in Project vicinity.
Slender nemacladus *Nemacladus capillaris*			SEN	SEN	Dry slopes, burned areas.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Wolf's evening primrose *Oenothera wolfii*	SOC	T								NI	Species has not been documented within Project area.
Adder's-tongue *Ophioglossum pusilum*			SEN	SEN	Open fens, wet meadows, grassy slopes, roadside ditches.	Coos Douglas	CB-S	UMP-D RRS-D		NI	Not documented in Project vicinity.
Coffee fern *Pellaea andromedifolia*			SEN	SEN	Rock outcrops, cliffs.	Coos Douglas Jackson	CB-D RO-D MD-D	UMP-S RRS-S		NI	Not documented in Project vicinity.

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	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Bird's-foot fern *Pellaea mucronata ssp mucronata*			SEN	SEN	Rocky dry openings.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Blue-leaved penstemon *Penstemon glaucinus*	SOC		SEN	SEN	Openings in mid to high elevation pine, fir, and mt hemlock communities. Well-drained volcanic soils along rocky points and ridges.	Klamath	LV-S	FW-D		NI	Not documented in Project vicinity.
Red-rooted yampah *Perideridia erythrorhiza*	SOC	C	SEN	SEN	Moist meadows, forest edges below 4500'.	Douglas Jackson Klamath	RO-D MD-D	UMP-S RRS-D FW-D		NI	Not documented in Project vicinity.
Silvery phacelia *Phacelia argentea*	SOC	T			Sandy beach dunes and bluffs near the coast.	Coos	CB-D			MIIH	Species was not documented during surveys; however, suitable habitat remains to be surveyed.
Playa phacelia *Phacelia inundata*	SOC		SEN		Alkaline flats, dry lake margins. Elevation 4800 - 6400 feet.	Klamath	LV-D			NI	No suitable habitat in Project area.
Siskiyou phacelia *Phacelia leonis*			SEN	SEN	Red fir forest.		MD-S	RRS-D		NI	Not documented in Project vicinity.
American pillwort *Pilularia americana*			SEN	SEN	Vernal pools, mud flats, lake margins.	Jackson Klamath	MD-S	RRS-S FW-S		NI	Not documented in Project vicinity.
Whitebark pine *Pinus albicaulis*	C			SEN	Although its role in the plant community is changing, whitebark pine historically dominated many of the upper subalpine plant communities of the western United States. It showed scattered occurrence on the Olympic Peninsula, the southern Cascades and other ranges of southern Oregon.	Douglas Jackson Klamath		UMP-D RRS-D FW-D		NI	Not documented in Project vicinity.
Gray Pine *Pinus sabiniana*			STR	STR	Infertile soils in mixed conifer and hardwood forests.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Austin's plagiobothrys *Plagiobothrys austiniae*			SEN		Vernally wet areas, along road and trail edges.	Jackson	MD-D			NI	Not documented in Project vicinity.
Coral seeded allocarya *Plagiobothrys figuratus var. corallicarpus*	SOC	C	SEN	SEN	Low elevation meadows and moist clearings and fields.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Greene's popcorn flower *Plagiobothrys greenei*			SEN	SEN	Vernal pools.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Rough popcorn flower *Plagiobothrys hirtus*	E	E			Grows in open, seasonal wetlands in poorly- drained clay or silty clay loam soils at elevations ranging from 100 to 900 ft.	Douglas	RO-D	UMP-S		LAA	Potential impacts to individuals in suitable habitat that has not been surveyed.
Desert allocarya *Plagiobothrys salsus*	SOC		SEN	SEN	Playas in alkali sink, wetland-riparian.	Klamath	LV-D	FW-S		NI	Not documented in Project vicinity.
Large round-leaved orchid *Platanthera orbiculata var. orbiculata*			S&M-C	S&M-C	Infrequent distribution. Generally found in mature to old-growth stands, primarily at lower to mid elevations up to 914 m (3000 ft.). Often in rich, damp humus in the deep shade of heavily forested (mature- to old-growth) areas.		RO			NI	Not documented in Project vicinity.
Timber bluegrass *Poa rhizomata*			SEN	SEN	Dry Douglas-fir/ponderosa pine forests.	Jackson	MD-D	UMP-S RRS-S		NI	Not documented in Project vicinity.
San Francisco bluegrass *Poa unilateralis*			STR		Coastal strand, northern coastal scrub, coastal sage scrub.		CB-S			NI	Not documented in Project vicinity.

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Profuse-flowered mesa mint *Pogogyne floribunda*	SOC		SEN	SEN	Vernal pools, seasonal lakes.	Klamath	LV-D	FW-S		NI	Not documented in Project vicinity.
Silvies valley desert combleaf *Polyctenium fremontii var. bisulcatum*			STR		Mud flats, dry meadows, sagebrush areas, edge of vernal pools, shallow soil on basalt, dry streambeds and swales, gravel bars, rocky wash; 1,000-2,700 m.		LV-S			NI	Not documented in Project vicinity.
California sword-fern *Polystichum californicum*			SEN	SEN	Creek banks and canyouns in redwoods and mixed evergreen forests.	Coos Douglas	CB-D RO-D	UMP-D RRS-S		NI	Not documented in Project vicinity.
Rafinesque's pondweed *Potamogeton diversifolius*				SEN	Shallow water, ditches, ponds, lakes.	Klamath		FW-S		NI	Not documented in Project vicinity.
California chicory *Rafinesquia californica*			SEN	SEN	Chaparral, recent burns, in the Applegate Valley.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.
Southern Oregon buttercup *Ranunculus austrooreganus*		C	SEN		Oak woodlands, chaparral and dry grasslands.	Jackson	MD-D			NI	Not documented in Project vicinity.
Redberry *Rhamnus ilicifolia*			SEN	SEN	Chaparral in Applegate Valley.	Jackson	MD-D	RRS-D		NI	Not documented in Project vicinity.
White beakrush *Rhynchospora alba*			SEN		Marshes, bogs.	Jackson	CB-D MD-S			NI	Not documented in Project vicinity.
Brownish beakrush *Rhynchospora capitellata*			STR	STR	Coastal salt marsh, yellow pine forest, wetland-riparian. Occurs almost always under natural conditions in wetlands.		CB-S	RRS-S		NI	Not documented in Project vicinity.
Straggly gooseberry *Ribes divaricatum var. pubiflorum*			SEN	SEN	Coastal bluffs, forest edges; 0-1,500 m.		MD-D	RRS-S		NI	Not documented in Project vicinity.
Thompson's mistmaiden *Romanzoffia thompsonii*			SEN	SEN	Sunny, vernally wet mossy rocks.	Douglas Jackson	CB-D RO-D MD-S	UMP-D RRS-D		NI	Not documented in Project vicinity.
Columbia cress *Rorippa columbiae*		C	SEN	SEN	Along intermittent and perennial streams and lakeshores: banks, sandbars, vernal pools, lakebeds, and ditches.	Klamath	MD-D LV-D	RRS-S FW-D		NI	Not documented in Project vicinity.
Lowland toothcup *Rotala ramosior*			SEN	SEN	Open, wet gravelly soil around ponds (5-400 feet in western Oregon).		LV-S	UMP-S FW-S		NI	Not documented in Project vicinity.
Polished willow *Salix laevigata*				STR	Riparian forests along streams, seepage areas, springs, subalkaline or brackish lakeshores, canyons, ditches; 0-2,200 m.	Klamath		FW-S		NI	Not documented in Project vicinity.
Wolf's willow *Salix wolfii*			SEN		Stream banks, springs, wet meadows, bogs; 2,000-3,800 m. (NOTE: this source lists S. wolfii var. wolfii as the variety occurring in Oregon.)		LV-S			NI	Not documented in Project vicinity.
Joint-leaved saxifrage *Saxifragopsis fragarioides*			SEN	SEN	Grows on dry cliffs in the high Siskiyou Mountains.	Jackson	MD-D	RRS-D		NI	Not documented in Project vicinity.
Scheuchzeria *Scheuchzeria palustris ssp. americana*				SEN	Grows in ponds and along streams in Oregon Cascades.	Douglas Klamath		UMP-D RRS-D FW-D		NI	Not documented in Project vicinity.

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Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Water clubrush *Schoenoplectus subterminalis* (formerly *Scirpus subterminalis*)			SEN	SEN	Lakes, ponds, marshes.	Coos Douglas Klamath	CB-D RO-S MD-S LV-S	UMP-D RRS-D FW-D		NI	Not documented in Project vicinity.
Slender bulrush *Scirpus heterochaetus*			STR		Lake margins	Klamath	LV-S			NI	Not documented in Project vicinity.
Drooping bulrush *Scirpus pendulus*			SEN	SEN	Marshes, wet meadows, ditches.	Jackson	CB-S RO-S MD-D	RRS-D		NI	Not documented in Project vicinity.
California fetid adderstongue *Scoliopus bigelovii*				SEN	Redwood and coastal coniferous forests, mossy mountain stream banks, shaded slopes; 0--500 m.			RRS-D		NI	Not documented in Project vicinity.
Rogue River stonecrop *Sedum moranii*		C	SEN	SEN	Steep south to west facing slopes and rock outcrops (200-275 m).		MD-D	RRS-D		NI	Not documented in Project vicinity.
Bog groundsel *Senecio triangularis var. angustifolius*			STR		Sphagnum bogs near the coast.	Coos	CB-D			NI	Not documented in Project vicinity.
Verrucose sea-purslane *Sesuvium verrucosum*			SEN	SEN	Valley grassland, coastal sage scrub, alkali sink, wetland riparian.		LV-D	FW-S		NI	Not documented in Project vicinity.
Henderson sidalcea *Sidalcea hendersonii*	SOC		SEN		Wet meadows, tidal marshes and flats at low elevations.	Douglas	CB-D			NI	Not documented in vicinity of project.
Hickman's checkerbloom *Sidalcea hickmanii ssp. nov. (hickman's)*			SEN		Shallow soil in open rocky areas. Known from one site in Sams Valley.	Jackson	MD-D			NI	Not documented in vicinity of project.
Maple-leaved sidalcea *Sidalcea malachroides*				STR	Disturbed habitat in coastal prairie, mixed evergreen forest, redwood forest.			RRS-S		NI	Not documented in Project vicinity.
Coast checkermallow *Sidalcea malviflora ssp. patula*	SOC	C	SEN	SEN	Open coastal forest.	Coos	CB-D	RRS-D		NI	Not documented in Project vicinity.
Bolander's catchfly *Silene hookeri ssp. bolanderi*			SEN	SEN	Oak and douglas fir woodlands; 100-1,000 m.		MD-D	RRS-D		NI	Not documented in Project vicinity.
Serpentine catchfly *Silene serpentinicola*			STR	STR	Grassy, gravelly, or rocky openings in chaparral, woodlands, and coniferous forest on serpentine; of conservation concern; 100-800 m.		MD-S	RRS-S		NI	Not documented in Project vicinity.
Hitchcock's blue-eyed grass *Sisyrinchium hitchcockii*	SOC		SEN		Known in the Umpqua and southern Willamette valleys.	Douglas	RO-D			NI	Not documented in Project vicinity.
Parish's horse-nettle *Solanum parishii*			SEN	SEN	Chaparral, dry conifer openings, recent burns.	Jackson	MD-D	RRS-D		NI	Not documented in Project vicinity.
Western sophora *Sophora leachiana*		C	SEN	SEN	Dry, open areas, open mixed woodlands, roadcuts and clearcuts (140-460 m).		MD-D	RRS-D		NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Common jewel flower *Streptanthus glandulosus*			SEN	SEN	Serpentine areas. (Note: this source lists the subspecies *S. g. josephinensis* as occurring in Oregon.)		MD-D	RRS-S		NI	Not documented in Project vicinity.
Howell's streptanthus *Streptanthus howellii*		C	SEN	SEN	Dry, serpentine slopes, mixed evergreen forests, open pine woods or brushy areas (485-1,220 m).		CB-S MD-D	RRS-D		NI	Not documented in Project vicinity.
Broadleaf pondweed *Stuckenia striata*			STR		Sagebrush scrub, wetland-riparian. Occurs almost always under natural conditions in wetlands.		LV-S			NI	Not documented in Project vicinity.
Long-flowered snowberry *Symphoricarpos longiflorus*			SEN		Pinyon-juniper woodland.		LV-D			NI	Not documented in Project vicinity.
Howell's tauschia *Tauschia howellii*	SOC	C		SEN	Granitic gravel ridgetops above 6000 ft.	Jackson		RRS-D		NI	No suitable habitat in Project area.
Short-podded thelypody *Thelypodium brachycarpum*	SOC		SEN	SEN	Alkaline flats, lake margins in shrub steppe and near edges of pine forests.	Klamath	LV-S	FW-D		NI	No suitable habitat in Project area.
Howell's thelypody *Thelypodium howellii ssp. howellii*	SOC		STR		Moist alkaline soils, open, wet or dry meadows and marshes (1,200-1,550 m).	Klamath	LV-S			NI	Not documented in Project vicinity.
Leiberg's clover *Trifolium leibergii*		C	SEN		Grows on a distinct habitat characterized by a thin, gravelly soil layer consisting of decomposing (broken-down) volcanic ash "tuff." Underneath the thin layer of soil is the solid "tuff," which has deep cracks running through it.		LV-D			NI	Not documented in Project vicinity.
Siskiyou trillium *Trillium kurabayashii*			SEN	SEN	Rich, moist conifer-hardwood forest, slopes, especially lower slopes, predominantly deciduous flat woods along streams, edges of Sequoia groves, and alder, vine maple, and fern thickets along streams, especially older, higher flood terraces, not the lowest and wettest; at higher elevations, both in forests and in open grassy meadows with scattered oak trees.		CB-D	RRS-D		NI	Not documented in Project vicinity.
Leach's brodiaea *Triteleia hendersonii var. leachiae*	SOC	C			Open and wooded slopes in the Siskiyou Mountains of Josephine, Curry, and Douglas counties.	Coos	CB-D MD-S			NI	Not documented in Project vicinity.
Sierra brodiaea *Triteleia ixioides ssp. anilina*			STR		Coniferous forest edge, often in sand or gravel.	Jackson	MD-S			NI	Not documented in Project vicinity.
Golden triteleia *Triteleia ixioides ssp. scabra*			STR		Scrub edges, mixed conifer forest, in clay and granite soils.	Jackson	MD-S			NI	Not documented in Project vicinity.
Ithuriel's spear *Triteleia laxa*			STR		Open forests, mixed conifer or foothill woodlands, grasslands on clay soil; 0-1,500 m.	Jackson	CB-S			NI	Not documented in Project vicinity.
Humped bladderwort *Utricularia gibba*			SEN		Shallow water, mud.	Coos Douglas	CB-D RO-S			NI	Not documented in Project vicinity.
Lesser bladderwort *Utricularia minor*			SEN	SEN	Shallow water.	Coos Douglas Jackson Klamath	CB-D RO-S MD-D	UMP-D RRS-D FW-D		NI	Not documented in Project vicinity.
Northern bladderwort *Utricularia ochroleuca*				SEN				UMP-S FW-S		NI	Not documented in Project vicinity.

TABLE O-5

Special Status Plant (Vascular and Non-Vascular) and Fungi Species That May Occur Near the JCE & PCGP Project

Common Name and/or Scientific Name	Status [a/]				Expected Habitat	Documented or Suspected Occurrence [b/]				Effect of Impact [d/]	Impact Reasoning
	Federal	State	BLM	Forest Service		County	BLM	Forest Service	Within Vicinity of Project Area [c/]		
Western bog violet *Viola primulifolia ssp. occidentalis*		C	SEN	SEN	Serpentine bogs.	Douglas	CB-S MD-D	RRS-D		NI	No suitable habitat in Project area.
Dotted water-meal *Wolffia borealis*			SEN	SEN	Freshwater ponds and slow flowing ditches in which water has somewhat high levels of organic material. Occurs in natural ponds as well as in log and sewage treatment ponds (350-1,500 feet).	Jackson	RO-D MD-D	UMP-S		NI	Not documented in Project vicinity.
Columbia water-meal *Wolffia columbiana*			SEN	SEN	Free floating in quiet water.	Douglas Jackson	RO-D MD-S	UMP-S RRS-S		NI	Not documented in Project vicinity.
Small-flowered death camas *Zigadenus fontanus*	SOC		SEN	SEN	Rocky openings in chaparral in Applegate Valley.	Jackson	MD-D	RRS-S		NI	Not documented in Project vicinity.

a/ Status Key:
Federal Status: E = Endangered, T = Threatened, C = Candidate, SOC = Species of Concern, CH = Critical Habitat
State Status: E = Endangered, T = Threatened, C = Candidate
BLM and Forest Service Status: SEN = Sensitive, STR = Strategic, S&M = Survey and Manage species, letter after S&M = Survey and Manage Species Category (A – F)

b/ Occurrence Key:
BLM: CB = Coos Bay District, RO = Roseburg District, MD = Medford District, LV = Lakeview District
Forest Service: F-W = Fremont-Winema National Forest, RRS = Rogue River-Siskiyou National Forest, UMP = Umpqua National Forest

D = Documented occurrence: A species located on land administered by the BLM or the Forest Service based on historic or current known sites of a species reported by a credible source for which BLM and the Forest Service have knowledge of written, mapped or specimen documentation of the occurrence.
S = Suspected occurrence: Species is not documented on land administered by the BLM or the Forest Service, but may occur on the unit because: 1) BLM District or National Forest is considered to be within the species' range and 2) appropriate habitat is present or 3) known occurrence of the species (historic or current) in vicinity such that the species could occur on BLM or Forest Service land.

c/ **Pacific Connector Pipeline Project**: Botanical and fungi species documented within approximately 400ft-wide survey corridor, which generally included the Project ROW, TEWAs, and UCSAs plus a 100-foot buffer. The observations listed are based on project survey reports (SBS 2008a, 2010, 2011a, 2011c), and may differ from the sites discussed in the Survey and Manage Report (appendix K of this EIS).

d/ Effect of Impact:
Species federally listed or proposed for listing:
NE = No Effect
NLAA = Not Likely to Adversely Affect
LAA = Likely to Adversely Affect

All other species:
NI = No Impact
MIIH = May Impact Individuals or Habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species

References
Status: ISSSSP 2011; FWS 2013g; Forest Service 2011; BLM 2011; Forest Service and BLM 2011; ORBIC 2010a, 2012; ODA 2013; Currin 2013.
Expected Habitat: British Columbia Ministry of Environment 2009; BLM 2007; Calflora 2013; CNPS 2013; Castellano and O'Dell, 1997; Center for Plant Conservation, 2011; Cushman and Huff 2007; eFloras.org, 2013; Fryer, 2002; Morefield , 2001; ORBIC 2004, 2010a; ODA 2013; Oregon Flora Project 2013; Oregon State University 2013; ISSSP 2014; Eastman 1990; Pojar and MacKinnon 1994; BLM 2004; Hickman 1993; Hitchcock et al. 1969; Castellano et al. 1999; Arora 1986; Christy and Wagner 1996; Lawton 1971; Norris and Shevok 2004a and b; McCune and Geiser 1997; Brodo et al. 2001; Norvell 1998.
Documented and Suspected Occurrences: ISSSSP 2011; BLM 2006; ORBIC 2012; Forest Service 2006a; NRCS 2001; Siskiyou BioSurvey various dates (see biological survey reports submitted as a standalone document).

APPENDIX P

Pacific Connector's Proposed Modifications to FERC Staff's Plan and Procedures

TABLE P-1
Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
Variances Requested for Temporary Extra Work Areas (TEWAs) Located within or within 50 feet of Wetlands or Waterbodies and Areas Where the Construction Right-of-Way is Greater than 75 feet Wide					
1.64R	J	PEMA	TEWA 1.19-N Construction ROW > 75 feet	1	**Previously Disturbed Area - Industrial Site** The pipeline alignment has been routed based on the design of the South Dunes Power Plant and is confined to the very southern portion of the North Spit. The alignment is routed to an area of Wetland J that JCEP proposes to fill during development of the South Dunes Power Plant; therefore this portion of the wetland will be filled prior to Pacific Connector's activities. Although TEWA 1.19-N and the Weyerhaeuser Cove Pipe Yard encompass portions of Wetland J, Pacific Connector does not intend to affect Wetland J by additional construction activities which would occur in the TEWA, or the Yard. Because of the limited space available on the North Spit south of the South Dunes development activities, a 50-foot buffer from the wetland is not proposed within this previously disturbed industrial area. Pacific Connector would flag the wetland boundary, install sediment barriers, and, if necessary as determined by the EI, install safety fence around the wetland.
1.67R	L	PEMA	TEWA 1.19-N	1	**Previously Disturbed Area - Industrial Site** TEWA 1.19-N encompasses the proposed South Dunes Power Plant site, which will be developed within this previously disturbed industrial area. Pacific Connector would only use available areas of TEWA 1.19-N that are within JCEP's development footprint.
1.71	K	PFOC	TEWA 1.19-N	1	TEWA 1.19-N encompasses the southern portion of Wetland K. The TEWA is necessary for staging of the in-water lay activities associated with the crossing of Haynes Inlet. Pacific Connector has realigned the pipeline approximately 150 feet to the south, since the 2009 FEIS route, to accommodate the proposed South Dunes Power Plant. Pacific Connector will minimize impacts to this wetland by confining Project activities, as much as possible to the previously disturbed/graded area immediately adjacent to the pipeline within TEWA 1.19-N. However, to stage the Haynes Inlet in-water lay activities and facilitate the bored crossing of the railroad at MP 1.69R, impacts to Wetland K from TEWA1.19-N are necessary.
1.74R to 4.14R	NE026	E1UBL	TEWA 4.13-N TEWA 4.13-W Construction ROW > 75 feet	1, 2 & 3	The Pacific Connector Pipeline Project's Coos Bay Water Route across Haynes Inlet requires the construction right-of-way to be 250 feet in width and TEWAs to be located in the bay. The construction right-of-way and location of the TEWAs have been designed to encompass all areas that may be affected by project activities during construction. These activities include trench excavation, pipe laying from a barge, trench backfilling activities, and temporary spoil containment. These workspace requirements are based on bed material/sediment characteristics, the benthic topography, current velocities and other factors that could potentially affect the footprint of the project disturbance. The Coos Bay Water Route Construction Plan (see stand alone report 9-JPA) details the rationale/necessity for the construction right-of-way width and TEWAs. The construction plans provides the BMPs that would be used to minimize adverse impacts from in-water activities.

TABLE P-1
Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
6.21R to 6.45R	(GW027) EE004A (NW117) EE006, EE006A	PEM	TEWA 6.00-W TEWA 6.22-N TEWA 6.28-W TEWA 6.34-N TEWA 6.34-W Construction ROW >75 feet	5	**Agricultural Wetland - Disturbed Emergent Pasture** The alignment across the Kentuck Slough floodplain traverses approximately 1,060 feet of emergent pasture wetlands. The crossing of Kentuck Slough is proposed as a bore which requires TEWAs 6.00-W, 6.22-N, 6.28-W, 6.34-N, and 6.34-W for installation of bore pits, dewatering areas, storage of topsoil and spoil materials and installation of the pipeline across the floodplain by conventional methods. The construction right-of-way across the floodplain is also 95 feet in width and cannot be narrowed. The right-of-way width cannot be narrowed and the TEWAs cannot be eliminated within these wetland pastures because the trench width may become excessively wide due to the high groundwater table and the unconsolidated and saturated soils in the wetland. The right-of-way width and TEWAs are necessary because the trench will be wider in the wetland due to concrete coating of the pipeline. The pipeline will be coated with several inches of concrete to compensate for pipeline buoyancy which increases the overall pipe diameter. The pipeline in the pasture will have 5 feet of cover compared to the standard 3 feet of cover in non- agricultural uplands. It will be difficult to contain/confine saturated trench spoil materials within the wetland because these materials typically lack sufficient strength for stacking or piling. Pacific Connector will utilize appropriate low-ground pressure equipment or will operate equipment off of mats to minimize potential rutting or compaction impacts as specified in FERC's Wetland and Waterbody Procedures. Appropriate BMPs will be utilized, as specified in the ECRP to minimize potential sedimentation impacts. All of the affected wetlands are disturbed emergent pasture wetlands and impacts associated with the project activities are expected to be temporary and short-term.
8.34R & 8.41R to 8.45R	EE007 GDX029 (EE008)	R2 R4	TEWA 8.31-N TEWA 8.44-N	7	**Previously Disturbed Area – Agricultural Pasture** TEWAs 8.31-N and 8.44-N are required for topsoil salvage within the upland pasture and for the county road crossing. Surveys were denied on the property adjacent to Willanch Slough but the waterbody has been interpreted from various data. Ditch GDX029 is a roadside tributary to Willanch Slough that is 2-feet wide. During construction the Environmental Inspector (EI) would assure that TEWA 8.31-W does not extend across Willanch Slough (EE007); however, the TEWA would extend up to the drainage without affecting riparian vegetation. The EI would also ensure that temporary construction mats are utilized to ensure that project activities and TEWAs 8.31-N and 8.44-N do not disturb the ditch tributary and any disturbance to woody vegetation (trees/shrubs) adjacent to the ditch is minimized.

TABLE P-1
Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
8.48R to 8.55R	Ditch GDX030 GSI31	R4 R4	TEWA 8.45-W TEWA 8.44-N	7	The alignment in this area traverses an upland pasture entering a powerline corridor along a side hill on the ridgeline opposite the pasture. TEWA 8.44-N is within 50 feet of ditch GDX030, but would not affect any woody vegetation adjacent to the ditch. TEWA 8.45-W crosses ditch GDX030 as well as intermittent stream GSI31 and is designed to accommodate the additional spoil storage associated with side hill construction requirements and the PI at MP 8.52. To minimize impacts to the intermittent stream (GSI31) during construction, Pacific Connector's Environmental Inspector and Chief Inspector would determine the feasibility of minimizing the size of TEWA 8.45-W based on site-specific conditions (side hill).
10.95R to 11.06R	WW-100-001	PEMAh	TEWA 10.96W TEWA 10.71W Construction ROW >75 feet	9	**Agricultural Wetland - Disturbed Emergent Pasture** The construction right-of-way is greater than 75 feet and TEWAs 10.96W and 10.71W are required within this disturbed, emergent wetland pasture/hayfield interpreted from (NWI) to complete the Coos River HDD installation. Additionally they are required for conventional pipeline installation to ascend/descend the slope to the west. The 2009 FEIS Route was realigned to the Proposed Route in this area to incorporate the Brunschmid WRP2 Avoidance alternative.
11.22R to 8.75	SS-100-004 SS-100-005 SS-100-006 SS-100-007 SS-100-002a SS-100-008 WW-100-002 BW111 BW110	PEMAh PEMC R4 R2UBHx	TEWA 11.27-W TEWA 11.27-N TEWA 11.30-N TEWA 11.31-W TEWA 11.32-N Tewaa 11.41-W TEWA 11.41-W TEWA 11.53-W TEWA 11.53-N TEWA 12.08-W TEWA 12.08-N Construction ROW >75 feet	9 10 11	**Agricultural Wetland - Disturbed Emergent Pasture** The construction right-of-way, which is 95 feet in width and the listed TEWAs are required for the Coos River HDD installation, conventional pipeline installation across the floodplain, topsoil salvaging/storage within this agricultural wetland pasture, and for spoil storage/containment requirements. Wetland WW-100-002 is an extensive (> 1.0 mile) disturbed emergent wetland floodplain pasture that cannot be avoided by the project alignment. The 2009 FEIS Route was realigned to the Proposed Route in this area to incorporate the Brunschmid WRP2 Avoidance alternative. The construction right-of-way cannot be narrowed and the TEWAs cannot be eliminated because the trench width may become excessively wide within the wetland pasture. This is due to the high groundwater table and unconsolidated and saturated soils in the wetland. The trench width will be wider in the wetland because the pipeline will be weight-coated with several inches of concrete to compensate for pipeline buoyancy in the wetland. This increases the overall pipe diameter. The burial depth of the pipeline in the pasture will have 5 feet of cover over the top of the pipe compared to the standard 3 feet of cover in non-agricultural uplands. It may be difficult to contain/confine the saturated trench spoil materials because these materials typically spread out when stacked due to insufficient strength. Pacific Connector will utilize appropriate low-ground pressure equipment or will operate equipment off of mats to minimize potential rutting or compaction impacts in the pasture wetland as specified in FERC's Wetland and Waterbody Procedures. Wetlands WW-100-002 and BW111 are disturbed emergent pasture wetland and, therefore, impacts to the wetland are expected to be temporary and short-term.

TABLE P-1
Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
8.76	BDX109 BW110	R4UB3Cx PFOC	TEWA 8.76W	11	TEWA 8.76-W is located within 50 feet of wetland BDX109 (drainage ditch) and wetland BW110. This TEWA is required for construction staging across wetlands BW111, BDX109, and BW110. This TEWA has been located entirely within a previous forest clear-cut and currently supports trees less than 20 years old. Moving the TEWA back to ensure a 50-foot setback would push this TEWA into a mature forest. The drainage ditch would be protected from sedimentation by the use of BMPs which are outlined in the ECRP.
9.44	DW001	PEMC	Construction ROW >75 feet	12	The full width of the construction right-of-way (95 feet) is maintained through this narrow sloped emergent wetland to minimize overall project disturbance and disturbance to adjacent forested areas by eliminating TEWAs. TEWAs are generally required for construction staging purposes on either side of right-of-way neckdown areas. With elimination of the neckdown, TEWAs are not required.
10.04 to 10.19	DA002	PEM	Construction ROW >75 feet	12	**Agricultural Wetland - Disturbed Emergent Pasture** Survey access to this parcel was denied and the wetland delineation is preliminary. However, these TEWAs are required because of a 90 degree PI and for staging and topsoil storage

TABLE P-1
Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
10.04 to 10.40	DA002 (NW016A) NW016 BW086 BL084	PEM PEMC R2UBHx PEMC PUBYx	TEWA 10.03-W TEWA 10.08-W TEWA-10.21-W TEWA-10.33-W TEWA-10.33-N TEWA-10.37-W Construction ROW >75 feet	12	**Agricultural Wetland - Disturbed Emergent Pasture** Survey access to DA002 (NW016A) was denied and the wetland delineation is preliminary. The alignment across the Stock Slough floodplain was routed from the 2009 FEIS Route to minimize impacts to rural residences to provide a better road crossing of Stock Slough Rd and avoid a crossing of Stock Slough. To avoid residential impacts and structures, the alignment must traverse approximately 2,100 feet of emergent pasture wetlands. The TEWAs located in the floodplain pasture wetlands are required for the slough crossing, a road crossing, topsoil segregation within the agricultural wetlands, two sharp PIs, and two road crossings. TEWA 10.33-W is required for project staging in this area. The construction right-of-way, which is 95 feet in width, cannot be narrowed and the TEWAs cannot be eliminated within these wetlands because the trench width may become excessively wide during excavation in the wetland pasture due to the high groundwater table and excavation through unconsolidated saturated alluvial soils. The pipeline will be weight-coated with several inches of concrete to compensate for pipeline buoyancy which increases the overall pipe diameter. The pipeline in the pasture will have 5 feet of cover over the top of the pipe compared to the standard 3 feet of cover in non-agricultural uplands. It may be difficult to contain/confine the saturated trench spoil materials within the wetland because these materials typically spread out when stacked due to insufficient strength. Pacific Connector will utilize appropriate low-ground pressure equipment or will operate equipment off of mats to minimize potential rutting or compaction impacts as specified in the FERC's Wetland and Waterbody Procedures. Appropriate best management practices will be utilized, as specified in the ECRP to minimize potential sedimentation impacts. Wetlands DA02, NW016 and BW086 are disturbed emergent pasture wetlands and impacts associated with the project activities are expected to be temporary and short-term. Impacts from project activities within these wetlands are expected to be temporary and short-term because these wetlands are emergent pasture conditions.

TABLE P-1
Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
10.95 to 11.40	BW085 BDX081 BSP079 BW117 BDX118 BDX116	PEMC R4UB1Cx R2OWN PEMC R4UB1Cx R4UB1Cx	TEWA 10.80-N TEWA 11.04-W TEWA 11.14-N TEWA 11.14-W TEWA 11.30-N Construction ROW >75 feet	13	**Agricultural Wetland - Disturbed Emergent Pasture** The alignment across the Catching Slough floodplain traverses approximately 2,000 feet of emergent pasture wetlands. The crossing of Catching Slough (BSP079) is proposed as a bore which requires TEWAs 10.80-N, 11.04-W, 11.14- W, and 11.14-N for installation of bore pits, storage of topsoil and spoil materials and installation of the pipeline across the floodplain by conventional methods. TEWA 11.30-N is required for topsoil storage. The construction right-of-way across the floodplain is also 95 feet in width and cannot be narrowed. The right-of-way width cannot be narrowed and the TEWAs cannot be eliminated within these wetland pastures because the trench width may become excessively wide due to the high groundwater table and the unconsolidated and saturated soils in the wetland. The right-of-way width and TEWAs are necessary because the trench will be wider in the wetland due to concrete coating of the pipeline. The pipeline will be coated with several inches of concrete to compensate for pipeline buoyancy which increases the overall pipe diameter. The pipeline in the pasture will have 5 feet of cover compared to the standard 3 feet of cover in non- agricultural uplands. It will be difficult to contain/confine saturated trench spoil materials within the wetland because these materials typically lack sufficient strength for stacking or piling these materials. Pacific Connector will utilize appropriate low-ground pressure equipment or will operate equipment off of mats to minimize potential rutting or compaction impacts as specified in FERC's Wetland and Waterbody Procedures. Appropriate BMPs will be utilized, as specified in the ECRP to minimize potential sedimentation impacts. All of the affected wetlands are disturbed emergent pasture wetlands and impacts associated with the project activities are expected to be temporary and short-term.
12.27 to 12.68	NSI092 NSI093 NSI094 NSI095 NSI097 NSI098 BSP120 BSP121	R4SBC R2SB3C	TEWA 12.06-N TEWA 12.08-W TEWA 12.27-W TEWA 12.28-N TEWA 12.31-N TEWA 12.31-W TEWA 12.39-N TEWA 12.40W TEWA 12.45-N TEWA 12.47-W TEWA 12.53-N TEWA 12.53-W Construction ROW >75 feet	14 &15	**Previously Disturbed Area – Forest Clear-Cut** The alignment was rerouted to this location based on landowner concerns with the original route which was within 200 feet of two residences. Therefore the alignment was realigned in this location after on-site geotechnical surveys verified potential geologic hazards were not a significant concern. These TEWAs are required because the alignment traverses undulating and sidehill topography which will require grading and temporary fills slopes. The waterbodies traversed by the alignment in this area are intermittent drainages within recently clear cut areas and lack developed riparian vegetation.

TABLE P-1
Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
15.74	EW079	PEM	TEWA 15.45-W TEWA 15.70-N Construction ROW >75 feet	18	**Agricultural Wetland - Disturbed Emergent Pasture** The alignment in this area has been adjusted from the original route based on geologic hazards evaluations. Further topographic evaluation and constructability evaluations of the rerouted alignment in the area between MPs 15.31 and 16.03 required additional alignment adjustments. The pipeline was realigned outside the original survey corridor. Based on previous survey work, photo interpretation and review of existing data (NWI and soil surveys), an emergent wetland is suspected in this pasture at MP 15.74. TEWAs 15.45-W and 15.70-N were located in the level wetland pasture because of critical staging needs in this area. Existing access is available at this location and the project alignment is remote and rugged both to the north and south. To minimize impacts to this wetland pasture, Pacific Connector proposes to use the area primarily in the dry season; topsoil would be salvaged from the entire TEWAs; and the area would be scarified (ripped) during restoration efforts and revegetated according to the ECRP. Compaction testing would occur according to FERC's Upland Plan to ensure that compaction impacts are properly mitigated. Impacts to this wetland from project use are expected to be temporary and short- term.
18.93 & 19.06	NSP042 NSP043	R3SB1H R3SB1H	TEWA 18.49-W TEWA 18.96-N TEWA 18.96-W TEWA 19.06-N TEWA 19.06-W Construction ROW >75 feet	21	Due to the steep topographic conditions at these two waterbody crossings, these TEWAs could not be located 50 feet or more from the waterbodies. These TEWAs have been located at least 20 feet from the waterbodies to minimize potential impacts. The measures outlined in the ECRP will be utilized to minimize potential sedimentation impacts and to ensure that disturbed riparian areas are appropriately revegetated with woody riparian species.
22.78	NW040	PEMC	TEWA 22.59-N Construction ROW >75 feet	25	**Agricultural Wetland - Disturbed Emergent Pasture** This TEWA is necessary to segregate and store topsoil within this agricultural hayfield/pasture. The affected disturbed emergent wetland is associated with an excavated drainage ditch within the pasture and therefore impacts to this feature will be negligible.
23.36 & 23.52	CW010 CW011	PFOC	TEWA 23.09-W Construction ROW >75 feet	26	The construction right-of-way could not be necked down through these wetlands because the side hill alignment requires the full 95-foot construction right-of-way and TEWA 23.09-W to complete the necessary cut and fills and to contain all trench spoil. Disturbed areas in this forested wetland would be replanted as described in the ECRP which includes reestablishment with tree and shrub species.
27.00	BW134 BSP133	PEMC R2SB4H	Construction ROW >75 feet	29	Due to site-specific conditions at this location (e.g., steep topography, location of the existing road and creek crossing), the construction right-of-way could not be necked down through this wetland and waterbody. Pacific Connector proposes to utilize the measures outlined in the ECRP to minimize potential sedimentation impacts to this wetland.

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MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
29.21	NSI099	R4UBC	TEWA 29.19-W	31	**Previously Disturbed Area – Forest Clear-cut** The alignment between MPs 29.05 and 29.49 was rerouted to minimize impacts to Lone Rock Timberland's planned subdivision development. The reroute avoids impacts to a number of lots within the proposed subdivision. TEWA 21.19-W has been set back 50 feet from the intermittent stream (NSI 099) in most areas but because of the meander of the stream the setback cannot be maintained in all areas. The TEWA is necessary for ingress/egress, stream crossing and steep slope staging and for installation of the acute angle of the PI.
29.48	BSI073	R3SB1H	TEWA 29.44-W	31	**Previously Disturbed Area – Road & Forest Clear-cut** The alignment between MPs 29.05 and 29.49 was rerouted to minimize impacts to Lone Rock Timberland's planned subdivision. The reroute would avoid impacts to a number of lots within the proposed subdivision. TEWA 29.44-W has been set back behind the existing road that parallels the intermittent stream and wetland in this area. The TEWA is in a previous clear-cut devoid of mature trees. This TEWA is required for the road and stream/wetland crossing as well as steep slope staging, and it is not feasible or reasonable to set this TEWA farther back from these features.
29.53	BSI076	R4SB1C	TEWA 29.53-N TEWA 29.55-W	31	**Previously Disturbed Area – Forest Clear-cut** These TEWAs are needed for ingress/egress, road crossing, staging, spoil storage, and parking. The TEWAs are located within a recent clear cut with regenerating trees between 5 and 10 years of age. The location of the TEWAs will not affect any riparian areas associated with this intermittent stream which is expected to be dry at the time of construction. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately revegetated with woody riparian species.
29.52	BW072	PEMC	Construction ROW >75 feet	31	**Agricultural Wetland - Disturbed Emergent Pasture:** The full 95-foot construction right-of-way is maintained through this wetland to provide adequate space for topsoil segregation/storage and to deeper pipeline burial depths (5-foot) across this pasture/hayfield. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately revegetated.
29.85	BSP071	R3OWH	TEWA 29.48-N TEWA 29.78-W TEWA 29.87-W Construction ROW >75 feet	31	**Previously Disturbed Area – Pasture** The alignment across the East Fork Coquille River was adjusted to provide a perpendicular crossing to minimize the crossing length of the river, avoid Wetland BW250, and to avoid two potential MAMU stands along the river. TEWAs 29.48- N, 29.78-W, and 29.87-W were positioned to abut the existing riparian vegetation along the river banks within the pasture and hayfield but are located within 50 feet of the river.

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MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
32.40	BSP057	R3RB2H	TEWA 32.46-W TEWA 32.41-N TEWA 32.41-N	34	These TEWAs are required for the crossings of waterbodies BSP057 and BSP055 and a PI. They were reduced to the extent feasible but small portions extend to within 30 feet of BSP057. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed riparian areas are appropriately revegetated with woody riparian species.
32.50	BSI059 BSI058	R4UB4C	TEWA 32.48-N	34	This TEWA is needed for ingress/egress, staging, and spoil storage associated with the road crossing and PI. Due to site-specific topographic conditions, it is not feasible to provide a 50-foot setback from the waterbodies, although the TEWA will be offset at least 10 feet from the intermittent drainage which should be dry at the time of construction. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed riparian areas are appropriately revegetated with woody riparian species.
33.02	BSP050	R3SB1C	TEWA 33.02-W	35	Although this TEWA has been located 20 feet from the waterbody, maintaining a 50-foot setback is not feasible due to the location of Waterbody BSP049. This TEWA is required during the crossing of Waterbody BSP049 and therefore additional setbacks to maintain a 50-foot setback from Waterbody BSP050 would make this TEWA impractical during the crossing of Waterbody BSP049. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed riparian areas are appropriately revegetated with woody riparian species.
34.45	CSP005	R3SB1H	TEWA 34.42-W TEWA 34.47-W	36	Due to the steep incised topographic conditions at this stream crossing, these TEWAs cannot be located 50 feet or more from the waterbody. These TEWAs will be set back a minimum of 10 feet from the waterbody. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed riparian areas are appropriately revegetated with woody riparian species.
52.23	GW39	PEM	TEWA 52.23-N	52	**Previously Disturbed Area – Quarry:** Wetland GW39 is a small man-made pond within a borrow pit/quarry located within TEWA 52.23-N. The small excavated pond is unlikely to be a jurisdictional feature. TEWA 52.23-N was selected for use as a potential rock disposal area and for staging.
55.90 55.94	BSI202 BSI203	R4SB3C	TEWA 55.82-N TEWA 55.92-N TEWA 55.95-N TEWA 55.89-W	56	**Previously Disturbed Area – Pasture** These TEWAs are located in previously disturbed pastures and will not affect any riparian areas. They are required for topsoil segregation/storage in the pastures and will be set back a minimum of 10 feet from the intermittent drainages which should be dry during construction. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately revegetated.

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MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
56.65	DA15	PFO	TEWA 56.69-W TEWA 56.72-N	56	Survey access to this parcel was denied and the wetland delineation is preliminary. However, these TEWAs are required for the open cut crossing of Ireland Road (Douglas Co. Road 140). Ireland Road is elevated with 4-5 feet of gravel fill at the pipeline crossing, therefore this material will need to be temporary stored and replaced during restoration. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately revegetated.
56.75	BW160 BW161	PFOC	TEWA 56.74-W TEWA 56.75-N TEWA 56.79-N Construction ROW >75 feet	56	These TEWAs are required for ingress/egress, the crossing of Ireland Road, and topsoil and spoil storage. They are located in the wetland and cannot be adjusted to be 50 feet or more from the wetlands and still be useful to complete the required construction activities. Impacts to the wetland from TEWA 56.74-W would mostly occur to emergent wetland areas. Portions of TEWA 56.75-N have been located to utilize an existing road which bisects the wetlands. TEWA 56.79- N has been located within previously disturbed emergent areas within wetland BW161.
56.92	BW163	PEMC	TEWA 56.79-N Construction ROW >75 feet	57	**Agricultural Wetland - Disturbed Emergent Pasture** This TEWA is required to segregate and store topsoil within this disturbed emergent pasture wetland. Impacts to this wetland from project construction are expected to be temporary and short-term.
57.11 to 57.30	BSI140 BW142 BW141	R4SB1C PEMC	TEWA 57.11-N TEWA 56.79-N TEWA 57.25-W Construction ROW >75 feet	57	**Agricultural Wetland - Disturbed Emergent Pasture** TEWAs 57.11-N and TEWA 57.26W are required to segregate and store topsoil within this disturbed, emergent wetland pasture (BW142/BW141). The full 95-foot construction right-of-way will be maintained through this wetland because impacts will be temporary, minor, and short-term. The TEWAs located in or adjacent to BSI140 (intermittent drainage) are also located in previously disturbed areas or are required for spoil/topsoil storage associated with the road crossing and the PI. This intermittent drainage is expected to be dry during construction and Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately revegetated.

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MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
57.83 to 60.48	BSI147/EE012 BW150 BW158 BSP159 BSP155 BW154 BSI132 BSI129 BW127 NSP013	R4SB3C PEMC PEMC R2SB1H R2SB3H PEMC R4SB3C R4SB3C PEMC R3SB1H	TEWA 57.81-N TEWA 57.91-N TEWA 58.21-N TEWA 58.56-N TEWA 58.65-W TEWA 58.79-N TEWA 58.79-W TEWA 59.30-N TEWA 59.31-W TEWA 59.66-N TEWA 60.01-N TEWA 60.05-W TEWA 60.35-W TEWA 60.45-N Construction ROW >75 feet	57, 58, 59, 60	**Previously Disturbed Area – Pasture** These TEWAs have not been located 50 feet or more from these waterbodies and wetlands because they have been located within existing disturbed pasture areas. They will not affect any riparian areas. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately revegetated.
63.96	BSP240 BSI 241	R2UB1H R4UB1J	TEWA 64.00-W	64	The steep topography immediately east of Kent Creek prevents location of this TEWA 50 feet or more from these waterbodies. Although this TEWA will be set back a minimum of 10 feet from Kent Creek, additional setbacks are not feasible considering the space requirements necessary to clear the construction right-of-way, deck and haul timber, and cross the creek using the dry open cut crossing method. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed riparian areas are appropriately revegetated with woody riparian species.
66.95	BSP168 BSP169 BSP230	R3SB1C R4SB3J R4SB1J	TEWA 66.89-N TEWA 66.89-W TEWA 66.97-W DG105 MP 67.00	66	**Previously Disturbed Area – Pasture** All of these TEWAs have been located within previously disturbed pastures and will not affect existing riparian areas associated with Willis Creek (BSP168). Due to the alignment of the project along the intermittent drainage (BSI230), this drainage could not be avoided by TEWA 66.89-W.
71.11	SS-100-015	R4	TEWA 71.06	71	SS-100-015 is an interpreted intermittent waterbody (NWI) that is encompassed within TEWA 71.06 which is required for the Direct Pipe crossing of I-5, South Umpqua River, Dole Road and the railroad. This waterbody is expected to be dry at the time of the crossing. As defined by Section I. B.1. of FERC's Wetland and Waterbody Procedures, these features are not considered waterbodies and are therefore protected under FERC's Upland Plan. During restoration the site/feature would be restored to the approximately preconstruction contour and appropriate erosion control BMPs would be installed as determined by the EI.
71.25	BSP 026	R3OWH	TEWA 71.25	71	The purpose of the TEWA is for hydrostatic test water withdrawal and has been located to primarily occupy existing cleared/disturbed areas. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation

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MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
74.16	WW-100-066	PEM	Construction ROW > 75'	74	This feature is an interpreted wetland (NWI) and because of the sideslopes in this area the 95-foot construction right-of-way was maintained and TEWAs eliminated. Pacific Connector proposes to utilize the measures outlined in the ECRP to minimize potential sedimentation impacts to this wetland and to ensure that disturbed areas are appropriately revegetated.
76.38	BSP 001	PFO1A R2	TEWA 76.36-N TEWA 76.36-W	77	**Previously Disturbed Area – Pasture** These TEWAs have not been located 50 feet or more from these forested wetland/waterbody because they are located within existing pastures and riparian areas will not be disturbed. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately revegetated.
76.69	BW002	PEMC	TEWA 76.67-N Construction ROW >75 feet	77	The full 95-foot construction right-of-way and TEWA 76.67-N are necessary in this wetland because the pipeline traverses steep topography and narrow ridgelines in this area. The TEWA is necessary for steep slope construction staging and spoil storage associated with the PI, and other potential grading activities necessary to safely install the pipeline. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately restored and revegetated.
77.93 & 78.02	BSI008 BSI010	R3SB1H R4SB3C	TEWA 77.72-N TEWA 77.95-W	78	**Previously Disturbed Area – Pasture & Intermittent Stream** These TEWAs are necessary for staging and pipe storage in an area of the project which traverses rugged and remote terrain with limited access and limited areas suitable for staging. These TEWAs are located in a level, previously disturbed pasture where access is available in the Little Lick Creek drainage. The TEWAs encompass the intermitted drainages which are expected to be dry during construction. Elimination of these drainages from the TEWAs and applying a 50- foot setback would exclude significant areas of these critical staging TEWAs. Pacific Connector will limit project activities within these intermittent tributaries and will also use existing access across the drainages or will use construction mats over these drainages as necessary to minimize potential channel disturbance. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately restored and revegetated.

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MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
79.12	NSP038	R3SB1H	TEWA 79.13-N TEWA 79.14-W	79	These TEWAs have been located 50 feet from North Myrtle Creek (NSP037); however, this setback pushes these TEWAs into NSP038 (Trib. N. Myrtle Creek). These TEWAs cannot be set back further to allow a 50-foot offset from NSP038 due to the extremely steep slopes immediately east of the creek (left bank). These TEWAs are needed for the crossing of Myrtle Creek, the crossing of the tributary (NSP038) as well as for construction up the long steep slope adjacent to NSP0398. This slope is approximately 1,300 feet in length and has an average slope of approximately 40 percent. Pacific Connector's EI will monitor clearing and construction activities at the crossing of NSP038 to mark/flag any vegetation that can potentially be protected within the clearing limits. The EI will review these clearing limits (vegetation protection) with Pacific Connector's Chief Inspector to ensure that the crossing can be safely constructed. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts to this tributary as well as to North Fork Myrtle Creek and to ensure that disturbed areas are appropriately restored and revegetated including woody riparian vegetation.
81.19	BSP172	R3OWH	TEWA 81.16-W TEWA 81.16-N	82	TEWA 81.16-N is located in an overgrown hayfield pasture and will be offset at least 10 feet from South Fork Myrtle Creek. No woody riparian vegetation will be impacted immediately adjacent to the creek except for Himalayan blackberries. TEWA 81.16-W is required for ingress/egress and the crossings of South Fork Myrtle Creek and Myrtle Road. Although this TEWA has been set back 20 feet or more from the creek, an increased setback to maintain a 50-foot offset from the creek is not feasible because of the narrow upland area between the creek and the Myrtle Road and the steep embankment that must be graded/filled to provide safe access. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts to the South Fork Myrtle Creek and to ensure that disturbed areas are appropriately restored and revegetated including woody riparian vegetation.
84.19	EW026 EW024 EW025	PEMC	TEWA 84.19-W	85	TEWA 84.18-W is required for staging in a remote area where the project traverses steep and rugged terrain and where level areas for large staging and access are extremely limited. Although TEWA 84.18-W entirely encompasses these emergent wetlands, they will be avoided by project activities. The EI will delineate the boundaries of these wetlands with silt fence and ensure that these sites are protected from disturbance.
88.16 & 88.27	BSI236 BSI238	R4SB1J	TEWA 88.07-N TEWA 88.25-W	89	This intermittent drainage, which is expected to be dry during construction, is confined to a road ditch and cannot be avoided by TEWA 88.07-N because of the project's alignment, location of the PIs, and parallel road alignment. These TEWAs are required for ingress/egress, the road crossing, and staging and spoil storage. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to restore the ditch/drainage.

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MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
88.48	BSP232	R3SB1H	TEWA 88.49-N TEWA 88.49-W	90	**Previously Disturbed Area – hayfield/pasture** These TEWAs have not been located 50 feet or more from this waterbody (Fate Creek) because these TEWAs have been located in agricultural hayfields/pastures and will not disturb woody riparian areas immediately adjacent to the creek. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately revegetated.
88.62	BSP233	R3SB1H	TEWA 88.61-W	90	**Previously Disturbed Area – hayfield/pasture** A small portion of this TEWA is located within 50 feet or more from this waterbody (Days Creek) because this TEWAs has been located in agricultural hayfields/pastures and will not disturb woody riparian areas immediately adjacent to the creek. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed areas are appropriately revegetated.
92.62	ASP303	R3RB2H	TEWA 92.57-N TEWA 92.57-W TEWA 92.63-W TEWA 92.63-N TEWA 92.62	94	The steep side sloping topography on the west side (right bank) of St John's Creek prevents locating TEWA 92.57-N and TEWA 92.57-W 50 feet or more from this waterbody. The slope on the west side of the creek is over 1,800 feet in length and has an average slope of greater than 40 percent. Similarly, on the east side (left bank) of the creek, steep slopes limit setbacks of 50 feet or more for TEWAs 92.63-W and TEWA 92.63-N. Further, an existing road provides access to the east side of the creek and the road is incorporated within these work areas. All of these TEWAs will be set back a minimum of 10 feet from the creek. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that disturbed riparian areas are appropriately revegetated with woody riparian species.
94.50 to 94.66	AW197 AW201	PEMC	TEWA 94.52-N TEWA 94.52-W TEWA 94.64-N Construction ROW >75 feet	96	**Previously Disturbed Emergent Wetland** These previously disturbed seasonal emergent wetlands are located in a previously reclaimed barrow/fill area that currently supports a pasture. The alignment has been selected to provide the best crossing location for the South Umpqua River. These TEWAs have been selected as the Milo Yard, a proposed pipe storage and contractor yard. This site is a significant staging area for project activities because of the proximity of the pipeline alignment to a large level area (previous industrial site) with excellent access from Highway 227. These TEWAs are also necessary for ingress/egress, the crossing of Highway 227, spoil storage, and parking. To restore these wetlands, Pacific Connector would utilize the procedures outlined in the ECRP to restore these disturbed wetlands.

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MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
94.72	ASP196 (South Umpqua River)	R2OWH	TEWA 94.69-N TEWA 94.69-W Construction ROW >75 feet	96	These TEWAs and full construction right-of-way width are required for the diverted open cut crossing of the South Umpqua River, a major waterbody with an ordinary high water mark (OHWM) greater than 100 feet in width. The width of the flowing water is significantly less than the OHWM in the summer, when the crossing is proposed. These TEWAs are required to install the temporary portable in-stream diversions so that the crossing can be completed in the dry. The crossing procedures are described in Resource Report 2. The ECRP outlines the measures that will be utilized to restore banks and woody riparian vegetation.
94.84 ,	ASI193 AW195 AW194	R4SB3C PEMC PEMC	TEWA 94.86-N TEWA 94.69-N TEWA 95.04-N	96, 97	**Agricultural Wetland - Disturbed Emergent Pasture** These TEWAs are required for topsoil segregation/storage and are located in or within 50 feet of the intermittent tributary to the South Fork Umpqua River (ASI193). These TEWAs are located in the pasture and will not disturb any woody riparian vegetation associated with the intermittent drainage.
102.18	CW057 CW056	PEMA PEMC	TEWA 102.00-W TEWA 102.19-N Construction ROW >75 feet	104	TEWA 102.19-N is located in a ridgeline saddle that is intersected by both Forest Service roads 3220 and 3230. This TEWA provides a critical staging area for the project in an area of limited access and suitable topographic conditions to allow for project staging. Pacific Connector will utilize the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure potential sedimentation is minimized and disturbed areas are appropriately revegetated/ reforested.
103.91	CW055	PEMC	TEWA-103.92-N TEWA 103.91-W Construction ROW >75 feet	106	**Previously Disturbed Area – Forest Clear-cut** These TEWAs are located in a recent forest clearcut which includes the entire wetland swale. Because this wetland was previously disturbed, the TEWAs were located within 50 feet of the wetland. These TEWAs are necessary for ingress/egress, log storage during clearing, staging and temporary spoil storage associated with the road crossing. Pacific Connector will use the measures outlined in the ECRP to minimize potential sedimentation impacts to the wetland and to ensure that the area is appropriately restored and reforested.
109.15	GDX015 GW014	R4 PSS	TEWA 109.10-W Construction ROW >75 feet	111	The side hill alignment, location of the road crossing (FS 3200500), and PI prevent eliminating TEWA 109.10-W and narrowing of the construction right-of- way to 75 feet at the crossing of Wetland GW014 and road side ditch (GDX015). These conditions also prevent a 50-foot setback. The road crossing (minimum 5 feet of cover), side hill construction and PI will require additional excavation and spoil storage. To minimize potential impacts to the wetland, the EI and Chief Inspector will determine at the time of construction what measures can be accommodated in the TEWA configuration based on site-specific conditions (i.e., topographic, slope grading requirements).

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109.68	GSP022	R2	TEWA 109.68-N	112	TEWA 109.68-N is located along FS Road 3200500 and across the culverted crossing of East Fork Cow Creek (GSP022). The TEWA was aligned to minimize impacts to riparian vegetation. The configuration of TEWA 109.68-N was designed to allow the removal of the culvert for potential restoration purposes if the road is not required for future use by the Forest Service. Pacific Connector and the Forest Service discussed the potential removal of the culvert for mitigation purposes during an on-site meeting in the summer of 2008.
110.73	EW069 ESI068	PUB3C R4SB1H	TEWA 110.73 Peavine Quarry	113	**Previously Disturbed Area – Quarry** This TEWA encompasses an existing quarry on the Umpqua National Forest. Although wetland features EW069 and ESI068 are located in the quarry and were created by quarry activities, Pacific Connector Pipeline Project activities will not disturb these features.
118.89	ASP202	R2SB1H	TEWA 118.70-N TEWA 118.83-W TEWA 118.89-W	121	**Previously Disturbed Area – Pasture** These TEWAs are required for the crossing of West Fork Trail Creek, ingress/egress, and topsoil segregation/storage. They have been located within 50 feet of this stream within a previously disturbed pasture. Woody riparian vegetation associated the waterbody will not be disturbed. Pacific Connector will use the measures outlined in the ECRP to minimize potential sedimentation and to ensure that the pasture and riparian areas are appropriately revegetated.
120.83	AW204	PEMC	TEWA 120.73-N TEWA 120.85-N	123	**Previously Disturbed Area – Residential yard/pasture** These TEWAs have been located within 50 feet of this wetland because they are located in the previously disturbed area (residential yards/pasture) and will not disturb any woody riparian vegetation associated the waterbody. Pacific Connector will use the measures outlined in the ECRP to minimize potential sedimentation and to appropriately revegetate the pasture and riparian areas within the construction right-of-way.
122.00 & 122.6	ESI070 ESI071 ESI072 ESI073 ASP235	R4SB1C R4SB2C R3UBH	TEWA 121.95-W TEWA 122.61-W	124	These TEWAs are required for the Rogue River (ASP235) HDD, pipe pull-back areas, and to access the river for a water source (Hydrostatic, HDD, dust abatement) and for potential frac out response. Although the TEWA is located across these intermittent drainages, ground-disturbing activities will be minimized through the use of rollers to span these drainages. The EI will locate appropriate BMPs to minimize sediment delivery to these intermittent drainages and will work with the HDD contractor to minimize construction-related disturbance to these drainages.

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MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
126.58	ASI221	R4UB1C	TEWA126.56-N	129	This TEWA is located within 50 feet of this intermittent drainage because an existing access road intersects the right-of-way at this location. The TEWA is required for staging/parking. The intermittent drainage is expected to be dry during construction. The TEWA is located in a chalk outcrop and supports limited vegetation growth; therefore, its location within 50 feet of the intermittent drainage will not affect riparian vegetation. The outcrop material is also suitable as pipe padding material and may be used as a padding source if allowed by the landowner. Pacific Connector will use the measures outlined in the ECRP to minimize potential sedimentation and to appropriately revegetate all disturbed areas.
128.60	AW278 ASP310	PEMC/ R3UB3	TEWA 128.55-W TEWA 128.55-N Construction ROW >75 feet	131	**Agricultural Wetland - Disturbed Emergent Irrigated Pasture** These TEWAs have been located outside of this heavily grazed irrigated pasture wetland, except portions of TEWA 128.55-N which are required for topsoil segregation and storage. The full 95 foot right-of-way will be maintained in the wetland because impacts to this disturbed emergent irrigated pasture wetland will be temporary and short-term. Pacific Connector will use the measures outlined in the ECRP to minimize potential sedimentation and to ensure that the pasture is appropriately revegetated.
130.83	AW244 AW245	R4SB1C	TEWA 130.81-W Construction ROW > 75'	133	This TEWA is required for ingress/egress and the crossing of Crowsfoot Road. It cannot be moved out of this wetland and still efficiently accomplish the road crossing. TEWA 130.81-W is bisected by an existing road that intersects with Crowsfoot Road within the construction right-of-way. Narrowing the construction right-of-way to 75 feet would not minimize disturbance to these wetlands because additional TEWAs would be needed to provide the necessary workspace for the road crossing.
131.25	AW248	PEMC	TEWA 131.03-N	134	This TEWA was reduced in size and located in an area primarily dominated by emergent vegetation with very few shrubs. Moving the TEWA back to allow a 50 foot setback would disturb more shrub vegetation; therefore, the TEWA was not set back 50 feet. The construction right-of-way was necked down to minimize disturbance to this wetland. Pacific Connector will use the measures outlined in the ECRP to minimize potential sedimentation impacts and to ensure that the wetland and uplands are appropriately revegetated.
131.98	ASP252	R4SB1C	TEWA 131.90-N TEWA131.94-W	134	**Previously Disturbed Area – Hayfield** These TEWAs are located with a 10-foot minimum setback from Big Butte Creek (ASP252) because it is located in an irrigated hayfield and riparian vegetation will not be affected by its location. Pacific Connector will use the measures outlined in the ECRP to minimize potential sedimentation and to ensure that the hayfield is appropriately revegetated.

TABLE P-1
Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
132.12 to 132.67	AW243 AW242	PEMC	TEWA 132.04-W TEWA 132.44-N TEWA 132.44-W TEWA 132.47-W TEWA132.37-W TEWA 132.47-N TEWA 132.57-W TEWA 132.67-W Construction ROW > 75'	134, 135	**Agricultural Wetland – Hayfield/ Pasture** These TEWAs, which are located within an irrigated hayfield/pasture wetland, are required for the crossing of the Butte Falls Highway and for ingress/egress. The full 95-foot construction right-of-way is maintained throughout the pasture/hayfields because topsoil salvaging is required. Five feet of cover is required in the pasture. Because of the 5-foot depth of cover, additional area is required for spoil and topsoil storage.
133.08	AW263	PEMC	Construction ROW > 75'	135	The full 95-foot construction right-of-way is maintained through this wetland to provide adequate space for topsoil segregation/storage. Significant slash and woody materials from clearing operations need to be stored in adjacent uplands in addition to spoil from upland grading during right-of-way construction. Pacific Connector will use low-ground-weight equipment or operate equipment off of mats to minimize rutting and compaction impacts. The measures outlined in the ECRP will be used to minimize potential sedimentation impacts and to ensure that the wetlands are appropriately revegetated.
133.35	ASP241 ASP240	R3UB3H R3UB3x	TEWA 133.24-N TEWA 133.28-W TEWA 133.40-N	136	Waterbody ASP241 is formed from leakage from the Medford Aqueduct (ASP240) which is to be crossed by conventional boring. TEWA 133.24-N is required for the bore pit installation and boring operations. The TEWA cannot be moved back to avoid the wetland considering the bore length (~300 feet) and the topography in this area. If the waterbody is flowing at the time of construction, the flow will be diverted around activities as necessary to avoid water quality impacts. TEWAs 133.28-W and TEWA 133.40 cannot be set back 50 feet from the waterbodies because they are critical to minimize the length of the bore to minimize boring risk/failure.
138.50 & 138.71	AW209 ASI210 ASI211	PEMC R4UB1C	TEWA 138.47-W Construction ROW > 75'	141	**Previously Disturbed Area – Pasture** This TEWA has not been set back 50 feet from the wetland and waterbody because it has been located in a clearing and will not impact any woody riparian vegetation. The construction right-of-way has not been narrowed to 75 feet through these wetlands because a neckdown on the working side of the right-of- way would only minimize temporary and short-term impacts to the emergent pasture wetlands. Pacific Connector will use the measures outlined in the ECRP to minimize potential sedimentation and to ensure that the pasture is appropriately revegetated.

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Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
139.07 & 139.14	AW213 ASI214	PEMC R4UB1C	TEWA 139.01-N TEWA 139.01-W TEWA 139.08-N TEWA 139.08-W Construction ROW > 75'	141	The location of wetland AW213 in relation to the gravel access road prevents a 50-foot set back from wetland AW213 to complete both road and wetland crossings. These TEWAs have been located with a setback of approximately 20 feet or more to minimize riparian vegetation impacts. TEWA 139.08-W is required for ingress/egress, and staging. This TEWA is accessed by an existing private graveled road in a remote area which is level and provides an ideal staging location. A 50-foot set back from AW213 and ASI214 was not provided because TEWA 139.08-W was located entirely within a rangeland pasture and would not affect woody riparian vegetation.
139.50 to 139.83	AW225 ASI226 ASI227 ASI228 ASI229 AW230 AW231 ASI 232	PEMC R4SB1C R4EMC	TEWA 139.57-N TEWA 139.55-W TEWA 139.69-N TEWA 139.82-W Construction ROW > 75'	142	The alignment in this area traverses a slightly sloping rangeland pasture which is bisected by numerous intermittent drainages, and emergent wetlands. The alignment was routed through the pasture to minimize forested impacts and was necked down to minimize impacts to these features where feasible. Although these TEWAs have been located to minimize impacts to these wetland/waterbody features, where possible, it is not feasible to set back TEWAs 139.57-N or TEWA 139.55-W 50 feet from these features. TEWA 139.69-N and TEWA 139.82-W, which are required for the PIs and spoil storage, are located within several of these intermittent drainages and emergent wetlands. The intermittent drainages are expected to be dry during construction and impacts to these features will be temporary and short-term and fully mitigated through implementation of the measures outlined in the ECRP (topsoil salvage, scarification and reseeding).
140.98	EW076 EW077 EW078	PEMC	TEWA 140.98	143	**Previously Disturbed Area – Reservoir Dam** TEWA 140.98 is required for water withdrawal proposed at Star Lake Reservoir. Water withdrawal activities for dust or fire control would not require any excavation or ground disturbance at this site. Where traffic is required across these emergent wetlands, the travel route will be matted if the wetlands are saturated to minimize potential compaction impacts.
142.28 to 142.65	EDX032 EW033 EW035 ESP034 EDX036	R4SB3Cx PEMC R3SB3H	TEWA 142.17-N TEWA 142.51-W TEWA 142.58-W TEWA 142.58-N Construction ROW > 75'	144, 145	**Agricultural Wetland – Irrigated Emergent Pasture** The full 95 foot construction right-of-way is maintained and the TEWAs are located within this irrigated pasture wetland because impacts to this disturbed emergent wetland are expected to be temporary and short-term. The TEWAs are required for topsoil segregation/storage and are needed for staging during the crossing of Salt Creek. These TEWAs have been located within the wetland pasture but outside of woody riparian areas immediately adjacent to the creek. The full right of way width is maintained because of the required 5-foot depth of cover over the top of the pipe in the pastures, which requires additional area for topsoil and spoil storage. Impacts to these features will be fully mitigated through implementation of the measures outlined in the ECRP (topsoil salvage, and reseeding) and the use of low-ground weight equipment or operating equipment off of equipment mats if needed to minimize rutting and compaction impacts.

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Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
143.73	EL041	PEMKx	TEWA 143.69-W	146	**Agricultural Wetland – Stock Pond** The alignment and location of the PI prevents setting the TEWA outside the stock pond (wetland EL041). The alignment on the C2 Ranch was rerouted based on landowner recommendations, but the TEWA could not be located to avoid the excavated pond. During construction Pacific Connector will minimize disturbance to the stock pond as much as feasible and will repair any damage to the pond during restoration.
144.70	GSP005	R4	TEWA 144.59-N TEWA 144.70-W	146	Waterbody GSP005, a confined stream reach flowing immediately adjacent to BLM Road 36-2E-19 (Salt Creek Road), also runs through TEWA 144.59-N and is within 50 feet of TEWA 144.70-W. The alignment in this location was dictated by the landowner (C2 Ranch), and the acute angle (PI) of the pipeline requires the need for TEWAs 144.59-N and TEWA 144.70-W. The configuration of the alignment and the road made it impractical to avoid the stream with the TEWA in the project design. However, during construction the stream would be flagged by the EI and project activities/disturbance would minimize/avoid impacts to the stream to the extent practical. The EI would assure that appropriate BMPs are installed to protect the stream reach in this area.
145.54	ESI061 EW063 EDX064	R4SBC PEMC R4UBx	TEWA 145.38-N TEWA 145.53-W	147	The bored crossing of Highway 140 will require these TEWAs for ingress/egress to excavate the bore pit, store spoil, and for equipment staging. Therefore, a 50- foot setback on this intermittent drainage was not feasible considering the location of the highway in proximity to the intermittent stream. Further the shrub/tree riparian area is very limited along this intermittent stream and impacts to this riparian area will be replanted after construction.
145.63	EW067	R4UBX	TEWA 145.58-W TEWA 145.58-N	147	**Agricultural Wetland – Irrigation Ditch** Wetland EW067 is an irrigation ditch located immediately adjacent to Highway 140. The TEWAs are not set back 50 feet because the TEWAs will not disturb any riparian vegetation. Further the highway crossing will be bored and the location of the sharp PI makes it infeasible to include TEWA setbacks from this irrigation ditch.
152.31	AL169	PUBfx	TEWA 152.29-N	155	**Previously Disturbed Area – Excavated pond** This man made pond may be used as a water source for dust control if allowed by the landowner.
171.07	EW085	PEMC	TEWA 171.08-N TEWA 171.08-W	173	**Previously Disturbed Area - Existing Road** TEWA 171.08-N and TEWA 171.08-W were not placed 50 feet back from wetland EW085 because an existing road is located along the southern edge of the wetland. These TEWAs were located on the northern edge of the road shoulder adjacent to the wetland in the previously disturbed road area. Sediment barriers would be placed along the TEWAs adjacent to the wetland to ensure that sediment is contained within the construction right-of-way.

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Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
176.54	ESI069	R4SB2C	TEWA 176.49-N	178	TEWA 176.49-N was located across intermittent drainage (ESI069) because of the side slope construction requirements, and required PI locations in this area. The PIs (pipe bend angles) are required based on the slope contours. Prior to clearing, the EI will flag trees for salvage trees within TEWA 176.38-N, where feasible, to minimize riparian disturbance.
179.50	GW012	PEM	TEWA 179.50-W	181	**Disturbed Emergent Wetland** This wetland is located within the ROW of Clover Creek Road at the inlet of a culvert crossing on the road. The alignment has been co-located as close as possible with Clover Creek Road as recommended by the Forest Service and BLM (see Resource Report 10 Section 10.6.16). Sediment barriers would be placed along the TEWAs adjacent to the wetland to ensure that sediment is contained within the construction right-of-way/TEWA.
186.64	EW 101	PEMC	TEWA 186.22-W TEWA 186.65-W Construction ROW > 75 feet	187	The 95-foot construction right-of-way was not necked down to 75 feet. These TEWAs are required for topsoil salvage and were located immediately adjacent to wetland EW101 because this emergent wetland is a low-quality, grazed rangeland pasture. Temporary disturbance within the grazed wetland will be restored and temporary impacts are expected to be minor.
191.25	AW270	PEMC	TEWA 190.40-W TEWA 190.63-N TEWA 191.98-N	192	**Agricultural Wetland – Hayfield** These TEWAs which are located in or within 50 feet of this irrigated hayfield/pasture wetland are required for the crossing of Highway 66, for ingress/egress purposes, and for topsoil segregation/storage requirements. The full 95-foot construction right-of-way through this wetland pasture is maintained because of the wetland's configuration with the alignment and the road crossing which makes minimizing temporary impacts to this wetland infeasible. Impacts to this wetland will be temporary and short-term and fully mitigated during restoration, utilizing the measures outline in the ECRP.

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Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
191.50 to 198.20	Multiple Agricultural Hayfield/Pasture Wetlands and drainage Ditches/canals	PEMC R4UB3Cx	Multiple TEWAs and Construction ROW > 75 feet	192 – 198	**Active Agricultural Wetland – Hayfield/Pastures** The full 95-foot construction right-of-way was maintained between MPs 191.5 and 198.20 through the many and extensive hayfields/pastures wetlands in this area. Additionally, multiple TEWAs have been located in these hayfield/pasture wetlands in this area and are located immediately adjacent to the many drainage ditches/canals that are crossed. The construction right-of-way design is based on the expected high groundwater levels and the need to have the necessary space to contain the topsoil and excavated spoil. The trench width may become excessively wide because of the high groundwater table and the unconsolidated and saturated soils in the wetland. The right-of-way width and TEWAs are necessary because the trench will also need to be wider in the wetland because the pipeline will be weight-coated with several inches of concrete to compensate for pipeline buoyancy which increases the overall pipe diameter. In addition, the burial depth of the 36-inch pipeline in the pasture will have 5 feet of cover over the top of the pipe compared to the standard 3 feet of cover in non-agricultural uplands. Additionally, it will be difficult to contain/confine saturated trench spoil materials within the wetland because these materials typically lack sufficient strength for stacking or piling. The alignment for much of this area parallels a paved private access road which is provided by TEWAs 192.13-W and 194.43-W. Ingress/egress from this road will be critical for project activities. Trench dewatering will be an important component of the project construction activities in this area because of the high groundwater table. Therefore, to ensure that discharge from dewatering activities does not flow into the construction footprint, TEWAs have been located south of the private access road that parallels the alignment which is down slope of the alignment. These dewatering TEWAs include: 192.58-W, 192.76-W, 192.95-W, 193.12-W, 193.32-W, 193.50- W, 193.69-W, 193.88-W, 194.07-W, 194.26-W, 195.53-W, 194.72-W, 194.91-W, 195.08-W, 195.28-W, 195.69-W, 195.74-N, 195.76-W, and 196.65-W. Pacific Connector will utilize appropriate low-ground pressure equipment or will operate equipment off of mats to minimize potential rutting or compaction impacts as specified in FERC's Wetland and Waterbody Procedures. Appropriate BMPs will also be utilized, as specified in the ECRP, to minimize potential sedimentation impacts. All of the affected wetlands are disturbed emergent pasture wetlands and impacts associated with the project activities are expected to be temporary and short-term.
198.99	AL044	PABGh	TEWA 198.98-W	198	**Disturbed Industrial Yard** TEWA 198.98-W is required for the HDD crossing of the Klamath River and is located within a previously disturbed industrial yard. The EI will coordinate with the HDD Contractor to avoid this industrial pond during construction and will implement appropriate sediment control to minimize potential sedimentation of the pond.

TABLE P-1
Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
199.28 to 199.77	ASP151 AW152 AW154 AW155 AW156 AW157 AW158 AW159 AW160	L1UBHh R4UB3x PEMC	TEWA 199.58-W TEWA 199.60-N Construction ROW> 75 feet	199	**Active Agricultural Wetland – Hayfield/Pastures** TEWAs 199.60-N and 199.58-W are required for the HDD crossing of the Klamath River. TEWA 199.58-W is also required for staging of all project activities east of the Klamath River. This TEWA will be used to move all spread equipment around the Klamath River. Although the full construction right-of-way is shown across wetlands AW152, AW154, AW155, AW156, AW157, and AW158, disturbance to these wetlands will be limited to ingress/egress purposes from U.S. Highway 97 to the HDD and to the Klamath River for a water source. Impacts to wetlands AW155 and AW156 will be minimized by the installation of temporary construction access entrances which will be constructed of prefabricated mats or geotextile fabric overlaid with gravel (see typical BMPs figures provided in the ECRP). These temporary access entrances will minimize potential compaction or rutting impacts to these wetlands and will be removed after construction. Prefabricated timber mats or similar devices will also be used to cross wetland AW152 to minimize potential traffic impacts across this wetland. Wetland AW159 is an agricultural drainage ditch as well as a depressional emergent pasture wetland. Impacts to this wetland would be minimized by using construction mats to cross the ditch to access the right-of-way and HDD location. Where feasible, disturbance to the depressional pasture wetlands will be avoided, however if the wetland area is required for project activities the measures outlined in the ECRP will be used to restore impacted areas thorough scarification and replanting.
199.99 to 200.22	AW312 AW255	PEMC	TEWA 199.91-W TEWA 199.97-N TEWA 200.09-N TEWA 200.09-W TEWA 200.18-W Construction ROW > 75 feet	200	**Agricultural Wetland – Hayfield/Pastures** The construction right-of-way and TEWA requirements in this hayfield/pasture wetland were designed in consideration of the railroad crossing, the two sharp PIs in the alignment and the required 5-foot of cover over the top of the 36-inch diameter pipeline. The railroad will be bored and because of the length of the wetland the bore pits could not be placed outside the wetland. The two PIs will require additional workspace to install the radius bend or fitting and to contain the additional spoil materials associated with these PIs. Because of the location of the PIs the TEWAs could not be placed outside the wetland. In this area, the trench width may become excessively wide due to the high groundwater table and the unconsolidated and saturated soils in the wetland. Therefore the full 95-foot construction right-of-way was maintained through these wetland pastures. The right-of-way width and TEWAs are necessary because the trench will be wider in the wetland because the pipeline will be weight-coated with several inches of concrete to compensate for pipeline buoyancy which increases the overall pipe diameter. Further, the excavated trench spoil material will be difficult to contain/confine because they are expected to be saturated and will be spread out when stacked because these saturated materials typically lack sufficient strength.

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Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
201.00 to 212.08	AW093 AW095 AW098 AW102 AW108 AW122 AW132 NSP001	PEMC R3UBH	Multiple TEWAs Construction ROW > 75 feet	200-211	**Agricultural Wetland – Hayfield/Pastures and Previously Disturbed Areas -Pastures** The agricultural wetlands and numerous ditches and canals that are crossed in this area require the full 95-foot construction right-of-way and the TEWAs to have been located in the wetlands and immediately adjacent to the ditches/canals. In these areas, the pipeline will require a 5-foot depth of cover and topsoil will be segregated in these areas. The topsoil and additional spoil material that will be excavated and stored in these areas will require the full construction right-of-way width and TEWAs. The TEWAs are required for ingress/egress as well as the multiple road and canal/ditch crossings in this area. The TEWAs have been located immediately adjacent to the canals and ditches because the adjacent fields/pasture will not affect any riparian vegetation. Project impacts to these agricultural wetlands will be temporary and short-term and Pacific Connector will apply the appropriate measure outlined in the ERCP to restore these areas.
212.48 to 212.61	EW086 EW087 EDX054 EDX055	PEMC R4UB3Cx	TEWA 212.08-N TEWA 212.49-W TEWA 212.53-N TEWA 212.53-W TEWA 212.68-N TEWA 212.69-W Construction ROW >75 feet	211	**Previously Disturbed Area – Railroad right-of-way/Irrigation Canal/Irrigated Hayfield** These TEWAs are required for the bore of the Burlington Railroad at MP 212.52 and the crossing of the irrigation canal at MP 212.72. The wetlands are previously disturbed emergent wetlands.
219.69	AW292 ASI 291 NL116 Excavated Pond	PEMC R4UB3C PABGx	TEWA 218.80-W TEWA 219.70-W TEWA 219.69	219	**Previously Disturbed Area – Power Line Corridor** These TEWAs are located in a previously disturbed powerline corridor and their location will not impact any riparian vegetation. These TEWAs have been offset a minimum of 10 feet from this intermittent stream. Pacific Connector will utilize the measures outlined in the ECRP to minimize the potential for sedimentation and to ensure that adjacent areas are appropriately revegetated. TEWA 219.69 encompasses an excavated pond (NL116) for water withdrawal purposes for potential dust control. All required appropriation/withdrawal permits and landowner approvals would be acquired prior to withdrawals.
221.77	ASI138	R4UB3C	TEWA 221.27-N TEWA 221.78-N	221	**Previously Disturbed Area – Hayfield/Pasture** These TEWAs are located in a hayfield/pasture and their location will not impact any riparian vegetation. These TEWAs have been offset a minimum of 10 feet from this intermittent stream. Pacific Connector will utilize the measures outlined in the ECRP to minimize the potential for sedimentation and to ensure that adjacent areas are appropriately revegetated.

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MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
222.83	EL077	PABGx	UCSA 222.80-N	222	**Previously Disturbed Area – Excavated Pond** UCSA 222.08 encompasses this approximate 1.5-acre pond for potential water source/withdrawal purposes. If the pond is used as a water source for dust control or other purposes, all withdrawals would be permitted as necessary with the Oregon Department of Water Resources or landowner agreements.
225.00	ESI050 ESI051		Rock Source/Disposal MP 224.95	224	**Previously Disturbed Area** Rock Source/Disposal Site MP 224.95 is located in an existing quarry site and the boundaries were based on the site's existing limits. Pacific Connector will not affect these two small intermittent drainages with project activities at the site.
226.78 227.30	NW112 NDX111	PEMC R4SB2x	TEWA 225.15-N TEWA 226.80-W TEWA 227.25-W Construction ROW > 75 feet	226, 227	**Previously Disturbed Area – Irrigated Hayfield** The 95-foot construction right-of-way was maintained through this agricultural pasture wetland, and TEWAs 225.15-N and 226.84-W were not set back from the wetland because impacts to this low quality emergent wetland and irrigation ditch will be temporary, short-term and minor. TEWA 225.15-N is required for topsoil salvage and TEWA 226.84-W is necessary for the PI located at MP 226.87. TEWA 227.25-W is not set back from NDX111 because of the associated PI. Pacific Connector will minimize disturbance to irrigation ditch NW111 and will assure that the ditch is fully restored during restoration.
Project-wide	Waterbodies and Wetlands	Various	Various Uncleared Storage Areas (UCSA)	1 - 228	Pacific Connector requests a variance for the location of the uncleared storage areas (UCSAs) to be allowed within 50 feet of wetlands or waterbodies so that large woody debris can be stored on site and in close proximity to where it will be redistributed during restoration efforts. As defined in Resource Report 1 (Section 1.5.1) the UCSAs will be used to store forest slash, stumps, and dead and downed log materials that will be scattered across the right-of-way after construction. Pacific Connector requests this variance because forest and vegetation clearing and ground disturbance will not occur in these areas, therefore the potential for sedimentation to a wetland or waterbody is greatly minimized. Pacific Connector requests that the UCSAs be used to store large wood debris such as dead and downed logs and stumps which will be scattered over the right- of-way after construction. Other than large woody debris, woody material generally less than 8 inches in diameter would not be stored in the UCSA's within 50 feet of a wetland or waterbody. Pacific Connector expects that most of the existing large woody debris material may be sufficiently decayed, therefore minimizing the moving and handling of this material would be important so this material is not lost through the handling process.

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Pacific Connector's Proposed Site-Specific Variances to FERC's Wetland and Waterbody Procedures and Upland Plans

MP	Wetland	Cowardin Type	TEWA	Environmental Alignment Sheet	Variance Rationale
Project-wide	Various ditches and intermittent streams		Various	1 - 228	The project crosses numerous road ditches and intermittent streams that are not expected to be flowing at the time of construction. As defined by Section I.B.1. of FERC's Wetland and Waterbody Procedures, these features are not considered waterbodies and are therefore protected under FERC's Upland Plan. Pacific Connector will comply with this definition, except for intermittent streams on federal lands covered under the Northwest Forest Plan. Pacific Connector has generally provided minimum setbacks from these types of features and the TEWAs have been located outside these features where practical.
Project-wide but concentrated in the Klamath Basin 192 to 230.9	Numerous agricultural irrigation canals ditches and canals	R4UB3x	Various	192 - 228	A significant number of agricultural ditches and canals are traversed by the project in the Klamath Basin within agricultural croplands, pastures, and hayfields. These canals and ditches do not support riparian vegetation and adjacent areas are disturbed emergent and actively cultivated hayfields and pastures. Therefore, consistent with FERC's Wetland and Waterbody Procedures (Section V.B.2.a.), the locations of TEWAs have been located immediately adjacent to these waterbodies without a 50-foot setback to facilitate these crossings.
Project-wide	Refueling/Parking Various			1-228	Pacific Connector and their contractors will attempt to park all equipment overnight and fuel equipment at least 100 feet from waterbodies or in upland areas at least 100 feet from wetland boundaries. On BLM and Forest Service managed lands Pacific Connector would increase parking and refueling setbacks to 150 feet. These activities will only occur closer if the Environmental Inspector finds, in advance, no reasonable alternative and the contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill and the procedures outlined in Pacific Connector's SPCC plan is followed. On BLM and Forest Service manage lands any setback closer than 150 feet would require prior approval of an authorized USFS representative.
Project-wide	Various Hydrostatic/Dust Water Source Withdrawal TEWAs	Various	Various	1-228	Various TEWAs at the potential water source locations for hydrostatic test or dust control (see Table 1.6-2 in Resource Report 1 and Table 2.2-12) have been located within 50 feet of the source water to allow staging of necessary pumping equipment. Procedures outlined in the SPCC Plan would be implemented to ensure pumping equipment is adequately contained and refueling operations are properly controlled. Appropriate sediment control measures, as outlined in the ECRP will also be appropriately implemented, if necessary during these activities.

Treatment of Forest Slash and Variance from Section IV.F.3.e. of FERC's Upland Plan

Slash from timber clearing will be salvaged on or at the edge of the right-of-way and scattered/redistributed across the right-of-way during final cleanup and reclamation according to BLM and Forest Service fuel loading specifications to minimize fire hazard risks. This material will be pulled back onto the right-of- way during final cleanup after seeding. **If during final redistribution significant disturbance occurs to seeded areas the EIs will ensure that supplemental hand broadcast seeding occurs to ensure adequate seed coverage for erosion control.** Where it is not feasible to pull the slash back onto the right-of-way after seeding, seeding in these areas (broadcast or hydroseeding) will occur with specifications to ensure adequate seed coverage. Scattering the slash across the right-of-way will hinder Off Road Vehicle (ORV) traffic on the right-of-way and will act as a natural mulch to minimize erosion.

Because more than 1 ton per acre of woody material (logs, slash and chips) may be scattered across the right-of-way during final cleanup in many areas, **Pacific Connector requests a variance from Section IV. F. 3. e. of FERC's Upland Plan.** Pacific Connector will utilize the fuel loading standards of the BLM and the Forest Service as the limit for the quantity of woody debris that will be distributed across the right-of-way to minimize fire hazard risks for this variance request. **Section IV. F. 3. e. of FERC's Upland Plan** states that if wood chips are used as mulch to not use more than 1 ton per acre of chips and to add an equivalent of 11 lbs of available nitrogen where chips are used as mulch. The purpose of Section IV.F.3.e. of FERC's Upland Plan is to ensure that revegetation efforts are not hindered due to the decaying process of large amounts of wood chips which can bind-up soil nitrogen and impede revegetation. Pacific Connector requests this variance because it will be impractical and infeasible to remove this material from the right-of-way and it is a typical sivilcultural practice in the project area (i.e., forest slash left in logged areas). Furthermore, it is expected that the woody slash material will not deplete soil nitrogen in the short-term, during revegetation establishment, because the size of the woody material that will be scattered on the right-of-way will be large and will not readily decay in the short-term. The Forest Service and BLM fuel loading requirements that Pacific Connector would follow are provided in Section 1.6.1 of Resource Report 1.

Topsoil Salvaging on Forest Lands Where requested by Landowner

Along the alignment where topsoil segregation is proposed, Pacific Connector has requested 10 feet of temporary extra work area in addition to the 95-foot construction right-of-way to effectively conduct topsoil salvaging on level terrain. The purpose of this temporary extra work area is to ensure that the topsoil is segregated and kept separate from the trench subsoil. In steep forested landscapes, it is impractical to salvage topsoil based on topographic and vegetation conditions (i.e., large trees/stumps that would have to be removed in order to accomplish the task). The Forest Service has requested that topsoil be salvaged on NFS lands. However, Pacific Connector is **requesting a variance from Section IV.B.1 (4) of FERC's Upland Plan which specifies that topsoil be salvaged according to landowner requests.** Pacific Connector requests this variance on all forest lands managed by the Forest Service, BLM, or private landowners. The purpose of the variance is to prevent the need for additional temporary extra work areas (and associated disturbance) on NFS lands to conduct the topsoil segregation. The alignment mainly traverses forested habitats through NFS lands which are primarily designated as LSR. Resource Report 8 provides a more detailed discussion of LSRs.

According to Forest Service Standards and Guidelines, LSRs are managed with an objective to protect and enhance habitat for late-successional and old- growth related species. Limited silvicultural treatments are permitted in LSRs. It is Pacific Connector's opinion that widening the proposed 95-foot construction right-of-way to 105 feet, and likely even more on steep terrain, to accommodate topsoil salvaging, would create more long-term impacts in these habitats than is practical or warranted. The construction footprint has been purposefully restricted in LSRs to minimize overall project disturbance. This has been accomplished by reducing the total number of temporary extra work areas in LSRs and limiting these work areas to the minimum size necessary.

In forested habitats, the temporary extra work area that would be required to segregate the topsoil on NFS lands would be considered a long-term impact because of the time required to reestablish LSR forest stand characteristics. In forested areas, topsoil would be segregated from the trench line and spoil storage areas, and this topsoil would be returned to the same area after trench backfilling. This topsoil segregation area would coincide with the 50-foot permanent easement and the 30-foot corridor centered over the pipeline that would be maintained in a shrub or herbaceous state to facilitate corrosion and leak surveys and for aerial surveillance according to DOT regulations (192.705 Transmission lines: Patrolling and 192.706 Transmission lines: Leakage surveys). Creating long-term impacts to LSR habitats by enlarging the construction right-of-way to segregate topsoil does not provide a benefit compared to the habitat lost. This is because the topsoil that would be segregated occurs in the area that would become the permanent easement. This area will be maintained in a shrub or herbaceous state. Again, Pacific Connector believes that creating long-term impacts from cutting additional forested areas and causing added disturbance in order to segregate topsoil is not reasonable or advantageous.

Pacific Connector will comply with Section VI. B. 2. h. of the FERC Procedures that specifies that the topsoil will be segregated in wetlands, except in areas where standing water is present or soils are saturated. Pacific Connector will comply with this measure in all wetlands crossed by the project including those in forested areas.

Pacific Connector acknowledges and understands the importance of the soil and topsoil resource and would comply with the Forest Service and BLM's request to salvage topsoil if practical on forestlands. However, for the reasons stated above, this request is unreasonable. Pacific Connector would apply the measure outlined in the ECRP to minimize adverse impacts to soil resources, minimize erosion and potential sedimentation, and to appropriately revegetate or reforest all disturbed areas. Pacific Connector will only maintain the 30-foot area centered over the pipeline during long-term operations with these activities typically occurring about every 3 to 5 years. Pacific Connector believes that by utilizing the measures outlined in the ECRP that impacts to site productivity will be minimized and the disturbed areas associated with the right-of-way will restored. The 30 foot area centered over the pipeline, would be converted to a non- forested condition through project maintenance activities. This area would coincide with the typical topsoil salvaging area, therefore, any loss of soil productivity in this area from soil mixing should not inhibit the vegetation communities that Pacific Connector would maintain on the right-of-way (i.e., herbaceous and shrub vegetation). Further, as described in the Resource Reports and the ECRP, slash from forest clearing operations including dead and downed logs and other woody material that occur within the right-of-way would be salvaged on the edge of the construction right-of-way for redistribution during restoration. This material would provide effective ground cover for erosion control, provide important organic matter for nutrient cycling and provide habitat for all forest species including moss, lichen, fungi and mollusks species, among others.

The use of clean gravel or native cobbles in coldwater fisheries

According to Section V.C.1. of FERC's Wetland and Waterbody Procedures, clean gravel or native cobbles for the upper 1 foot of trench backfill is required in all waterbodies that contain coldwater fisheries, regardless of stream substrate materials. Pacific Connector requests a variance from this Section of the Wetland and Waterbody Procedures in fish bearing streams that do not have gravel, cobble or other rock substrates. Many of these streams crossed by the project are remote and steep valley or ravine bottoms therefore hauling rock to these steams would create more disturbance and is impractical, especially where these streams do not have these substrate characteristics. In these waterbodies, Pacific Connector would backfill the trench with the native material excavated from the trench.

APPENDIX Q

Road Crossings on Federal Lands

TABLE Q-1

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
16.78 - 17.12	Powerline Access Rd	Dirt 2,3	Not Crossed	0.36	0	16
17.4	Menasha Logging Spur	Gravel 2,3	Not Crossed	0.84	0	16
17.4	South Sumner Rd	Gravel 1,2,3	Open Cut	2.44	0	16
19.83	Powerline Access Rd (BLM 27-12-23.0)	Gravel 2	Not Crossed	2.84	0	16
19.83	Hungry Mtn Rd (BLM 27-12-28.0)	Gravel 2	Open Cut	2.65	0	14
23.09	Fisher Rd (Private) including BLM 7-12-25)	Gravel 2,3	Open Cut	1.03	0	16
23.22	Unknown Rd	Dirt	Open Cut	0.07	0	16
23.99	Powerline Access Rd	Gravel	Open Cut	0.23	0	16
24.36	Hudson Rdg Tie - BLM Rd 27-11-17.1	Gravel	Not Crossed	0.36	0	16
24.36	Hudson Rdg Tie - BLM Rd 27-11-17.1	Gravel	Open Cut	0.28	0	16
24.55 - 24.81	Private logging Rd (BLM 27-11-30.1)	Gravel	Open Cut	0.74	0	14
24.99 - 25.14	Logging Spur - BLM 27-11-30.03	Gravel	In ROW	0.27	0	16
25.60 - 26.07	Logging Rd Menasha (BLM 27-11-30.1)	Gravel 1,2,3	Open Cut	1.98	0	14
26.95	Lee McKinley Rd (Middle Creek Rd)	Gravel 2	Open Cut	2.05	0	16
27.07	Dirt Two-Track	Pasture/Dirt 2,3	Not Crossed	0.61	0	10
28.5	Dora Ridge Rd - BLM 28-11.3.1	Gravel 2,3	Open Cut	5.55	0	20
28.53	Dora Ridge Rd - BLM 28-11.3.1	Gravel 2,3	OFF ROW	0.03	0	20
29.02	BLM 28-11-9 & 9.5 A (BLM) & B (Private)	Gravel 2,3	Open Cut	0.7	0	16
31.51	Dora Spur Rd-BLM 28-11-13.2 A&B	Gravel/Dirt,1,2,3	Not Crossed	0.38	0	14
31.69	Dora Thinning Rd - BLM 28-11-13.2	Gravel	Not Crossed	0.43	0	16
31.69 - 31.81	Back Dora - BLM 28-11-13.6	Gravel	In ROW	0.17	0	12
32.1	Dora Thinning Rd - BLM 28-11-13	Gravel	OFF ROW	1.52	0	14
33.74 - 33.80	Elk Mountain Loop - BLM 28-11-25.0	Paved	In ROW	0.51	0	20
34.02	Elk Creek Rd - BLM 28-11-29	Paved	Open Cut	7.44	0	20
35.33 - 35.80	Elk Creek Rd - BLM 28-11-29.0 (Access Rd 10 Miles from Sitkum Gravelford Co Rd 63)	Paved	In ROW	2.79	0	20
35.34 - 35.80	Elk Creek Rd - BLM 28-11-29.0	Paved	OFF ROW	4.65	0	16
35.8	Elk Creek Rd - BLM 28-11-29.0 & Big Creek - BLM 28-11-28	Paved	OFF ROW	3.28	0	14
35.83 - 36.11	Elk Creek Rd - BLM 28-11-29.0	Paved	In ROW	0.37	0	20
36.18	Logging Spur - BLM 28-10-29.0 28-10-29.2	Gravel	Open Cut	0.22	0	20
36.64 - 37.15	Elk Creek Rd - BLM 28-10-29.0	Paved	In ROW	1.26	0	20
37.15 - 37.22	Unknown BLM Logging Spur	Gravel	In ROW	0.08	0	20
38	Private Dr	Gravel 2,3	OFF ROW	0.21	0	10
38.06	BLM 28-10-27.2	Gravel	Open Cut	0.34	0	20
38.34 - 38.87	Weaver Sitkum Tie Rd	Paved	OFF ROW	3.44	0	16
38.34 - 38.87	Weaver Sitkum Tie Rd - BLM 28-10-9.4	Paved	In ROW	4.84	0	20
38.34 - 38.87	Chaney Rd - BLM 28-10-9.0A	Paved	OFF ROW	0.46	0	20
38.58	BLM 28-10-27.2	Gravel	Open Cut	0.24	0	20
38.87	Sandy Creek (BLM 29-10-15), Mainline Paved Access Rd 10.3 Miles from Hwy 42	Paved	Not Crossed	1.01	0	20
38.87	Sandy Creek - BLM 29-10-15	Paved	OFF ROW	6.26	0	14
38.87	Sandy Creek - BLM 29-10-2.1	Paved	OFF ROW	1.91	0	16
38.87	Big Creek Rd - BLM 29-11-28	Paved	OFF ROW	4.51	0	14

TABLE Q-1

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
39.35 - 39.85	Weaver Sitkum Tie Rd - BLM 28-10-9.4	Paved	In ROW	1.4	0	20
40.27 - 40.37	Weaver Sitkum Tie Rd - BLM 28-10-9.4	Paved	In ROW	0.6	0	20
40.68	Weaver Sitkum Tie Rd - BLM 28-10-9.4	Paved	Open Cut	0.55	0	20
41.19	Weaver Sitkum Tie Rd - BLM 28-10-9.4	Paved	Open Cut	0.22	0	20
41.19	Cawrse Rd - BLM 28-10-36	Gravel	Open Cut	0.15	0	16
41.32	Logging Spur	Gravel	Open Cut	0.17	0	16
41.37	Weaver Sitkum Tie Rd - BLM 28-10-9.4	Paved	Open Cut	0.43	0	20
41.39	BLM 28-9-31	Gravel	Open Cut	0.14	0	16
41.75	BLM 28-9-31.1	Gravel 1,2,3	Open Cut	0.12	0	16
42.03 - 42.50	Weaver Rd - BLM 28-8-18	Paved	In ROW	1.16	0	14
42.03 - 42.50	Weaver Rd - BLM 28-8-18	Dirt	Not Crossed	9.46	0	14
42.1	Camas Creek - BLM 29-9-6.3	Gravel	Open Cut	0.1	0	16
42.74 - 42.86	North Rock Creek – BLM 30-10-3	Paved	OFF ROW	0.66	0	14
42.74 - 42.86	North Rock Creek – BLM 30-10-3	Paved	In ROW	0.4	0	16
42.74 - 42.86	North Rock Creek – BLM 28-10-12	Paved	OFF ROW	4.9	0	20
42.74 - 42.86	S Fk Camas Creek Rd - BLM 28-9-20	Paved	OFF ROW	2.78	0	16
43.05	BLM 29-9-6.6	Gravel	Open Cut	0.14	0	16
43.05 - 43.10	North Rock Creek – BLM 30-10-3	Paved	In ROW	0.05	0	16
43.29 - 43.45	North Rock Creek - BLM 30-10-3	Paved	In ROW	2.94	0	16
43.29 - 43.45	North Rock Creek - BLM 30-10-3.0	Paved	OFF ROW	7.54	0	16
44	Signal Tree Lookout - BLM 29-9-33.4	Gravel	OFF ROW-COMM SITE	1.08	0	16
44.19	Plum Creek Timber Logging Rd - BLM 29-9-18.1	Dirt 1, 2, 3	Open Cut	2.3	0	16
44.52 - 44.87	BLM 29-9-9.3 & Pvt. RWA C-344 G.P.	Gravel 2	In ROW	0.38	0	16
44.87 - 45.23	Upper Signal Tree - BLM 28-9-9.1	Gravel 2	OFF ROW	2.05	0	20
44.87 - 45.23	Upper Signal Tree - BLM 28-9-35.0	Gravel 2	In ROW	1.33	0	20
44.87 - 45.23	Upper Signal Tree - BLM 28-9-35.0	Gravel 2	In ROW	0.05	0	20
45.24	BLM 29-9-9.2	Gravel	Open Cut	0.18	0	16
45.85 - 45.92	Upper Signal Tree - BLM 28-9-35	Dirt	OFF ROW	3.4	0	20
45.85 - 45.92	Upper Signal Tree - BLM 28-9-35	Paved	In ROW	0.61	0	16
46.51	Lower Signal Tree - BLM 29-9-36.0	Paved 1	Open Cut	12.37	0	14
47.07 - 47.66	Deep Creek - BLM 29-9-12.2	Gravel 2,3	In ROW	0.67	0	16
47.1	Holms Creek Spur - BLM 29-9-15.1	Gravel	Not Crossed	1.02	0	
47.10 - 47.71	Bingham Holmes Road - BLM 29-9-23	Gravel	In ROW	1.26	0	
48.16	Wildcat Creek Spur - BLM 29-9-14	Dirt	Open Cut	0.69	0	
48.21 - 48.40	Deep Creek - BLM 29-9-12.1	Gravel 2	In ROW	0.81	0	16
48.39 - 48.69	Deep Creek Spur BLM 29-9-13.0	Gravel 2	OFF ROW	0.31	0	16
48.39 - 48.69	Deep Creek Spur - BLM 29-9-13.0	Gravel 2	OFF ROW	0.22	0	16
48.44 - 48.67	Deep Creek Spur - BLM 29-9-13.0	Gravel 2	In ROW	0.3	0	16
48.69 - 49.15	Deep Creek Spur - BLM 29-9-13.2	Gravel 2	In ROW	0.5	0	16
49	Wildcat Rd	Paved	OFF ROW	1.38	0	10
49	Private Rd	Gravel	OFF ROW	0.38	0	10
52.62	Camas Mountain SP - BLM 29-8-9.3	Gravel 2,3	Open Cut	1.03	0	16
52.91	Private logging road (Camas Mountain SP - BLM 29-8-9.3)	Gravel 2,3	OFF ROW	0.45	0	16

TABLE Q-1

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
53.03	Private logging road (Camas Mountain SP - BLM 29-8-9.3)	Gravel 2,3	Open Cut	0.54	0	16
53.21 - 53.59	Shields Creek Spur - BLM 29-8-2.2	Gravel 2	In ROW	0.92	0	16
54.2	Shields Creek Spur- BLM 29-8-11 (Private)	Gravel 2	Open Cut	1.3	0	19
54.64	Shields Creek Spur- BLM 29-8-2.2 (Private)	Gravel 2	Open Cut	0.37	0	16
55.81	Berry Creek Access Rd - BLM 29-8-1	Paved	OFF ROW	1.1	0	20
59.62	McNabb Creek Rd - BLM 28-7-3	Gravel 1,2,3	Open Cut	0.35	0	16
62.52 - 63.62	D R Johnson (BLM 29-6-6.0)	Dirt/Gravel	OFF ROW	0.51	0	16
62.52 - 63.62	D R Johnson (BLM 29-6-6.0)	Dirt/Gravel 2,3	OFF ROW	0.37	0	16
62.52 - 63.62	D R Johnson (BLM 29-7-6.0)	Dirt/Gravel 2,3,4	In ROW	1.59	1	16
63.41	BLM 28-6-31 & BLM 28-6-32	Dirt/Gravel 1,2,3	Not Crossed	0.72	0	16
64.55 - 64.71	Private Rd - DG-090.500 – PLMP 58.3+4.87	Dirt 2,3,4	In ROW	1.15	0.18	16
75.04 - 75.65	Bilger Creek Rd - BLM 29-5-11	Rock 1,2,3,4	In ROW	4.84	0.05	16
75.8	Bilger Creek Spur- BLM 29-5-2.2	Dirt/Rock 1,2,3	Open Cut	0.25	0	16
79.89 - 80.42	Pack Saddle Rd - BLM 29-4-17	Gravel 1,2,3	In ROW	0.99	0	14
79.89 - 80.42	Pack Saddle Rd - BLM 29-4-20	Gravel 1,2,3	OFF ROW	1.12	0	20
82.75 - 83.76	Wood Creek Rd - BLM 29-4-35.0	Gravel 1,2,3	In ROW	2.61	0	16
82.97	Wood Creek Spur- BLM 29-4-27.3	Gravel 1,2,3	Open Cut	0.04	0	16
83.4	Wood Creek Spur- BLM 29-4-27	Gravel	Open Cut	0.33	0	16
86.46 - 87.38	High Noon Spur- BLM 29-3-31.3 & BLM 29-3-31.4	Gravel 2,3	In ROW	1.52	0	16
86.8	East Fork Wood Creek Rd – BLM 30-4-3/Private	Dirt 2,3	Open Cut	2.31	0	10
87.06	High Noon Spur - BLM 29-3-31.3, & Fate Creek Spur 30-3.6.1	Gravel 2,3	Open Cut	1.21	0	14
88.21 - 88.48	Fate Creek - BLM 30-3-6	Gravel 2,3	Open Cut	0.82	0	16
89.96	Bland Mtn Spur – BLM 30-3-17.1	Gravel 2,3	Open Cut	0.53	0	16
90.19	Bland Mtn – BLM 30-4-1	Gravel 2,3	Open Cut	3.8	0	16
90.19 - 90.36	Bland Mtn Spur - BLM 30-3-17.2	Gravel	In ROW	0.16	0	16
90.36 - 90.74	Lavadoure Crk Spur - 30-3-20.2	Dirt	In ROW	0.77	0	14
91.19 - 91.74	John Days Spur - BLM 30-3-28 (Wook Rd)	Dirt/Gravel 2,3	In ROW	3.15	0	16
92.63	St Johns Creek Spur - BLM 30-3-34.1	Gravel 2,3	Not Crossed	0.07	0	16
92.63	St Johns Creek Spur - BLM 30-3-34.1	Gravel 2,3	Open Cut	2.19	0	16
93.03 - 93.50	Unknown Rd	Dirt	In ROW	0.72	0	12
93.58 - 93.62	Corn Creek Spur - BLM 30-3-23	Gravel 2,3	Not Crossed	1.73	0	14
93.58 - 93.62	Corn Creek Rd - BLM 30-3-26	Gravel 2,3	OFF ROW	0.84	0	16
93.58 - 93.62	Corn Creek Spur - BLM 30-3-23.1	Gravel 2,3	OFF ROW	0.37	0	14
93.65	Unknown Spur	Dirt	Open Cut	0.1	0	12
93.74	Maize Ts Rd - BLM 30-3-23.5	Gravel 2,3	Open Cut	0.87	0	15
93.76 - 94.34	Unknown Private Rd	Gravel 2,3	In ROW	1.7	0	15
97.07	Academy Rd - 31-3-3	Dirt 2,3	Open Cut	0.62	0	10
97.07 - 97.66	Unknown Rd	Dirt	In ROW	0.7	0	14
97.67	Stouts Creek Spur- BLM 31-3-1.3	Gravel 2	Not Crossed	0.46	0	16
97.95	E Fk Stouts Creek Spur- BLM 31-3-3.1	Gravel 2	OFF ROW	1.65	0	16
97.95	E Fk Stouts Creek Spur- BLM 31-3-1	Gravel 2	Open Cut	1.01	0	16
97.95	E Fk Stouts Creek Spur- BLM 31-3-2.2	Gravel 2	OFF ROW	0.4	0	16
97.95	E Fk Stouts Creek Spur- BLM 31-3-2.1	Gravel 2	OFF ROW	0.58	0	16

TABLE Q-1

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
97.95	E Fk Stouts Creek Spur- BLM 31-3-34	Gravel 2	OFF ROW	1.42	0	16
97.96	Mighty Fine Ext Spur- BLM 31-3-1.4	Gravel	Open Cut	0.17	0	10
98.31 - 98.48	E. FK Stouts Creek Spur- BLM 31-3-	Dirt 2,3	In ROW	0.52	0	16
100.02 - 100.40	31-3-13; NonInv	Gravel 1,2,3	In ROW	0.41	0	16
100.40 - 100.67	FS 3220705	Gravel 1,2,3	In ROW	0.26	0	16
100.67 - 100.75	31-3-24; NonInv	Gravel 1,2,3,4	In ROW	1.29	0.72	16
101.57	FS 3220707 Spur	Dirt 2,3,4	Open Cut	0.44	0.16	14
101.77 - 101.92	FS 3220790	Dirt 2,3,4	Open Cut	0.5	0.04	14
102.25	FS 3220792	Dirt 2,3	In ROW	0.11	0	14
102.3	Green Butte FS 3220000	Gravel, 2, 3	Open cut	7.38	0	16
102.3	Green Butte FS 3220000	Gravel, 2, 3	OFF ROW	3.87	0	16
102.62 - 102.83	FS 3220792	Dirt 2,3	In ROW	0.58	0	14
103.95	FS 3230137	Gravel 2, 3, 4	Not Crossed	0.39	0	16
104.14	FS 3230136	Gravel 1, 2, 3, 4	Open Cut	0.39	0.02	14
104.24	FS 3230000	Gravel 2, 3	Open Cut	9.52	0	16
104.24	FS 3230000	Gravel 2, 3	OFF ROW	0.05	0	16
104.27	FS 3230100	Gravel, 1, 2, 3	Open Cut	0.68	0	14
104.27	FS 3230135	Gravel, 1, 2, 3	Not Crossed	0.27	0	14
104.83	FS 3230120	Dirt	Open Cut	0.28	0	14
104.84	FS 3230100	Gravel, 1, 2, 3	Open Cut	0.35	0	14
104.85	FS 3230121	Dirt	Open Cut	0.18	0	14
105.32	FS 3230100	Gravel 1, 2, 3	Open Cut	0.43	0	14
105.38 - 105.53	Wildcat Ridge Rd - FS 3200	Gravel 2, 3	In ROW	4.12	0	14
105.69 - 106.00	FS 3200255	Dirt 2, 3	In ROW	0.38	0	14
105.69 - 106.00	FS 3200255	Dirt 2, 3	Open Cut	0.12	0	14
106.13 - 106.37	FS 3200260	Gravel, 2, 3	In ROW	0.48	0	14
106.50 - 106.77	FS 3200269	Dirt	In ROW	0.35	0	14
106.77	FS 3200280	Gravel	In ROW	0.2	0	14
106.77 - 106.84	Wildcat Ridge Rd - FS 3200	Gravel 2	Not Crossed	0.91	0	14
106.77 - 107.10	FS 3200270	Dirt	In ROW	0.51	0	14
107.26 - 107.47	FS 3200300	Dirt	In ROW	0.25	0	14
107.43 - 107.63	FS 3200301	Dirt 2,3,4	In ROW	0.28	0.01	14
108.09	Wildcat Ridge Rd - FS 3200	Gravel 2	Open Cut	0.94	0	14
108.2	FS 3200330	Gravel	In ROW	0.23	0	14
108.32	Wildcat Ridge Rd - FS 3200	Gravel 2	Open Cut	0.9	0	14
108.88	E Fk T.S. FS 3200380	Gravel	Open Cut	0.13	0	10
108.96	Cow Creek/Wildcat Ridge Rd – FS 3200	Gravel 2	Open Cut	1.86	0	14
109.15	FS 3200500	Gravel 2	Open Cut	0.56	0	10
109.30 - 109.37	FS 3200500	Gravel 2	In ROW	0.41	0	10
109.59 - 109.68	FS 3200500	Gravel 2	In ROW	0.2	0	10
110.15 - 110.54	FS 3232891	Dirt 2,3	In ROW	0.48	0	10
110.4	Pevine Quarry FS 3232895, FS 3232896 and FS 3232898	Gravel	Not Crossed	0.6	0	10
110.55	South Fork Cow Creek USFS 3232	Gravel 2,3	Open Cut	8.66	0	16
111	Long Prarie Rd FS 3200600	Gravel 2,3	OFF ROW	4.47	0	14

TABLE Q-1

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
111.66 - 112.07	Wildcat Ridge Rd (Cow Creek Rd) - FS 3200000	Gravel 2,3	In ROW	4.67	0	14
112.07	FS 3200750	Gravel 2, 3	In ROW	0.45	0	14
112.56 - 112.94	FS 3200750	Gravel, 2, 3	In ROW	0.73	0	14
113.66	BLM 32-1-31.3	Dirt 2,3,4	Open Cut	3.13	0.24	16
115.13	Unknown Rd	Gravel, 2,3	Open Cut	1.08	0	16
115.36	Hardway MI - BLM 33-2-12	Gravel, 2,3	Open Cut	0.28	0	17
115.84	Dwinnel Rd - BLM 33-1-5	Gravel 2,3	Open Cut	2.71	0	16
116.33	Dwinnel Rd - BLM 33-1-5	Gravel 2,3	Open Cut	0.44	0	16
118.93	West Fork Creek Trail Rd	Paved	Open Cut	0.55	0	30
119.03	Cabin Canyon Rd (Trail Creek Spur- BLM 33-1-29.2	Dirt 2	Open Cut	1.14	0	14
119.7	Cabin Canyon MI - BLM 33-1-29.1	Dirt 2	Open Cut	1.17	0	16
120.28	Cabin Creek Ridge BLM 33-1-28	Dirt 2	Open Cut	1.1	0	14
120.45	Unknown	Dirt	Open Cut	0.21	0	14
123.08	Old Ferry – BLM 34-1-10	Gravel 2,3,4	Open Cut	3.09	0.26	14
124	Flounce Rock Comm Site	Gravel	OFF ROW-COMM SITE	4.58	0	14
124.97 - 125.13	Indian Creek Firebreak BLM 34-1-23	Gravel 2,3,4	Open Cut	2.4	0.68	10
125.40 - 125.56	Indian Creek Firebreak - BLM 34-1-23	Dirt, Rock 2,3	Open Cut	0.79	0	10
125.87	Indian Creek Firebreak - BLM 34-1-23	Dirt, Rock 2,3	Open Cut	0.4	0	10
126.27 - 126.59	Indian Creek Firebreak - BLM 34-1-23	Dirt, Rock 2, 3	Open Cut	0.67	0	10
126.64	Unknown Rd	Dirt 1,2,3	Open Cut	0.19	0	10
127.3	Indian Creek Firebreak - BLM 34-1-23	Dirt, Rock 2,3	Open Cut	3.27	0	10
128.06 - 128.17	BLM Rd 34-1W-23.2	Dirt 2,3,4	In ROW	0.7	4.2	16
128.17	Indian Creek Homesite - BLM 34-1-23.2	Dirt 2,3,4	OFF ROW	4.49	0.15	16
128.38	Unknown	Dirt	Open Cut	0.52	0	16
128.68	Reese Creek Spur - BLM 034-1E-30.3	Dirt 2,3,4	OFF ROW	0.55	0.2	14
128.68	Reese Creek Spur - BLM 034-1E-30.2	Dirt 2,3,4	OFF ROW	0.38	0.14	14
129	Indian Lake Reservoir Access	Gravel	OFF ROW	0.85	0	10
129.28	Reese Creek Spur - BLM 034-1E-30.1	Dirt 2,3,4	Open Cut	1.24	0.79	14
129.28	Reese Creek Spur - BLM 034-1E-32	Dirt 2,3	OFF ROW	1.17	0	14
133.34	Private Dr	Gravel 2	Open Cut	1.05	0	16
133.36	Unknown	Dirt	Bore	0.17	0	16
134.65	OBENCHAIN R/W - BLM 35-1E-18	Dirt 2,3	OFF ROW	2.07	0	16
134.65	Obenchain R/W - BLM 35-1E-11.1	Dirt 2,3	Open Cut	0.75	0	16
136.84	Geppert Butte Spur W - BLM 35-1E-13.1	Dirt 2,3,4	Open Cut	0.51	0.15	15
138.63	BLM 35-1E-13	Dirt 2,3	OFF ROW	0.64	0	16
140.31	Unknown	Dirt	Open Cut	0.04	0	
140.63	Salt Over Rd - BLM 36-2E-7.1	Dirt	Open Cut	0.05	0	
140.67	Hanscom Drway - BLM 35-2E-33	Dirt 2,3,4	OFF ROW	0.65	0.41	20
140.67	Unknown Rd	Dirt 2,3,4	Open Cut	0.31	0	20
141.45 - 141.80	Unnamed BLM Rd	Gravel	In ROW	0.56	0	
141.8	Salt Creek Access Rd - BLM 36-2E-7	Gravel 2,3	Open Cut	3.59	0	20
144.69	Salt Creek Rd - BLM 36-2E-19	Dirt	Open Cut	1.62	0	14
145.15	Salt Creek Rd (Gardner Road) BLM 36-2E-19	Gravel	OFF ROW	0.07	0	14
145.15	Salt Creek Rd (Gardner Road) BLM 36-2E-19	Gravel	Not Crossed	1.06	0	14

TABLE Q-1

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
150.15	Heppsie Mtn B Spur - BLM 37-2E-1	Gravel 2,3,4	OFF ROW	0.59	0.31	16
150.15	Heppsie Mtn B Spur - BLM 37-2E-1	Gravel 2,3,4	Open Cut	0.43	0	16
150.25 - 150.64	Heppsie Mtn Quarry Spur - BLM 37-2E-1.3 - (includes BLM 37-2E-1.1)	Gravel 2,3	Open Cut	2.28	0	16
150.35 - 150.64	Heppsie Mtn Quarry Spur - BLM 37-2E-1.3 - (includes BLM 37-2E-1.1)	Gravel 2,3	OFF ROW	1.64	0	18
150.98 - 151.57	BLM 37-3E-6.10	Dirt 2,3	In ROW	0.55	0	16
151.56	BLM 37-3E-6.10	Dirt 2,3	Open Cut	0.19	0	14
152.06 - 152.14	BLM 37-3E-6.10	Dirt 2,3	In ROW	0.43	0	14
152.08 - 152.31	Unknown Rd	Dirt	Open Cut	0.22	0	10
152.31	Heppsie Mtn Pond Spur - BLM 37-3E-6.3	Dirt	Open Cut	0.07	0	14
152.38	Heppsie Mtn Stub Spur - BLM 37-3E-6.4	Dirt	Open Cut	1.71	0	14
152.56	Heppsie Mtn Mainline - BLM 37-3E-31	Gravel 2,3	Open Cut	1.44	0	18
153.52	Heppsie Mtn Ridge Top Spur – BLM 37-3E-5.2	Dirt 2,3	Open Cut	0.17	0	12
153.8	Heppsie Mtn Mainline - BLM 36-3E-31	Gravel 2,3	Open Cut	0.22	0	18
155.45	Unknown Private Rd	Dirt 2,3	Open Cut	0.32	0	14
155.50 - 155.97	FS 2815410	Dirt, Gravel 2,3,4	In ROW	1.43	0.42	14
155.98	FS 2815415	Dirt	Open Cut	0.33	0	14
156.32	FS 2815415	Dirt	Open Cut	0.28	0	14
156.77	FS 2815000	Gravel 2,3	Open Cut	6.81	0	16
157.4	FS-2815320	Decommissioned 2,3,4	Open Cut	0.06	0.1	14
157.55	FS-2815300	Gravel,2,3	Open Cut	2.26	0	14
158.72 - 159.41	FS 3707500	Gravel 2,3	In ROW	2.72	0	16
159.99 - 160.62	S. Fk Little Butte Creek Rd – FS 3730	Dirt/Gravel 2,3	In ROW	1.97	0	20
160	Robinson Butte Comm Site –FS 3730050	Gravel	OFF ROW-COMM SITE	1.92	0	16
160.09	FS 3730180	Dirt	Open Cut	0.15	0	
160.41	FS 3730090	Decommissioned	Open Cut	0.24	0	
160.59	FS 3730070	Decommissioned	Open Cut	0.12	0	
160.62 - 160.73	FS 3700133	Rock 2,3	In ROW	0.15	0	14
160.76	FS 3700134 (Big Elk Cinder Pit)	Rock 2,3	Open Cut	0.48	0	14
160.76 - 160.91	FS 3700130	Gravel 2,3	Open Cut	0.7	0	18
160.85	FS 3700130	Gravel 2,3	Open Cut	0.05	0	18
161	FS 2800700	Gravel	OFF ROW	1	0	14
161.26	FS 3700131	Dirt 2,3	Open Cut	0.27	0	12
161.41	Big Elk Rd FS 3700000	Gravel 2	OFF ROW	4.61	0	16
161.41	Big Elk Rd FS 3700000	Paved	Open Cut	5.1	0	16
161.41	FS 3707000	Gravel (cinder)	OFF ROW	3.31	0	16
162	FS 2800800	Gravel	OFF ROW	0.7	0	18
162.02	FS 3700113	Dirt	Open Cut	0.22	0	
162.80 - 162.90	FS 3700113	Dirt 2,3	In ROW	0.55	0	14
163.14	FS 3700100	Gravel 2, 3	Open Cut	0.99	0	16
163.14 - 163.21	FS 3700115	Unknown	In ROW	0.28	0	
163.79 - 164.21	FS 3720180	Decommissioned	Open Cut	0.44	0	
163.95	FS 3720185	Decommissioned	Open Cut	0.09	0	

TABLE Q-1

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
164.21 - 165.93	FS 3720000	Gravel 2	Open Cut	3.53	0	16
164.3	FS 3720190	Decommissioned	Open Cut	0.04	0	
164.4	FS 3720180	Decommissioned	Open Cut	0.16	0	
165.68	FS 3705000	Dirt	Open Cut	4.52	0	20
165.72	FS 3720500	Gravel 2	Not Crossed	0.2	0	16
166.1	Brown Mtn Rd – FS 3720510	Decommissioned 2,3,4	Open Cut	0.31	0.48	14
166.45	FS 3720520	Gravel 2,3	Open Cut	0.78	0	16
167.31	FS 3720000 Daley Creek Rd	Gravel 2,3	Open Cut	3.19	0	16
167.51 - 167.69	FS 3720820	Dirt	Open Cut	0.48	0	
168.28 - 168.68	West Muddy Springs FS 3700750	Gravel 2	In ROW	0.91	0	14
168.42	FS 3700754	Dirt	Open Cut	0.29	0	
168.84	Dead Indian Memorial Rd	Paved	Open Cut	8.38	0	10
168.85	FS 3700240	Paved	OFF ROW	0.54	0	10
168.92	FS 3800991	Dirt	Open Cut	0.35	0	
169.1	FS 3800990	Dirt	Open Cut	0.37	0	
169.34	FS 3800996	Dirt	Open Cut	0.19	0	
170.85	FS 3800960	Dirt 2,3	Open Cut	0.03	0	14
170.97	FS Unauthorized Rd	Dirt 2,3	Open Cut	0.03	0	10
171.09	FS 3800950 Spencer Creek Quarry	Dirt 2,3	Open Cut	0.11	0	14
171.41	Private Rd.	Dirt 2,3	Open Cut	0.16	0	16
171.6	FS 3800940	Dirt 2,3	Open Cut	0.18	0	16
172.08	FS 3800900	Dirt 2,3	Open Cut	0.11	0	14
172.24 - 172.31	FS 3800903	Dirt 1,2,3	Open Cut	0.23	0	14
172.57	FS 3850 (Desolation)	Gravel 2,3	Open Cut	0.26	0	16
173.02	BLM 38-5-12 (NonInv)	Dirt 2,3	Open Cut	0.11	0	16
173.29	FS 3800820	Dirt	Open Cut	0.15	0	14
174.17	FS 3800790	Gravel 2,3	Open Cut	0.22	0	14
174.68	FS 3852 (Buck Peak)	Gravel 2,3	Open Cut	0.04	0	16
175.38 - 175.47	FS 3852015	Dirt 2,3	Open Cut	0.18	0	16
175.64 - 176.02	Unknown Rd	Dirt	In ROW	0.53	0	16
176.36	Private Rd (Closed Berm)	Dirt 2,3	Open Cut	0.03	0	16
176.66	BLM 38-6E-21.2 (N. Clover)	Rock 2,3	Open Cut	0.06	0	14
177.81	BLM 38-6E-27.1 (Clover Spur)	Rock 2,3	Open Cut	0.1	0	14
178.3	BLM 38-6E-27 Weyco Clover Spur	Gravel 2,3	Open Cut	0.18	0	14
179.25	BLM 38-6E-35.4 (S Clover Butte)	Rock 2,3	Open Cut	0.11	0	14
179.81	BLM 38-6E-35 (3828 Clover Butte)	Rock 2,3	Open Cut	0.06	0	14
184.81	Private Rd 101-100 - BLM 39-9E-18	Gravel 2,3	OFF ROW	2.04	0	16

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
1.46R	Jordan Cove Rd	Paved	Not Crossed	0.31	0	16
1.64R	Southern Pacific Service Rd	Gravel	Bore	0.25	0	10
1.68R	Private Rd	Gravel	Open Cut	0.26	0	10
4.14R	North Bay Dr	Paved	Open Cut	1.87	0	10
4.30R - 4.81R	Private Logging Spur	Dirt	In ROW	1.04	0	10
4.97R - 5.10R	Private Logging Spur	Gravel	In ROW	0.35	0	10
5.30R - 6.00R	Private Logging Spur	Gravel	In ROW	0.45	0	10
5.30R - 6.00R	Private Logging Spur	Dirt	In ROW	0.41	0	10
5.54R	Private Logging Spur	Dirt	Open Cut	0.15	0	
5.64R	Private Logging Spur	Dirt	Open Cut	0.14	0	
5.64R	Private Logging Spur	Dirt	Open Cut	0.12	0	
5.6R	Private Logging Road	Paved/Gravel	OFF ROW	0.8	0	10
5.6R	Private Logging Road	Gravel	OFF ROW	0.37	0	10
6.31R	Private Logging Road	Gravel	OFF ROW	0.93	0	10
6.31R	Kentuck Slough Rd (Kentuck Way Ln)	Paved	Bore	0.52	0	10
6.64R - 7.34R	Logging Spur	Dirt	In ROW	0.81	0	10
7.34R	Logging Rd	Gravel	Not Crossed	0.06	0	10
7.34R - 7.44R	Carlton Heights Rd	Paved/Gravel	In ROW	1.24	0	10
7.44R	E Bay Dr	Paved	OFF ROW	0.21	0	10
7.73R	Logging Spur	Dirt	Open Cut	0.08	0	10
7.77R - 7.86R	Logging Spur	Dirt	Open Cut	0.8	0	10
7.88R - 8.12R	Logging Spur	Dirt	Open Cut	0.35	0	10
8.17R	Logging Spur	Dirt	Open Cut	0.2	0	10
8.44R	Willanch Slough	Paved	Open Cut	1.63	0	10
8.93R	Logging Spur	Dirt	Open Cut	0.66	0	10
12.08R	Lillian Ln/Messerle Logging Rd	Dirt 2,3,4	Open Cut	2.09	0.03	16
9.27R - 9.49R	Unknown Rd	Gravel/Dirt	In ROW	1.91	0	
9.40R	Noah Butte Rd	Gravel	Open Cut	1.6	0	10
9.49R - 9.74R	Unknown Rd	Dirt/Gravel 1,2,3,4	Open Cut	1.28	0.36	
9.94R	Unknown Rd	Dirt 1,2,3	Not Crossed	0.2	0	
10.20R	Unknown Rd	Dirt 1,2,3	Open Cut	0.7	0	
10.54R - 10.61R	Unknown Rd	Gravel/Dirt 1,2,3	In ROW	1.19	0	
11.41R	Private Road	Gravel	Open Cut	0.35	0	
8.25	Coos River Highway Co - Rd 241	Paved	HDD	0.54	0	16
8.95 - 9.59	Lillian Ln/Messerle Logging Rd	Dirt 2,3,4	Open Cut	2.09	0.03	16
10.04	Private Dr	Gravel	Open Cut	0.2	0	16
10.19	Stock Slough Ln	Paved	Open Cut	1.2	0	16
10.39	Raven Wood Ln	Gravel 1,2	Open Cut	0.32	0	16
10.59	Private Ln to McGinnis-Weeker Etc	Gravel 1,2	Open Cut	0.09	0	16
10.71	Private Ln to McGinnis-Weeker Etc	Paved	Open Cut	0.53	0	16
10.74	Private Ln to Woytus	Paved	Open Cut	0.43	0	16
10.96	Private Road	Gravel	Not Crossed	0.14	0	
11.08	East Catching Slough Rd	Paved	Bore	1	0	16
11.15	West Catching Slough Rd	Dirt 2	Not Crossed	0.41	0	16

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
11.33	Anchor Dr (Farm Rd)	Dirt 2	Open Cut	0.65	0	16
11.64	Private Rd	Gravel 2,3	Open Cut	0.96	0	16
11.69	Private Rd	Gravel	Open Cut	0.17	0	16
11.88	Private Rd	Gravel	Open Cut	0.26	0	16
11.96	Old Wagon Rd (aka East Side Sumner Rd)	Paved	Open Cut	1.08	0	16
12.58	Roseburg Logging Rd (Alderwood Dr)	Paved/ Dirt	Open Cut	0.13	0	16
12.77	Roseburg Logging Rd & Spur	Dirt 2	Open Cut	0.17	0	16
12.79	Alder Wood Ln & Skyline Dr	Gravel 2	Not Crossed	1.18	0	16
12.79 - 12.94	BPA Powerline Rd & Roseburg Logging Rd	Gravel 2	OFF ROW	0.39	0	16
12.94	BPA Powerline Rd & Roseburg Logging Rd	Gravel 2	Open Cut	0.4	0	16
13.21 - 13.42	Roseburg Logging Rd & Spur	Dirt 2	Open Cut	0.97	0	16
13.74	Coos Sumner Ln	Gravel 2,3	Open Cut	0.34	0	16
14	Private Rd	Unknown	OFF ROW	0.91	0	10
14.23	Coos City - Sumner Rd	Paved	Open Cut	3.56	0	16
14.28	Doyle Ln	Gravel 2	Open Cut	0.07	0	16
14.60 - 15.01	Menasha Logging Spur	Dirt 2,3	In ROW	0.41	0	16
14.91	Menasha Logging Spur	Dirt 2,3	Open Cut	0.22	0	16
15.16	Messerle Logging Spur	Dirt 1,2,3	Open Cut	0.51	0	16
15.67	Logging Rd	Gravel 2,3	Open Cut	0.18	0	16
15.7	Boone Creek Rd	Gravel 2,3	Open Cut	0.53	0	16
16.04	Powerline Access (Emineth Pvt Rd)	Gravel 2,3	Open Cut	0.65	0	16
16.42	Powerline Access Rd	Dirt 2,3	Not Crossed	0.18	0	16
16.59	Private Rd	Dirt 2,3	Open Cut	0.43	0	16
17.79	Powerline Access Rd	Dirt 2,3	Open Cut	0.49	0	16
17.82 - 18.08	Menasha Logging Spur	Gravel	Open Cut	0.38	0	16
17.88	Menasha Logging Spur	Gravel	Open Cut	0.07	0	16
18.43 - 18.52	Menasha Logging Spur	Gravel 1,2,3	Open Cut	0.59	0	10
18.61	Menasha Logging Spur	Gravel 2,3	Open Cut	1.31	0	16
19.24	Coos Co Sheep - Logging Rd	Dirt 1,2,3	Open Cut	0.25	0	10
19.45	Coos Co Sheep - Logging Rd	Gravel/Dirt	Open Cut	0.59	0	16
19.45 - 19.58	Powerline Access Rd	Gravel/Dirt	Open Cut	0.18	0	16
20	Blue Ridge Comm Site	Gravel	OFF ROW-COMM SITE	3.74	0	16
20.73	Powerline Access Rd	Dirt 2,3	Not Crossed	0.11	0	16
21.09	Logging Spur	Gravel 2,3	Open Cut	0.14	0	16
21.98	Powerline Access	Dirt 2,3	Open Cut	0.32	0	14
22.19	Powerline Access	Gravel/Dirt 2,3	Open Cut	1.18	0	16
22.39	Powerline Access Rd	Gravel	Open Cut	0.28	0	16
22.57	Private Dr	Gravel	Open Cut	0.05	0	
22.58	Fairview-Laverne Park Rd	Paved	Open Cut	5.46	0	16
23.9	Unknown Rd	Dirt	Open Cut	0.32	0	
24.1	Coos Bay Wagon Rd	Paved	Open Cut	1.02	0	16
24.55	Coos Bay Wagon Rd	Paved	Open Cut	6.71	0	16
25.15	Powerline Access Rds	Dirt	Open Cut	0.52	0	10

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
26.08 - 26.65	Menasha Pvt. Logging spur	Dirt/Gravel	In ROW	0.78	0	10
26.65	Powerline Access Rd	Dirt 2,3	Open Cut	0.53	0	16
26.65 - 26.75	Logging Spur	Dirt	In ROW	0.28	0	10
27.52 - 28.15	Logging Rd	Dirt 1,2,3	In ROW	1.89	0	16
29.14	Lone Rock Logging Rd	Gravel 2,3	Open Cut	0.26	0	16
29.21	Lone Rock Logging Rd	Gravel 2,3	Open Cut	1.22	0	16
29.27 - 29.45	Lone Rock Logging Rd	Gravel 2,3	Open Cut	0.3	0	16
29.47	Lone Rock Logging Rd	Gravel 2,3	Open Cut	0.27	0	16
29.59	Myrtle Point - Sitkum Rd	Paved	Open Cut	9.63	0	16
30.38 - 31.49	Logging Spur	Gravel/Dirt,1,2,3	In ROW	1.28	0	16
31.30 - 31.46	Logging Spur	Gravel	Open Cut	0.27	0	10
32.35	Private Logging Spur	Gravel 1,2,3	Open Cut	0.1	0	16
32.55	Logging Rd	Gravel/Dirt 2.3	Open Cut	1.78	0	16
32.55	Golden Brick Rd	Gravel/Dirt 2.3	OFF ROW	0.31	0	16
32.94	Logging Spur	Gravel/Dirt 1,2.3	Open Cut	0.43	0	10
33.25	Unknown Rd	Dirt	Open Cut	0.44	0	10
33.37	Unknown Rd	Dirt	Open Cut	0.39	0	10
34.31	Gold Brick Rd	Gravel/Dirt 1,2,3	Open Cut	0.37	0	16
34.37	Logging Spur	Gravel 1,2,3	Open Cut	0.18	0	10
34.42	Logging Rd	Dirt 2,3	Open Cut	0.34	0	16
34.44 - 34.52	Logging Spur	Dirt 2,3	Open Cut	0.2	0	16
34.69	Logging Rd	Gravel 2	Open Cut	1.49	0	16
34.71 - 35.04	Logging Spur	Gravel	In ROW	0.42	0	10
38.98 - 39.22	Plum Creek Logging Spur - CO-171	Dirt/Gravel	In ROW	0.61	0	16
39.60 - 39.72	Tri-W Group Logging Spur	Gravel/Dirt	In ROW	0.33	0	16
39.94	Tri-W Group Logging Spur	Gravel 2	Not Crossed	0.04	0	16
40.02	Tri-W Group Access Spur	Dirt 1,2,3	Not Crossed	0.11	0	16
40.61	Tri-W Group Access Spur	Gravel	Open Cut	0.15	0	16
40.8	Logging Spur	Dirt	Open Cut	0.11	0	16
40.93	Logging Spur	Dirt	Open Cut	0.11	0	16
42.37 - 42.51	Plum Creek Logging Spur CO-177 2 Plum Logging Spur	Dirt/Gravel	In ROW	0.14	0	16
42.5	Unknown	Gravel	OFF ROW	0.32	0	16
42.68	Plum Creek Logging Spur - CO-177 3	Gravel	Open Cut	0.4	0	16
42.94 - 43.05	Logging Spur	Gravel	Open Cut	0.13	0	16
43.63	BLM 29-9-8	Gravel 2	Open Cut	0.16	0	14
43.63 - 43.90	Lone Rock Logging Spur - CO-177.2R	Gravel 2,3	In ROW	0.32	0	10
44.29	Plum Crk Logging Spur Upper Rock	Dirt 1, 2, 3	Open Cut	0.37	0	16
45.50 - 45.70	Unknown Logging Rd	Dirt	In ROW	0.32	0	16
45.75	Plum Creek Logging Rd	Dirt	Open Cut	0.21	0	16
45.8	Logging Spur	Gravel 2,3	Open Cut	0.23	0	16
45.92 - 46.35	Plum Creek Logging Spur	Dirt/Gravel 2,3	In ROW	0.62	0	16
45.92 - 46.40	Plum Creek Logging Spur	Dirt/Gravel 2,3	OFF ROW	0.07	0	16
46.51	Unknown Rd	Dirt	OFF ROW	0.19	0	16
46.72	Logging Spur	Gravel 1,2	OFF ROW	0.16	0	16

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
46.72	Logging Spur	Gravel 1,2	OFF ROW	0.03	0	16
46.74	Logging Spur	Gravel 1,2	Open Cut	0.69	0	16
46.81	Unknown Rd	Gravel	Open Cut	0.1	0	
49.76	Upper Camas County Rd CoRd 128	Paved	Open Cut	2.27	0	10
49.76	Baldwin Rd	Paved	Off ROW	0.23	0	10
49.8	Weaver Tie Rd	Paved	Not Crossed	2.77	0	
49.8	Lang Creek Road	Paved	Not Crossed	0.36	0	
50	Private Rd	Gravel	OFF ROW	0.49	0	10
50.2	Private Farm Rd	Dirt	Open Cut	0.07	0	16
50.46	Private Rd	Gravel/Dirt	Open Cut	0.23	0	16
50.55 - 50.75	Barnes Private Rd	Dirt/Gravel	In ROW	0.42	0	16
50.83	Kirkendall Rd	Paved	Open Cut	0.25	0	10
51.31-51.37	Private Rd	Dirt	Open Cut	0.2	0	16
51.54	State Hwy 42	Paved	OFF ROW	0.43	0	14
51.54	State Hwy 42	Paved	Bore	0.94	0	14
51.54	Quiet Mountain Rd	Paved	Bore	0.4	0	14
51.96	Private Rd	Gravel	Open Cut	0.52	0	16
52.04	Private Rd	Gravel	Open Cut	0.51	0	10
52.16	Private Rd	Gravel	Open Cut	0.52	0	10
53.74	Logging Spur	Gravel	Open Cut	0.17	0	16
54.21 - 54.35	Logging Spur	Gravel	In ROW	0.14	0	14
54.64	Shields Creek Spur- 29-8-2.2 (Private)	Gravel 2	OFF ROW	1.51	0	16
54.81 - 55.01	Seneca Logging Spur	Dirt/Gravel	In ROW	0.26	0	16
55.81	Ireland CoRd 140	Paved	Bore	0.62	0	16
55.81	Berry Creek Rd CoRd 365	Paved	OFF ROW	2.85	0	16
56.06	Private Dr	Gravel	Open Cut	0.15	0	16
56.12	Private Dr	Gravel	Open Cut	0.14	0	16
56.16	Private Dr	Gravel	Open Cut	0.17	0	16
56.2	Private Dr DG-039	Gravel	Open Cut	0.13	0	16
56.32	Private Dr DG-041	Gravel	Open Cut	0.1	0	16
56.74	Benedict Rd CoRd 141	Paved	OFF ROW	1.21	0	16
56.74	Ireland CoRd 140	Paved	Open Cut	1.74	0	16
56.91	Private Dr	Gravel 2	Open Cut	0.06	0	16
57.1	Private Dr	Gravel 2	Open Cut	0.12	0	14
57.35	Private Dr	Gravel 2	Open Cut	0.06	0	14
57.6	Olalla Rd CoRD 38	Paved	OFF ROW	2.61	0	16
57.6	Upper Olalla - CoRd 38	Paved	Open Cut	0.29	0	16
58.19	Private Rd	Dirt 1,2	Open Cut	0.2	0	16
58.65	Private Rd	Dirt 1,2,3	OFF ROW	0.93	0	16
58.65	Private Rd	Dirt 1,2,3	Open Cut	0.31	0	16
59.34	Private Rd	Dirt	Open Cut	0.25	0	16
59.6	Private Rd	Gravel 2	Open Cut	0.11	0	16
60.02	Private Rd	Dirt 1,2,3,4	Open Cut	0.44	0.11	16
60.58	Hoover Hill Rd	Paved	OFF ROW	2.01	0	16

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
60.58	Olivant Rd - 28-7-34 (Private)	Gravel 2	Open Cut	0.58	0	16
61.9	Nichols Bros Private Rd Logging Rd	Dirt 2,3,4	Not Crossed	0.44	0.16	16
61.90 - 62.44	John Clarke DG-075	Dirt 2,3	In ROW	0.63	0	16
63.91	Kent Creek - CoRD 100	Paved	OFF ROW	0.11	0	14
63.92	Kent Creek - CoRD 100	Paved	Open Cut	1.68	0	14
64.17	Unknown Rd	Dirt	Open Cut	0.05	0	16
64.90 - 65.35	Private Rd - DG-090.500	Dirt/Gravel	In ROW	0.48	0	16
65.6	Private Dr	Gravel	Not Crossed	0.22	0	16
65.82	Rice Creek CoRD 43	Paved	Open Cut	0.95	0	16
66.21	Private Rd - DG-098.000	Gravel 2,3	Open Cut	0.34	0	16
66.37 - 66.47	Private Rd - DG-099.000	Gravel 2,3	Open Cut	0.98	0	16
66.88	Willis Creek Rd - 88A	Paved	Open Cut	0.83	0	14
66.9	Private Rd Track 106	Dirt	Open Cut	0.14	0	16
66.97	Private Rd	Dirt	Open Cut	0.62	0	16
67.19 - 67.30	Barton Private Rd	Dirt 2,3	In ROW	0.59	0	16
67.58	Barton Private Rd	Dirt/Gravel 2,3,4	Not Crossed	1.72	0.04	16
67.58 - 68.36	Private Rd Barton, Sumner, Brambila	Dirt 2,3	In ROW	0.79	0	16
67.67	Private Rd	Dirt	Open Cut	0.44	0	16
68-59 - 68.88	Unknown Rd	Unknown	In ROW	0.52	0	
68.07 - 68-39	Barton Private Rd	Unknown	In ROW	0.84	0	
68.6	Private Rd - Petty Brambila	Dirt/Gravel 2,3,4	Open Cut	1.14	0.03	16
68.94	Old 99 State Hwy	Paved	Open Cut	2.3	0	14
69.3	Private Dr	Unknown	Open Cut	0.49	0	
70.46	Edies Ln	Gravel	Open Cut	1.16	0	
71.22	I-5	Paved	HDD	0.53	0	
71.33	Dole - CoRD 14	Paved	HDD	6.47	0	14
72.05	Unknown Rd	Dirt 1,2,3,4	Open Cut	0.33	0.12	
72.23 - 72.61	Unknown Rd	Dirt 1,2,3,4	Open Cut	0.53	0.2	
73.58	Unknown Rd	Dirt/Gravel 1,2,3,4	Not Crossed	3.14	0.5	
73.62 - 74.39	Clarks Branch CoRD 105	Gravel 2,3	OFF ROW	6.1	0	16
74.32 - 74.73	Gow Ranch Private	Gravel 2,3,4	Open Cut	1	0.11	16
74.74 - 74.99	Gow Ranch Private	Gravel 2,3,4	In ROW	1.46	0.24	10
74.97 - 75.11	Gow Ranch Private	Dirt 1,2,3	Open Cut	0.82	0	16
75	Harness Mountain Comm Site	Gravel	OFF ROW-COMM SITE	6.14	0	10
75.80 - 75.93	Private Rd - Logging Spur	Gravel	In ROW	0.14	0	16
76.35	Bilger Creek - CoRD 103	Gravel	Open Cut	1.31	0	16
76.58	Unknown Rd	Dirt/Gravel 1,2,3,4	Open Cut	0.42	0.04	
76.84	Unknown Rd	Dirt/Gravel 1,2,3	Open Cut	0.99	0	
77.07 - 77.12	Unknown Private Rd	Dirt/Gravel 1,2,3	In ROW	1.37	0	
77.31	Unknown Rd	Dirt/Gravel 1,2,3	Open Cut	0.19	0	
77.61	Private Road (Davis, Wayne)	Dirt/Gravel 1,2,3	Open Cut	0.49	0	
77.88 - 77.98	Little Lick Private Rd	Dirt 1,2,3,4	Open Cut	1.22	0.17	16
78	Private Rd to Big Lick Res.	Gravel	OFF ROW	1.73	0	10

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
78.98	North Myrtle - CoRD 15	Paved	Open Cut	5.72	0	14
79.56	Clack Private Rd	Dirt/Gravel 1,2,3,4	Open Cut	1.39	0.43	16
79.56	Clack Private Rd	Dirt/Gravel 1,2,3	OFF ROW	0.41	0	14
79.6	Powerline Access Rd	Dirt 1,2,3,4	Open Cut	0.22	0.09	
80.71 - 80.73	Roseburg Forest Products	Dirt/Gravel	Open Cut	0.14	0	10
80.92	Powerline Private Rd	Gravel	Open Cut	0.16	0	10
81.09	Roseburg Forest Products	Gravel	Open Cut	0.56	0	16
81.15	South Myrtle - Co RD 18	Paved	Open Cut	8.2	0	24
81.68	Private Road (Sutch, Steve)	Unknown	Open Cut	0.51	0	
82.23 - 82.42	Unknown Rd	Dirt	In ROW	0.29	0	
82.42	Unknown Rd	Dirt	Open Cut	0.45	0	
82.64	Unknown Rd	Dirt	Not Crossed	0.21	0	
84.05	Unknown Rd	Dirt/Gravel 1,2,3	Open Cut	0.32	0	10
84.16	Roseburg Resources	Dirt	Open Cut	0.2	0	16
84.22	Wood Creek – CoRD 92	Gravel	Open Cut	1.27	0	16
85.78	Unknown Rd	Dirt 1,2,3	Open Cut	0.7	0	10
87.95	Eichmann Logging Spur	Dirt	Open Cut	0.63	0	16
88.09	Eichmann	Dirt 1, 2, 3	Open Cut	0.09	0	16
88.09	Private Dr	Gravel/Dirt 2,3		0.18	0	
88.53	Days Creek - CoRD 34	Paved	Open Cut	2.19	0	14
88.69	Private Ln	Gravel	Open Cut	0.07	0	16
88.77	Calley Logging Spur	Dirt	Open Cut	0.23	0	16
88.93	Seneca Jones Private Rd	Dirt	Open Cut	0.48	0	16
89.07	Seneca Jones Private Rd	Dirt	Open Cut	0.18	0	16
89.10 - 89.28	Unknown Rd	Dirt	In ROW	0.18	0	16
89.27 - 89.50	Seneca Jones Private Rd 7 & 8	Dirt, Gravel 2,3,4	In ROW	1.64	0.1	16
89.27 - 89.50	Seneca Jones Private Rd 7 & 8	Dirt, Gravel 2,3	In ROW	0.37	0	16
89.74 - 88.87	New Logging Spur	Dirt 2,3	In ROW	0.29	0	16
90.85	Lavadoure Creek - BLM 30-3-2-.2	Gravel	OFF ROW	3.96	0	16
90.86 - 90.93	Unknown Spur	Dirt	In ROW	0.08	0	12
90.88 - 91.19	Unknown Spur	Dirt	In ROW	0.52	0	12
91.96	St Johns Creek Spur 1	Dirt 2,3	Open Cut	0.25	0	16
92.29	St Johns Creek Spur 1	Dirt 2,3	Open Cut	1.1	0	16
92.36	St Johns Creek Spur 2	Gravel 2,3	Open Cut	0.21	0	16
94.68	State Hwy 227 Tiller Trail Hwy	Paved	Open Cut	8.77	0	14
94.81	Milo & Academy Dr	Paved	OFF ROW	0.43	0	16
95.51	Academy Rd - 31-3-3	Gravel, 1, 2, 3, 4	Open Cut	1.93	0.02	16
96.33	Academy Rd - 31-3-3	Dirt/Gravel 1,2,3	Open Cut	0.86	0	10
96.33	Academy Rd - 31-3-2.3	Dirt/Gravel 1,2,3	Open Cut	0.81	0	10
96.33	E Fk Stouts Creek Rd - 31-3-2.1	Dirt/Gravel 1,2,3	Open Cut	0.2	0	10
96.67 - 96.91	Private Rd 1.1	Gravel 2,3	In ROW	0.49	0	16
98.48 - 99.29	Unknown Private Rd	Dirt 2,3, 4	In ROW	1.22	0.1	16
100.76	Unknown	Dirt	Open Cut	0.19	0	16
103.60 - 103.66	C&D Lumber	Dirt/Gravel, 2, 3, 4	In ROW	0.31	0	16

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
103.79	C&D Lumber	Gravel 2, 3, 4	Open Cut	0.37	0.28	16
103.93	C&D Lumber	Gravel 2, 3, 4	Open Cut	0.22	0	16
113.37	Unknown Rd	Dirt 2,3,4	Not Crossed	0.13	0	16
113.49	Unknown Rd	Dirt 2,3,4	Not Crossed	0.2	0.12	16
114.08	Unknown Rd	Dirt	Open Cut	0.2	0	16
116.08	Old Ben Ex 33-1-7.2	Gravel 2,3	Open Cut	0.19	0	16
117.85	Morris Taylor Dr	Dirt 2, 3, 4	Open Cut	1.71	1.78	16
118.25	Morris Taylor Dr	Dirt 2, 3, 4	Open Cut	0.09	0	16
118.57	Morris Taylor Dr	Dirt 2, 3, 4	Open Cut	0.23	0	16
118.79	Morris Taylor Dr	Dirt 2, 3, 4	Open Cut	0.66	0	16
120.05	Unknown Rd	Dirt 2	Open Cut	0.57	0	14
120.55	Loper Ln	Dirt/Gravel 2,3	OFF ROW	0.05	0	16
120.55	Loper Ln	Dirt/Gravel 2,3	Open Cut	0.31	0	16
120.85 - 120.91	Private Dr	Dirt/Gravel 2,3	Open Cut	1.78	0	16
121.8	Unknown Rd	Dirt/Gravel 1,2,3	Open Cut	0.61	0	10
122.05	Private Rd	Gravel	Not Crossed	0.3	0	16
122.36	Private Rd	Dirt 2, 3, 4	HDD	0.31	0.01	16
122.54	Ragsdale Rd	Paved	HDD	0.59	0	16
122.58	Old Trail Creek Rd.	Gravel, Paved 2,3	HDD	0.22	0	16
122.6	State Hwy 62	Paved, Concrete	HDD	0.5	0	10
122.76	2500-3013 Old Ferry Rd	Gravel 2,3	HDD	0.08	0	16
122.99	2500-3013 Old Ferry Rd	Gravel 2,3,4	Open Cut	0.58	0	16
129.67	Unknown Rd	Dirt 2,3,4	Open Cut	1.11	0.5	16
129.9	Powerline Rd	Dirt	Open Cut	0.13	0	16
130.23	Unknown Rd	Dirt 2,3,4	Open Cut	0.92	0.5	16
130.81	Crawfoot Rd	Paved	Open Cut	2.54	0	16
132.47	Butte Falls Hwy	Paved	Open Cut	3.57	0	16
133.47	Medford Aqueduct	Dirt	Open Cut	0.12	0	16
133.55	Unknown	Dirt	Open Cut	0.12	0	16
133.59	Medford Aqueduct Access Rd – BLM 34-1E-35	Dirt 2,3	Open Cut	1.79	0	16
133.98 - 134.14	Unknown Rd	Dirt	In ROW	0.53	0	16
134.14	Unknown Rd	Dirt 2,3,4	Open Cut	1.8	0.5	16
134.27	Unknown Rd	Dirt 2,3	Open Cut	0.25	0	16
134.87	Unknown Rd	Dirt 2,3	Open Cut	0.26	0	16
135.53	Unknown Rd	Dirt 2,3,4	Open Cut	0.81	0.29	16
136.13	Unknown Rd	Dirt 2,3,4	Open Cut	0.92	0.33	16
136.3	Unknown Rd	Dirt 2,3,4	Open Cut	0.22	0.08	16
136.46	Unknown Rd	Dirt 2,3,4	OFF ROW	0.41	0.15	16
136.46	Unknown Rd	Dirt 2,3,4	Open Cut	0.26	0.09	16
137.14	Unknown Rd	Dirt 2,3,4	Open Cut	0.23	0.08	16
137.3	Obenchain Rd	Gravel, Paved 2	Open Cut	2.33	0	16
138.08	Terbeck Existing Access	Dirt 2,3,4	Open Cut	0.21	0.08	16
138.63	Unknown Rd	Dirt 2,3,4	Open Cut	0.83	0.08	16
139.06	Unknown Rd	Dirt 2,3	Open Cut	0.64	0	16

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
139.45	Unknown Rd	Dirt 2,3	Open Cut	0.33	0	16
142.09	Unknown Rd	Dirt 2,3	Open Cut	0.07	0	16
142.59	Unknown Rd	Dirt 2,3,4	Open Cut	0.52	0.33	16
142.8	Unknown Rd	Dirt 1,2,3	Open Cut	0.57	0	
143.64	Unknown Rd	Dirt 2,3,4	Open Cut	2.48	0.07	16
144.06	Unknown Rd	Dirt 1,2,3,	Open Cut	1.32	0	16
145.2	Private Rd	Gravel	Open Cut	0.69	0	16
145.38	Private Rd	Gravel	Open Cut	0.52	0	16
145.58	Lake of the Woods - State Hwy 140	Paved	Bore	10.11	0	10
145.98	Unknown Rd	Dirt 2,3	Open Cut	0.08	0	16
146.2	Unknown Rd	Dirt 2,3	Open Cut	0.32	0	16
146.81	Hanley South Canal Rd	Dirt 2,3	Open Cut	2.66	0	14
147	Private Dr	Gravel	OFF ROW	0.07	0	10
147.68	Unknown Rd	Gravel 2,3	Open Cut	1.43	0	16
147.76 - 148.00	Unknown Rd	Dirt	Open Cut	0.5	0	10
148	Private Dr	Gravel	OFF ROW	0.15	0	10
151.68	Unknown Rd	Dirt 2,3	Open Cut	0.12	0	16
151.77	Unknown Rd	Dirt 2,3	Open Cut	0.18	0	16
152.99	Unknown Rd	Dirt 2,3,4	Open Cut	0.78	0.27	12
155.03	Unknown Private Rd	Dirt 2,3	Open Cut	0.37	0	14
169.5	Unknown Rd	Dirt/Gravel	Open Cut	0.1	0	10
169.52 - 170.96	Clover Creek Rd - CoRd 603	Paved	Not Crossed	21.37	0	10
169.75	Unknown Rd	Dirt/Gravel	Open Cut	0.08	0	10
172.8	Unknown Rd	Dirt	Open Cut	0.19	0	
177.1	Private Rd (Section 21)	Rock 2,3	Open Cut	0.03	0	16
177.99	Rock Rd2 (Section 27)	Rock 2,3	Open Cut	0.03	0	16
178.26 - 178.28	Private Rd	Gravel 2,3	In ROW	0.38	0	16
178.76	Private Rd	Rock 2,3	Open Cut	0.56	0	16
180.36	206-59 (Private Rd)	Gravel 2,3	Open Cut	0.04	0	16
180.79	Private Rd	Rock 2,3	Open Cut	2.87	0	16
181	Private Rd	Dirt 2,3	Open Cut	0.14	0	16
181.33	Private Rd	Dirt 2,3	Open Cut	0.41	0	16
181.55	Private Rd	Dirt 2,3	Open Cut	0.04	0	16
182.13	Private Rd	Gravel (cinder) 2,3	Open Cut	0.07	0	16
182.16	Private Rd	Gravel (cinder) 2,3	Open Cut	0.45	0	16
182.49	201-50 - Private Rd	Rock 2,3	Open Cut	0.6	0	16
182.98	201-50 - Private Rd	Rock 2,3	Open Cut	0.58	0	16
183.6	201-50 - Private Rd	Rock 2,3	Open Cut	0.3	0	16
183.64	North Branch Rd – County 3451	Rock 2,3	Open Cut	0.16	0	16
183.79	Unknown Rd	Dirt 2,3	Open Cut	0.04	0	16
184.07	Unknown Rd	Dirt/Cinder 2,3	Open Cut	0.13	0	16
184.81	Private Rd UST-100	Gravel 2,3	OFF ROW	3.73	0	16
184.81	Private Rd 85105	Gravel 2,3	Open Cut	1.89	0	16
185.26	Unknown Rd	Gravel (cinder) 2,3	Open Cut	0.07	0	16

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
185.53	Unknown Rd	Gravel (cinder) 2,3	Open Cut	0.04	0	10
185.68	Unknown Rd	Gravel (cinder) 2,3	Open Cut	0.07	0	16
185.94	Unknown Rd	Dirt 2,3	Open Cut	0.04	0	16
186.2	Unknown Rd	Dirt 2,3	Open Cut	0.06	0	10
186.75	Unknown Rd	Dirt 2,3,4	Open Cut	0.05	0	16
187.46	Unknown Rd - PAR 187.46 (BVA 13)	Gravel	Open Cut	0.1	0	16
187.76	Power Line Access Road	Dirt	Open Cut	0.85	0	16
187.84	Unknown Rd	Dirt	Open Cut	0.04	0	
188.09	Unknown Rd	Dirt	Open Cut	0.08	0	
188.17	Unknown Rd	Dirt	Open Cut	0.35	0	
188.41	Unknown	Dirt	Open Cut	0.19	0	
188.86	Unknown Rd	Dirt 1,2,3	Open Cut	0.4	0	
189.9	Old Wagon Rd	Dirt	OFF ROW	1.19	0	10
190.63	Homestead Ln	Dirt 2	Open Cut	1.09	0	16
192.03	Hwy 66	Paved	Open Cut	7.02	0	10
192.13	Rd on Levee	Gravel 2,4	Open Cut	0.51	0	16
192.57 - 197.61	Weyerhaeuser Timber Company Rd	Paved 1	Not Crossed	5.46	0	16
192.571	Weyerhaeuser Timber Company Rd	Paved 1	OFF ROW	0.23	0	16
194.52	Kerns Swamp Rd	Gravel 2	Open Cut	0.18	0	16
195.14	Unknown Rd	Dirt	Open Cut	0.04	0	10
197.61	Weyerhaeuser Corp Rds	Paved	Open Cut	0.21	0	16
198.22 - 198.42	Weyerhaeuser Corp Rd	Paved	Open Cut	1.33	0	16
198.42 - 199.00	Weyerhaeuser Corp Rds	Gravel	In ROW	0.71	0	16
198.63	Weyerhaeuser Corp Rd	Paved	Open Cut	0.23	0	16
199.19	Unknown Industrial Rd	Gravel	Not Crossed	0.94	0	16
199.28	BN & SF Railroad	Rails	HDD	0.26	0	
199.57	Hwy 97	Paved	HDD	1.61	0	10
199.6	Private Rd	Gravel	Not Crossed	0.07	0	16
200.07	Southern Pacific RR	Rails	Bore	0.25	0	
200.35	Joe Wright Rd	Paved	Open Cut	1.68	0	16
201	Midland Hwy - Tingley Ln	Paved	Open Cut	1.61	0	10
201.49	Miller Island Rd/Drway	Gravel 2,4	Open Cut	0.53	0.07	16
202.92-203.61	Unknown Rd	Dirt	In ROW	0.95	0	
203.76	Unknown Rd	Dirt	Open Cut	0.19	0	
203.97	Old Midland Rd/Drway	Paved	Open Cut	1.35	0	10
204.13	Rd on Levee - BOR 735	Dirt 2	Open Cut	0.25	0	16
204.32	Road on Levee - BOR 736	Dirt 2	Open Cut	0.34	0	16
204.65	Spring Lake Rd - CoRd 876	Paved	Open Cut	0.51	0	10
204.75	Existing Field/Canal Rd - BOR 737	Dirt 2	Open Cut	0.14	0	16
204.99	Existing Farm Rd - BOR 738	Dirt 2	Open Cut	0.12	0	16
205.07	Existing Field/Canal Rd -BOR 738	Dirt 2	Not Crossed	0.33	0	16
205.39	Existing Field Rd - BOR 739	Dirt 2	Open Cut	0.29	0	16
205.64	Existing Field Rd - BOR 739	Dirt 2	Open Cut	0.16	0	16
205.72	Homedale Rd - CoRd 830	Paved	Open Cut	1.1	0	10

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
205.97	Rd on Levee	Dirt	Open Cut	0.64	0	
206.5	Cross Rd	Paved	Open Cut	1.17	0	10
207.27	Matney Rd - CoRd 889	Paved	Open Cut	1.01	0	10
207.41	Levee Rd - CoRd 962	Gravel 2	Open Cut	0.22	0	16
207.7	Unknown Rd	Gravel 2	Not Crossed	0.21	0	16
207.98	Rd on Levee - BOR 742	Dirt 2	Not Crossed	0.16	0	16
208	Rd on Levee - BOR 742	Dirt 2	Not Crossed	0.03	0	16
208.17	Unknown Rd	Dirt	Open Cut	0.03	0	
208.18	Unknown Rd	Dirt/Gravel 2	Open Cut	0.18	0	16
208.72	TAR-208.72 to TEWA 208.67-W	Dirt 2		0.16	0	16
208.78	Southern Pacific RR	Rails	Bore	0.07	0	
208.8	State Hwy 39	Paved	Bore	5.1	0	10
209	Stukel Mountain Comm Site	Gravel	OFF ROW-COMM SITE	6.09	0	14
209.04	Cheyne/Elliot Rd	Paved	Open Cut	0.29	0	
209.14	Matney Rd - Zuckerman Rd	Paved	Open Cut	0.61	0	
210.16	Wong Rd - CoRd 918	Paved	Open Cut	0.91	0	16
210.27	Rd on Levee - BOR 743	Dirt 2	Open Cut	0.26	0	16
210.63	Chin Rd - CoRd 982	Gravel 2	Open Cut	0.31	0	16
210.86	17987 Hwy 39 - Driveway BOR 744	Gravel 2	Open Cut	0.05	0	16
211.2	18191 Hwy 39 - Driveway BOR 745	Gravel 2	Open Cut	0.06	0	16
211.53 - 211.86	IOOF Cemetery Rd	Gravel 2	Not Crossed	0.38	0	16
211.86	Private Dr	Dirt 2	Open Cut	0.42	0	16
212.52	Burlington Northern & Santa Fe RR	Rails	Bore	0.05	0	
213.05	Gaston Drway (off Hill Rd) – BOR 746	Gravel 2	Open Cut	0.83	0	16
213.25	Rd on Levee	Dirt	Open Cut	0.33	0	
214.17	Road on Levee	Dirt	Open Cut	0.35	0	
214.31	Hill Rd - CoRd 566	Paved	Open Cut	1.6	0	10
214.7	Private Dr	Gravel 2	Not Crossed	0.23	0	16
215.06	Unknown Rd	Dirt 2	Open Cut	0.1	0	16
215.13	Unknown Rd	Dirt	Open Cut	0.05	0	
215.39 - 215.65	Powerline Access Rd	Dirt	Open Cut	3	0	16
215.72	Taylor Rd	Dirt	Not Crossed	0.37	0	10
217.5	Unknown Rd	Dirt 2	Open Cut	0.43	0	16
217.54	Unknown Rd	Dirt 2	Open Cut	0.09	0	16
217.82	Patricia Ln	Gravel 2	Open Cut	0.05	0	16
217.84	Unknown Rd	Gravel 2	Open Cut	0.06	0	16
217.93	Dodds Hollow Rd	Gravel 2	Open Cut	1.93	0	16
218.31	Unknown Rd	Gravel 2	Open Cut	0.15	0	16
218.84	Pope Rd	Dirt, Paved, Gravel 2,4	Open Cut	3.09	0.02	16
218.84 - 218.90	Private Dr	Gravel 2	Not Crossed	0.07	0	16
218.90 - 221.28	Powerline Access Rd	Dirt 2, 4	Open Cut	3.14	0.79	16
219.36	Unknown Rd	Dirt 1,2,3	Open Cut	0.56	0	16
219.59	Unknown Rd	Dirt 1,2,3	Open Cut	1.28	0	16

TABLE Q-2

Access Roads to and Roads Crossed by the Pacific Connector Pipeline on Non-Federal Lands

Milepost	Name	Surface	Crossing Method	Length	Acres of Improvement	Average Width
219.66	Unknown Rd	Dirt 1,2,3	Open Cut	0.18	0	16
221.29	Powerline Access Rd	Dirt 2	Open Cut	0.53	0	16
221.56	Unknown Rd	Dirt 2	Open Cut	0.27	0	16
221.85	Unknown Rd	Dirt 2	Open Cut	0.46	0	16
221.99	Harpold Rd	Paved	Open Cut	1.37	0	10
223.17	29029 Pickett	Gravel 2,4	Open Cut	0.49	0.12	16
223.43	Shasta View Irrigation	Dirt 2,4	Open Cut	0.49	0.03	16
223.68	UKNOWN RD	Dirt	Open Cut	0.05	0	
223.82	30083 Pickett	Dirt, Gravel 2,4	Open Cut	0.48	0.12	16
223.95	30403 Pickett	Dirt	Open Cut	0.05	0	
224.19	Unknown Rd	Dirt	Open Cut	0.05	0	
224.53	Unknown Rd	Dirt 2	Open Cut	0.8	0	16
225.14	Maupin Rd	Paved	Open Cut	2.4	0	16
225.14	Pickett Rd	Paved	OFF ROW	2.79	0	16
225.31	Unknown Rd	Dirt	Open Cut	0.04	0	
225.92	Unnamed Rd	Dirt 2	Open Cut	1.58	0	16
226.4	Unnamed Rd	Dirt 2	Open Cut	0.75	0	16
226.4	Unnamed Rd	Dirt 2	OFF ROW	0.5	0	16
227.03	Transformer Rd	Paved	Open Cut	1	0	16
227.63	More Lock Rd	Gravel 2	Open Cut	0.52	0	16
227.74	More Lock Rd	Gravel 2	Open Cut	0.23	0	16
227.88	More Lock Rd	Gravel 2	Open Cut	0.25	0	16
228.36	Malin Loop Rd	Paved	OFF ROW	0.44	0	16

APPENDIX R

Federal Lands Review

R-1. **Visual Quality Assessments for the Pacific Connector Gas Pipeline on the Rogue River and Winema National Forests**

R-2. **Analysis of Potential Impacts to Wilderness, Inventoried Roadless Areas, Potential Wilderness Areas and Other Undeveloped Areas from the Construction and Operation of the Proposed PCGP Project, Umpqua, Rogue River, and Winema National Forests**

R-3. **Winter Range Standard and Guideline Compliance, Rogue River National Forest**

R-4. **Connectivity and Diversity Block Assessment, Coos Bay and Roseburg District BLM**

R-5. **Analysis of Bureau of Land Management Areas with Wilderness Characteristics**

R-6. **Consistency Determination, Pacific Connector Gas Pipeline Project and Upper Rock Creek Area of Critical Environmental Concern**

R-7. **Risk Assessment for the Proposed Pacific Connector Gas Pipeline For Compliance with the Requirements of Resource Management Plans of the Coos Bay, Roseburg and Medford Districts as Amended by the Record of Decision and Resource Management Plan Amendment for Management of Port-Orford Cedar in Southwest Oregon, Coos Bay, Roseburg and Medford Districts Coos, Curry, Douglas and Josephine Counties**

R-8. **Visual Resource Analysis**

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

Appendix R-1

Visual Quality Assessments for the Pacific Connector Gas Pipeline on the Rogue River and Winema National Forests

Pacific Connector Gas Pipeline

Rogue River, and Winema National Forests

Prepared for:

USDA Forest Service

Prepared by:

Donna Mattson, Forest Service Consulting Landscape Architect, in Collaboration with North State Resources

Draft EIS

Pacific Connector Gas Pipeline
Scenery Management Analysis
and
Mitigation Recommendations

Prepared by
Donna M. Mattson
Consulting Landscape Architect, US Forest Service
Reviewed by
Christina Lilienthal, Lead National Forest Landscape Architect for the PCGP Project
March 25, 2009

The Pacific Connector Pipeline project traverses three National Forests along its route from Coos Bay to Klamath Falls. These Forests use the Visual Management System, (VMS) to manage the visual resources and to analyze visual effects of proposed projects. The VMS uses a rating system known as Visual Quality Objectives, (VQO) to establish standards for scenery resource management.

The Visual Management System, Handbook 462 was published in 1974. Since then, Handbook 701 updates the most current Forest Service direction for scenery management. The Landscape Aesthetics, Scenery Management System utilizes a very similar rating system as the VMS that is used to evaluate project impacts to the visual quality. In addition, an appendix has been adopted to address the stability of scenic attributes as well as the direct visual effects of a project. Appendix J utilizes a scenic stability indicator to rate the stability of scenic attributes and how a project will affect that stability. The three Forests involved in the PCGP route have not formally adopted the Scenery Management System as Forest Plan standards. However, the direction to the Forest Service has been, since 1996, to incorporate the new system as we work on new projects. This analysis will utilize the existing visual quality objectives established in the forest plans of the Rogue River-Siskiyou, Fremont-Winema and Umpqua National Forests, as well as apply the scenic stability indicator of Appendix J to address the conditions and trends that may place the scenery attributes and the proposed and recommended restoration efforts at risk.

The proponent Aesthetics Management Plan proposes restoration efforts and some minimal mitigation measures that broadly address the effects to scenery. However, where the route is in areas where the Visual Quality Objective is partial retention or retention these measures will not meet these objectives within the target time frame. This analysis has examined these areas and the proposed mitigations within the proponents Aesthetics Management Plan and shows why the proponents AMP falls short of the Forest(s) objectives for visual resources. This analysis looks at the proponents AMP, and then makes recommendations for mitigation measures recommended to improve the restoration and mitigation efforts. and determines what VQO would be met.

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The Pacific Connector Gas Pipeline route traverses National Forest lands in areas that have very rocky and porous soils. It is expected that restoration efforts related to revegetation may require lengthy periods of time to meet the visual quality objectives. This is particularly true on the eastern side of the Cascade Range where rainfall is significantly less, the temperatures are colder and the species selection for revegetation is more limited.

PCGP Aesthetics Management Plan
(Interpretations from the Proponents Plan to Mitigate Scenic Quality Effects)

Construction Effects
The construction of this gas pipeline will require a 95 to 75 foot construction zone. This construction zone will be clear cut and leveled from one side to the other for construction safety. At the edges of this construction zone, the uncleared storage areas will be used to store equipment during construction as well as excess boulders and root wads. Temporary extra work areas will also be cleared and leveled during the construction phase of this project beyond the construction zone. The clearing of the right-of-way will create a sharp edged linear feature across a contiguously forested landscape. The excavation will expose subgrade soils that will contrast with the color of the forest canopy. It is expected that the amount of boulders and root wads will be excessive in this landscape making it difficult to dispose of in a manner that will not affect scenery. Boulders scattered on top of the ground do not appear natural and root wads with cut stumps are very distracting if found in more than occasional amounts. The compaction of soils and loss of topsoil caused by construction equipment will affect the success of proposed revegetation.

Right-of-way Maintenance Effects
A thirty foot corridor centered directly above the pipeline shall be maintained for the fifty year life of the pipeline by removing trees greater than 15 feet and vegetation greater than 6 feet in height.
Depending on the methods of clearing, the effects could be similar to road brushing which uses a thrashing technique that leaves a rough brushed appearance immediately after clearing. The 30 foot corridor, once the construction zone is revegetated and allowed to rehabilitate; will appear as a linear feature that is incongruent with natural terrain or even typical corridors such as roads that gradually climb the side hill rather than rise directly up a slope.

The construction techniques proposed by the proponent in designated visually sensitive areas are as follows:

a. Strategically place construction debris (slash, boulders, stumps,
b. Shape and blend the right of way to the extent practicable to conform with preconstruction contours and the characteristic landscape
c. Rock and log barriers used to prevent passage of OHV's.

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d. Utilize rock and boulder material generated during construction as trench backfill material where appropriate.
e. Unknown storage methods to ensure enhancement and mitigation of visual resources along the right of way to the extent they are practicable and safe.
f. Revegetate all disturbed areas and replant trees in temporary extra work areas (TEWAs) that were previously forested.
g. Plant a row or cluster of trees and/or shrubs across the right of way to provide visual screens at key road and trail crossings in sensitive viewsheds.

Specific Mitigation for Key Observation Points

Big Elk Road (MP 161.41)

a. "Neck-down" construction zone across road from 95' to 75'
b. Route shall cross directly perpendicular to the road
c. Revegetate with native trees, shrubs, and plants
d. Plant a row or cluster of trees and/or shrubs across the right of way to provide visual screens at key road and trail crossings in sensitive viewsheds.
e. Shorten the potential visual corridor by turning the corridor on both sides of the crossing
f. UCSA's eliminated within "necked-down" zones.

Pacific Crest Trail (PCT)

a. "Neck-down" construction zone from 95' to 75' across the trail
b. UCSA's eliminated within "necked-down" zones.
c. Shorten the potential visual corridor by turning the corridor on both ends of the crossing
d. Plant a row or cluster of trees and/or shrubs across the right of way to provide visual screens at trail crossing
e. Revegetate with native trees, shrubs, and plants

Dead Indian Memorial Road

a. "Neck-down" construction zone from 95' to 75' across the road
b. UCSA's eliminated within "necked-down" zones.
c. Shorten the potential visual corridor by turning the corridor on both ends of the crossing
d. Plant a row or cluster of trees and/or shrubs across the right of way to provide visual screens at road crossing
e. Revegetate with native trees, shrubs, and plants
f. Place barrier to discourage Off-highway vehicle use

Clover Creek Road

a. Relocate Block Valve 12
b. Regrade to approximate original contour

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c. Reseed construction right-of-way (ROW) area
d. Scatter slash across the right of way
e. Replant with seedlings

Site Specific Analysis of Affects on Scenery Resources

Big Elk Road Crossing

Forest Plan Standards
VQO- Foreground Retention

Visibility
The pipeline crosses Big Elk Road (FS RD 37) in a west-east alignment which runs through a mixed conifer forest. The route would be viewed from a foreground distance; however, the duration of the view is very short for those traveling on the highway at an average speed of 50mph. The broad 75' construction swath perpendicular to the road will attract the eye because of the existing vegetation that creates a tunnel effect along the roadway. The visual effect of a cleared corridor will be similar to an intersecting road. The corridor will be the single deviation from the contiguous edge of the timber along the road.

Visual Absorption Capability
The heavy timber canopy is very contiguous, decreasing the visual absorption capability. The terrain is very flat in this area. The view of the ROW is limited by the width and depth to which the viewer can see down the ROW. The Visual absorption capability is not a factor in immediate foreground viewing situations.

Visual Effects
The immediate visual effects created by the ROW will be a strong linear feature with strong edges at each side. The color contrast of the exposed soils will be evident, and the scale of the opening will be uncharacteristic to the surrounding landscape. The berm, boulders, and root wads created to block OHV users from accessing the site will draw attention to the corridor as these negative elements detract from the natural appearing landscape.

Seasonal Changes
The ROW corridor will be most evident in the winter when the snow creates the strongest contrast to the coniferous forest. Spring, summer, and fall will be similar in effects other than the changing color of the seeded grasses and shrubs.

Expected Results of Proposed Mitigation
The immediate effects of the PCGP corridor to the visual resource are unacceptable modification. The 75' swath with the tall adjacent tree line edges will be uncharacteristic to the surrounding landscape. A small cluster of trees a

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height less than 40' in height will not screen the open swath created by the corridor. The logs and boulders proposed to be strewn across the PCGP are unacceptable. Placing root wads in the uncleared storage areas is an unacceptable practice in all areas that are visible, regardless of the sensitivity level. After the grasses and shrubs begin to grow, the soil color contrast will be reduced as the exposed soils are covered. Shrubs will add texture and color variation to the flat plane.

It is expected that creating openings in this area will create frost pockets and hamper revegetation efforts. Revegetation could take as long as 20-30 years if successful at all. This is seen in strip cut harvests in the area that have taken 30 years to revegetate. Once the PCGP corridor is revegetated the cleared width will be reduced to a minimum of 30 feet in width. The expected results of the proponents restoration efforts will eventually meet modification, but not within five years. It is expected that it could take 20 to 30 years to fully revegetate and at this time the project is expected to meet partial retention.

Forest Service Mitigation Measures

Potential/Recommended Forest Service Mitigation Measures

The following mitigation measures shall be done in the construction ROW and TEWAs from the edge of Big Elk Road to where the corridor makes the turn and is no longer visible from the Big Elk Road.

1.0 Soil Color Contrast Mitigation

1.1 Chip slash to: a. mulch ROW to manage slash production, b. reduce soil erosion, and, c. retain soil moisture to increase revegetation success.

1.2 Where using hydro-mulch to avoid erosion, use colorant (commercially available) dark brownish green to reduce color contrast.

2.0 Edge/Form Mitigation

2.1 Scallop edges by removing trees in areas designated by the forest service landscape architect in consultation with Pacific Connector's Environmental Inspector(s) to reduce the straight linear edge, and change shadow cast patterns.

2.2 Feather edges of ROW by cutting some tall trees (40'+) along the immediate edge, leaving trees of heights at 10-40' in height for a distance of 50-100'. Feathering shall be done in accordance to advisement of forest service landscape architect and in coordination with Pacific Connector's EI(s).

3.0 Revegetate for Reduction of Width and Improving Form

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3.1 Transplant trees of 15' to 20' height into the ROW in clusters by using a tree spade to immediately reduce the sharp linear edge, and break up the wide barren swath. Transplant 15- 20 trees per 1/8th mile to blend the corridor into existing tree densities, in accordance to advisement of forest service landscape architect and in coordination with Pacific Connector's EI(s).

4.0 Treatment of TEWAS in highly visible areas

4.1 Transplant trees into the TEWAS in clusters by using a tree spade. Combine with partially buried (1/3-1/2 recess) boulders to create groupings for wildlife use and to appear more natural.

4.2 Treat compacted soils by sub soiling to aerate the soils where necessary as discussed in the ECRP, Section 10.

5.0 Root wad and Boulder Placement in Immediate Foreground

5.1 Every effort shall be made to bury all root wads and boulders within the ROW.

5.2 Root wads and boulders larger than one foot in diameter that are placed in the immediate foreground (300') shall be partially buried to approximately 1/3 the height of the boulder and 1/3 the height of the root wad. Cut faces should be directed away from the viewer platform, or concealed with soil or boulders. Root wads and boulders shall be placed in groupings of approximately 3 root wads and 2 boulders. There shall be no more than about one grouping per 1/8th mile within Retention areas or Class I areas. In partial retention areas/Class II areas there shall approximately 3 groupings per 1/8th mile. See Diagram C – Linear Guideline Template for typical construction. All mitigation measures shall be constructed under the on-site advisement of a scenery specialist in consultation with Pacific connector's EI(s) during the time of construction.

6.0 Treatment of Soil Compaction

6.1 Subsoiling and other soil compaction mitigations shall occur in areas determined necessary as per the ECRP Section 4.2.3 to reduce soil compaction and to improve success of revegetation efforts.

7.0 Planting Shrubs

7.1 Plant 1-2 gallon sized shrubs and protect with plant guards. This will reduce the soil contrast and the single plane of the open forest floor. Plant as designated on the site plan for the immediate foreground of the site.

8.0 Blocking from OHV use

8.1 Construct a berm with boulders to discourage access from OHV use.

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9.0 Screening

9.1 Screen the corridor from the viewer by leaving specific trees near the roadway that can be worked around, and transplanting trees of 15-20ft height in groupings in the immediate foreground, as designated by the forest service landscape architect and in coordination with Pacific Connector's EI(s).

10.0 Plant deciduous trees and shrubs for fall color.

10.1 Plant willow, ceonothus, ribes, huckleberry, chinquapin as designated by the site plan.

11.0 Plant deciduous trees and shrubs for fall color.

11.1 Plant willow, ceonothus, ribes, huckleberry, chinquapin as specified in the ECRP.

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Site Specific Design Mitigations

See section with diagrams.

Expected Results of Recommended Mitigation
The expected result of the recommended mitigations is that the visual quality level may be partial retention in 10 years if revegetation efforts and mitigations are successful. The Scenery Management System does not specify a timeframe for meeting Retention or High Scenic Integrity, however the Visual Management System requires that Retention VQO be met during or immediately after project completion.

Dead Indian Memorial Road Crossing

Forest Plan Standards
VQO- Foreground Retention

Visibility
The pipeline crosses Dead Indian Memorial Road (FS RD 37) in a west-east alignment which runs through a lodge pole ecotone vegetation type. The route would be viewed from a foreground distance; however, the duration of the view is very short. The broad 75' construction swath will attract the eye because the existing vegetation that creates a tunnel effect along the roadway. The northwest pipeline alignment bends approximately 600' from the edge of the road reducing the sight line distance down the corridor.

Visual Absorption Capability
The heavy timber canopy is very contiguous, decreasing the visual absorption capability. The terrain is very flat in this area. The view of the ROW is limited by the width and depth to which the viewer can see down the ROW.

Visual Effects
The immediate visual effects created by the ROW will be a strong linear feature with strong edges at each side. The color contrast of the exposed soils will be evident, and the scale of the opening will be uncharacteristic in the surrounding landscape. The proposed berm, boulders, and root wads created to block OHV users from accessing the site will draw attention to the corridor as these negative elements detract from the natural appearing landscape. This crossing will also likely create a 'daylight' cut into the cut bank along the edge of the road. This cut will also attract the eye to the corridor.

Seasonal Changes
The ROW corridor will be most evident in the winter when the snow creates the strongest contrast to the coniferous forest. Spring, summer, and fall will be

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similar in effects other than the changing color of the seeded grasses and shrubs.

Expected Results of Proposed Mitigation
The immediate effects of the ROW corridor are unacceptable modification. The 75' swath with the tall adjacent tree line edges will be uncharacteristic to the surrounding landscape. The proposed logs and boulders strewn across the ROW are unacceptable. Placing root wads in the uncleared storage areas is an unacceptable practice in all areas that are visible. After the grasses and shrubs begin to grow, the soil color contrast will be reduced as the exposed soils are covered.

It is expected that creating openings in this area will create frost pockets and hamper revegetation efforts. Revegetation could take as long as 20-30 years if successful at all. This is seen in strip cut harvests in the area that have taken 30 years to revegetate. Once this occurs the cleared ROW will be reduced to a minimum of 30 feet width. These practices will eventually meet modification, but not within five years.

The Winema National Forest Visual Quality Objective in this area is foreground retention. This proposal does not meet this objective, and is never expected to meet it, although there will be a filling in of vegetation and softening of appearance overtime.

Forest Service Mitigation Measures

Recommended Forest Service Mitigation Measures
The following mitigation measures shall be done in the construction ROW and TEWA(s) from the edge of Dead Indian Memorial Road to 600 feet beyond the immediate foreground.

1.0 Soil Color Contrast Mitigation

1.1 Chip slash to mulch ROW to: a. manage slash production, b. reduce soil erosion, and, c. retain soil moisture to increase revegetation success.

1.2 Where using hydro-mulch to avoid erosion, use colorant (commercially available) dark brownish green to reduce color contrast.

2.0 Edge/Form Mitigation

2.1 Scallop edges by removing trees in designated areas to reduce the straight linear edge, and change shadow cast patterns.

2.2 Feather edges of ROW by cutting tall trees (40'+) along the immediate edge, leaving trees of heights at 10-40' in height for a distance of 50-100'. Feathering shall be done in accordance to advisement of forest service

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(FS) landscape architect and in coordination with Pacific Connector's EI(s).

3.0 Revegetation for Reduction of width and improving form

3.1 Transplant trees into the ROW in clusters by using a tree spade to immediately reduce the sharp linear edge, and break up the wide barren swath.

4.0 Treatment of TEWAS in Scenic Areas

4.1 Transplant trees that are root pruned a year in advance, into the TEWAS in clusters by using a tree spade. Combine with boulders to create groupings for wildlife use and to appear more natural.

5.0 Root wad and Boulder Placement in Immediate Foreground

5.1 Every effort shall be made to bury all root wads and boulders within the ROW.

5.2 Root wads and boulders placed in the immediate foreground (300') should be partially buried to approximately 1/3 the height of the boulder and 1/3 the height of the root wad. Cut faces should be directed away from the viewer platform, or concealed by boulders or berms. Root wads and boulders shall be placed in groupings of approximately 3 root wads and 2 boulders. There shall be about one grouping per 1/8th mile within Retention areas or Class I areas. In partial retention areas/Class II areas there shall be approximately 3 groupings per 1/8th mile. See Diagram C – Linear Guideline Template for typical construction. All mitigation measures shall be constructed under the on-site advisement of a scenery specialist and in coordination with Pacific Connector's EI(s) during the time of construction.

6.0 Treatment of Soil Compaction

6.1 Subsoiling and other soil compaction mitigations shall occur in areas determined necessary as per the ECRP Section 4.2.3 to reduce soil compaction and to improve success of revegetation efforts.

7.0 Planting Shrubs

7.1 Plant 1-2 gallon size shrubs and protect with plant guards, in order to decrease the amount of time needed to address soil contrast and the single plane of the open forest floor. Plant as directed by the FS Landscape Architect and in coordination with Pacific Connector's EI(s).

8.0 Blocking from OHV use

8.1 Construct a berm with partially recessed boulders to discourage the access from OHV use. Construct as designated by the FS Landscape Architect and in coordination with Pacific Connector's EI(s).

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9.0 Screening

9.1 Screen the corridor from the viewer by leaving specific trees near the roadway that can be worked around, and transplanting trees of 15-20ft height in groupings in the immediate foreground, as designated by the FS Landscape Architect.

10.0 Plant deciduous trees and shrubs for fall color.

10.1 Plant willow, ceonothus, ribes, huckleberry, chinquapin as designated in the ECRP.

11.0 Reconstruct the cut bank

11.1 Recontour the cut bank to discourage OHV access, and to reduce the distractive effect of to the edge of the roadway as advised by FS Landscape Architect and in coordination with Pacific Connector's EI(s).

12.0 Scenic Stability

12.1 Develop a mitigation fund for National Forest project work related to design, NEPA, and implementation of thinning and a fuel break along the highway. This project would thin trees in a variable transition zone 50 to 500 feet in width along the highway, to reduce tree density, fuel loadings, and percent of canopy closure appropriate to the species. This project would open up the stands and reduce the risk of losing existing scenic attributes, and recommended mitigation efforts in the event of a large stand replacement fire.

Expected Results of Mitigation to Meet Partial Retention VQO

The expected result of the recommended mitigations is that the visual quality level may be Partial Retention in 10 years if revegetation and mitigations are successful. The Scenery Management System does not specify a timeframe for meeting Retention or High Scenic Integrity, however the Visual Management System requires that Retention VQO be met during or immediately after project completion.

Mitigations to Meet Retention VQO

The forest plan standard for this area is Foreground Retention.
This means that impacts are not visually evident from a foreground view.

The pipeline would have continued effects of a 30' overstory strip opening, meaning that for a distance of 600ft in one direction and 600ft in the other there will be an open sky strip. This is due to the removal of trees over 15ft and shrubs over 6ft. Because this strip is retained through out the existence of the pipeline in this location, retention would not ever be met; given the recommended mitigation measures within and along the edge of the ROW.

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Granted this strip would be seen from a moving car only for a short period of time, but the Visual Management system does not address duration of the view of an impact, other than to consider duration in the scenic class inventory. Due to the sensitivity level of this road, along with the scenic attractiveness and viewed distance, this area was assigned a Retention VQO in the Forest Plan standards and guidelines.

The recommended visual mitigation calls for softening the strip effect by scalloping and feathering the edges (2.1 and 2.2). This would soften the effect but would not make the strip "not visually evident".
In order to meet retention, the strip effect must be addressed. Address meaning make it "not visually evident". To do this the surrounding timbered area would need to be sufficiently "opened up" to allow the open sky to be visible to the viewer traveling along this route, so that when the viewer drives by the crossing the open sky is not differing from the visual experience provided on either side of the crossing. So, this would be a designed project that would create a gradual thinning that increased the open sky view as the viewer approached the crossing point until the opening sky view was no longer a strip within a contiguous forest, but just an open sky view afforded to the viewer that does not appear unnatural in form, line, color, and texture. This is a project that could occur beyond the ROW, probably a ¼ to ½ mile each direction of the crossing point, and for a 600ft on both sides of the road. This kind of project could mimic a natural occurrence such as an insect and disease opening that often occurs in this lodge pole vegetation type. (Please validate with a silviculturist, ecologist, or entomologist) Over time this type of thinning would have to be maintained or the contiguous forest would "come back", and the strip over the pipeline would once again become visually evident. This type of treatment could also be considered in the form of a fuel break, which would be considered, within SMS appendix J an action that could improve scenic stability by reducing the potential breadth of a stand replacement fire to a scale that is within the natural range of variability.

If this type of approach was included in the chosen alternative, then retention could be met as soon as soil color contrast mitigation was successful, and transplanted trees within the 75' corridor reached 20ft in height. The transplanted tree density would need to mimic the modified basal area of the surrounding area to blend the corridor into the landscape. Retention would not be met immediately nor within a year or one growing season, but it could eventually be met.

Pacific Crest Trail Crossing

Forest Plan Standards
VQO- Foreground Partial Retention

Visibility

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The PCGP ROW crosses the Pacific Crest Trail within late successional reserve timber, where large trees are the prominent visual element. The perpendicular crossing will create a 75' clearing across the trail which is currently an 8-10' corridor. The ROW clearing is excessively out of scale in this landscape, especially when experienced on foot. The clearing will extend for approximately .8 miles in both directions.

Visual Absorption Capability
There is no absorption capability that will lessen the visibility of this proposed right of way and its effects.

Visual Effects
The immediate visual effects include soil color contrast to existing adjacent vegetation, excessive vegetative clearing uncharacteristic in width and breadth, hard, linear edges, proposed distribution of extensive root wads, and boulders in the uncleared storage areas.
The planned logs and boulders strewn across the ROW will be very unnatural appearing even when the grasses and shrubs grow up. As trees grow to a height of 20 feet, the edges will begin to soften as tree boughs will begin to blend with adjacent trees, and the width of the vegetatively cleared ROW will eventually be reduced to 30 feet.

Seasonal Changes
The ROW corridor will be most evident in the winter when the snow creates the strongest contrast to the coniferous forest. Spring, summer, and fall will be similar in effects other than the changing color of the seeded grasses and shrubs.

Expected Results of Proposed Mitigation Measures
The immediate effects of the cleared ROW corridor are unacceptable modification.

It is expected that the soil color contrast, the broad opening, and the strewn logs and boulders in addition to the root wads and boulders stored in the uncleared storage areas will create an excessive amount of visual disturbance. The effects proposed activity are visually unrelated to those in this characteristic landscape. Seeding and transplanting will not be successful in blending the proposed changes within the foreground view with the existing landscape until the ground vegetation is restored; the hard linear edges of the clearing are softened. It is expected that the proposed mitigation measures will not be successful in achieving modification for the first five years. Opening the forest canopy up like this may create a frost pocket that will be difficult to revegetate in a timely manner.

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Proposed/Recommended forest Service Mitigation Measures
The following mitigation measures shall be done in the construction ROW and TEWA(s) from the edge of the PCT to where the corridor makes the turn and is no longer visible from the PCT.

1.0 Soil Color Contrast Mitigation

1.1 Chip slash to mulch the cleared ROW to: a. manage slash production, b. reduce soil erosion, and c. retain soil moisture to increase revegetation success.

1.2 Where using hydro-mulch to avoid erosion, use colorant (commercially available) dark brownish green to reduce color contrast.

2.0 Edge/Form Mitigation

2.1 Scallop edges by removing trees in designated uncleared storage areas to reduce the straight linear edge, and change shadow cast patterns.

2.2 Feather edges of ROW by cutting tall trees (40'+) along the immediate edge, leaving trees of heights at 10-40' in height for a distance of 50-100' to graduate the edge from mid-sized to full height. Feathering shall be done in accordance to advisement of forest service landscape architect and in coordination with Pacific Connector's EI(s).

3.0 Revegetate for Reduction of width and improving form

3.1 Transplant trees of 15' to 20' height into the ROW in clusters by using a tree spade to immediately reduce the sharp linear edge, and break up the wide barren swath. Root prune selected native vegetation a year in advance of transplant to increase success rate.

4.0 Treatment of TEWAS in highly visible areas

4.1 Transplant trees into the TEWAS in clusters by using a tree spade. Combine with groupings of boulders to create clumps for wildlife use and to appear more natural. Treat compacted soils by sub soiling to aerate the soils.

5.0 Root wad and Boulder Placement in Immediate Foreground

5.1 Every effort shall be made to bury all root wads and boulders within the pipeline ROW.

5.2 Root wads and boulders placed in the immediate foreground (300') should be partially buried to approximately 1/3 the height of the boulder and 1/3 the height of the root wad. Cut faces should be directed away from the viewer and cut ends concealed with soil and boulder placement. Root wads and boulders shall be placed in groupings of approximately 2

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root wads and 3 boulders. There shall be about one grouping per 1/8th mile within Retention areas or Class I areas. In partial retention areas/Class II areas there shall be approximately 3 groupings per 1/8th mile. See Diagram C – Linear Guideline Template for typical construction. All mitigation measures shall be constructed under the on-site advisement of a scenery specialist during the time of construction.

6.0 Treatment of Soil Compaction

6.1 Subsoiling and other soil compaction mitigations shall occur in areas determined necessary as per the ECRP Section 4.2.3 to reduce soil compaction and to improve success of revegetation efforts.

10.0 Planting Shrubs

10.1 Plant 1-2 gallon size shrubs and protect with plant guards to decrease the amount of time needed to address soil color contrast and the single plane of the open forest floor. Plant as designated on the site plan for the immediate foreground of the site.

Site Specific Designed Mitigation

Diagrams in a following section.

Expected Results of Recommended Mitigation

The expected result of the recommended mitigations is that the visual quality level would be Modification within 15-20 years. The hikers along this trail are very observant and the speed at which they travel will allow them ample to time to view the ROW, so it is expected that they will notice more of the effects of the corridor, but the edges will soften by vegetative growth.

The Scenery Management System does not specify a timeframe for meeting Retention or High Scenic Integrity, however the Visual Management System requires that Retention VQO be met during or immediately after project completion. This will not be the case with the proposed action.

Clover Creek Road

Forest Plan Standards

VQO- Foreground Partial Retention

Visibility

The PCGP ROW is located directly adjacent to the Clover Creek Road for over 18 miles. Eight miles of these are FS lands. The adjacent alignment will increase the apparent roadway corridor width from 54’ to 149’, almost tripling the

existing width. This 95' additional width for the ROW is fully visible in an immediate foreground view. The cumulative effect of the project area across all jurisdictions will dominate the view for the entire 18 miles.

Visual Absorption Capability
There is no absorption capability that will lessen the visibility of this proposed right of way and its effects.

Visual Effects
The immediate visual effects include soil color contrast to existing adjacent vegetation, grossly uncharacteristic scaled opening in width and breadth; hard, linear edge, extensive number root wads, and boulders strewn in the uncleared storage areas.
The logs and boulders strewn across the ROW are unacceptable. Permanently placing root wads in the uncleared storage areas is an unacceptable practice in all areas that are visible. (Pg. 39, National Forest Landscape Management, Vol. 2.) After the grasses and shrubs beginning to grow the soil color contrast will be reduced as the exposed soils are covered. Shrubs will add texture and color variation to the flat plane. As trees grow to a height of 20 feet, the ROW edges will be softened, and the width of the ROW will eventually be reduced to 30 feet. Where adjacent to the 54' roadway, the full opening will be 84'.

Seasonal Changes
The ROW corridor will be most evident in the winter when the snow creates the strongest contrast to the coniferous forest. Spring, summer, and fall will be similar in effects other than the changing color of the seeded grasses and shrubs. Seasonal changes will not make enough difference to note in the foreground, because the scale of the opening and the adjacency to the road makes the effects undifferentiated by seasonal change.

Expected Results of Proposed Mitigation Measures
The immediate effects of the ROW corridor are unacceptable modification. The 95' swath with the tall adjacent tree line edges will be uncharacteristic to the surrounding landscape. The extensive number of logs and boulders strewn across the ROW is unacceptable. Placing root wads in the uncleared storage areas is an unacceptable practice in all areas that are visible. After the grasses and shrubs beginning to grow the soil color contrast will be reduced as the exposed soils are covered. Revegetation could take as long as 20-30 years. Once this occurs the cleared ROW will be reduced to a minimum of 30 feet width. These practices will result in unacceptable modification.

Recommended Forest Service Mitigation Measures
The extensive project activities within immediate foreground of this road require site specific designed mitigation. See the Clover Creek mitigation measures by zone, and the template diagrams.

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1.0 Soil Color Contrast Mitigation

1.1 Chip slash to mulch cleared ROW to: a. manage slash production, b. reduce soil erosion, and c. retain soil moisture to increase revegetation success.

1.2 Where using hydro-mulch to avoid erosion, use colorant (commercially available) dark brownish green to reduce color contrast.

2.0 Edge/Form Mitigation

2.1 Scallop edges by removing trees in designated areas to reduce the straight linear edge, and change shadow cast patterns.

2.2 Feather edges of ROW by cutting tall trees (40'+) along the immediate edge, leaving trees of heights at 10-40' in height for a distance of 50-100'. Feathering shall be done in accordance to advisement of forest service landscape architect and in coordination with Pacific Connector's EI(s).

3.0 Revegetate for Reduction of Width and Improving Form

3.1 Transplant trees into the cleared ROW in clusters by using a tree spade to immediately reduce the sharp linear edge, and break up the wide barren swath.

4.0 Treatment of TEWA(s) in highly visible areas

4.1 Transplant trees into the TEWA(s) in clusters by using a tree spade. Combine with groupings of recessed boulders to create clumps for wildlife use and to appear more natural.

5.0 Root wad and Boulder Placement in Immediate Foreground

5.1 Every effort shall be made to bury all root wads and boulders within Row clearing.

5.2 Root wads and boulders placed in the immediate foreground (300') should be partially buried to approximately1/3 the height of the boulder and 1/3 the height of the root wad. Cut faces should be directed away from the viewer and cut ends concealed with soil and or boulders. Root wads and boulders shall be placed in groupings of approximately 3 root wads and 2 boulders. There shall be about one grouping per 1/8th mile within Retention areas or Class I areas. In partial retention areas/Class II areas there shall be approximately 3 groupings per 1/8th mile. See Diagram C – Linear Guideline Template for typical construction. All mitigation measures shall be constructed under the on-site advisement of a scenery specialist and in coordination with Pacific Connector's EI(s) during the time of construction.

6.0 Treatment of Soil Compaction

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6.1 Subsoiling and other soil compaction mitigations shall occur in areas determined necessary as per the ECRP Section 4.2.3 to reduce soil compaction and to improve success of revegetation efforts.

7.0 Planting Shrubs

7.1 Plant 1-2 gallon size shrubs and protect with plant guards to decrease the amount of time needed to address soil contrast and the single plane of the open forest floor. Plant as designated by the FS Landscape Architect and in coordination with Pacific Connector's EI(s).

8.0 Screening

8.1 Screen the corridor from the view by leaving specific trees near the roadway that can be worked around. Transplant trees 15-20ft in height. Construct groupings in the immediate foreground, as designated by the FS Landscape Architect.

11.0 Plant deciduous trees and shrubs for fall color.

11.1 Plant willow, ceonothus, ribes, huckleberry, chinquapin as designated by the ECRP.

Specific Site Designed Mitigations by Zone and Topography

These zones are shown on the template diagrams.

Zone A – Uncleared Storage Areas

This zone is an area that is not cleared for construction but used for storage of equipment, construction materials and root wads and boulders. This zone is near the edge of the construction corridor where vegetation remains, and where thick forest creates a strong edge or wall. This edge needs to be "feathered" by thinning the trees, leaving larger, fire resistant species. After construction this zone shall only be used for storing root wads and boulders in areas that are not visible from the road. The root wad and boulder storage should be fully screened by existing topography, or transplanted vegetation. Root wads and boulders can be buried under earthen berms that are designed as gentle rises in scale with other topographic variation in the area to blend with the existing natural environment. All berms shall be seeded/hydro mulched with native seed mix, mulched with chips generated from on-site slash and fertilized to promote rapid revegetation. Transplanted trees and shrubs planted to screen storage areas shall be an average height of 15-20 feet in height. See transplanted berm diagram.

Zone B – Offside Topsoil and Subsoil Storage Area

This zone is an area across the pipeline trench that is utilized during construction to store topsoil and excavated soils from the pipeline trench. After construction this area shall be seeded/hydro mulched with native seed mix, mulched with chips generated from on-site slash and fertilized to promote rapid revegetation. This zone shall have a minimum of 10 -15 transplanted trees depending on the

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density of trees in Zone A to immediately soften the edge of the clearing, and/or screen boulders and root wads. This zone may be used for burying boulders and root wads. See transplanted berm diagram.

Zone C – 30' Corridor Directly above Pipeline
This zone is centered directly over the pipeline, and will remain open via clearing of trees greater than 15' in height, and shrubs greater than 6' in height. Within this 30' span root wads and boulders can be buried. After construction this area shall be seeded/hydro mulch with native seed mix, mulched with chips generated from on site slash and fertilized to promote rapid revegetation. Boulder and root wad groupings may be designed into this corridor. See Boulder and Root wad Grouping Diagram. A maximum of about three groupings per quarter mile shall be placed within the entire block of zones. Groupings can be used to break up the open plan of the 30' corridor.

Zone D – Working Zone
This zone is between the existing road and the pipeline trench. During construction this area will receive the greatest level of equipment and truck traffic; therefore, soil compaction will be highest in this area. This area shall be wing subsoil treated to restore the soil aeration and improve the success of the restoration efforts. After construction this area shall be seeded/hydro mulched with native seed mix, mulched with chips generated from on site slash and fertilized to promote rapid revegetation. Boulder and root wad groupings may be designed into this zone. Berms shall be designed to break up the flat plane of the construction working surface, and to bury boulders and root wads. Logs and slash shall be placed behind berm

Zone E – The Road Side Edge
The road side edge is the zone that is between the construction zone, and the edge of the existing road. This zone is the equivalent of an uncleared storage area in other areas, but adjacent to the Clover Creek Road, this area shall vary in width, usage and treatment depending on the existing topography and vegetation.

Where this zone is level, or within 5-10 feet of the roadway elevation, a minimum of 25% of the existing shrubs and trees shall be retained in clumps to provide diverse form, color and texture to the roadside edge. All areas that are impacted by construction shall be seeded/hydro mulched with native seed mix, mulched with chips generated from on site slash and fertilized to promote rapid revegetation. There shall be no root wads, boulders or logs or slash placed in this zone.

Where this zone is sloping downward and away from the road at 30% or greater, vegetation high enough to screen the 30' corridor opening shall be retained. Root wads and boulders can be stored at the base of the slope meets the graded construction zone surface, where retained vegetation provides screening.

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Where this zone is sloping upward, and away from the road at 30% or greater, retained vegetation will provide diversity in form, color and texture. It is expected that where the road route is adjacent to a cut bank along the road that is greater than 10' in height, the PCGP ROW will be pulled back away from the cut bank by 20-30 feet. All areas that are impacted by construction shall be seeded/hydro mulched with native seed mix, mulched with chips generated from on site slash and fertilized to promote rapid revegetation. There shall be no root wads, boulders or logs or slash placed in this zone.

Template Diagrams

The following template diagrams specify mitigation measures to be used based on the topography. The diagrams are to be used in conjunction with the linear guidelines. The diagrams are typical templates to be used under the advisement of the FS Landscape Architect and in coordination with Pacific Connector's EI(s) that is available on site at the time of construction.

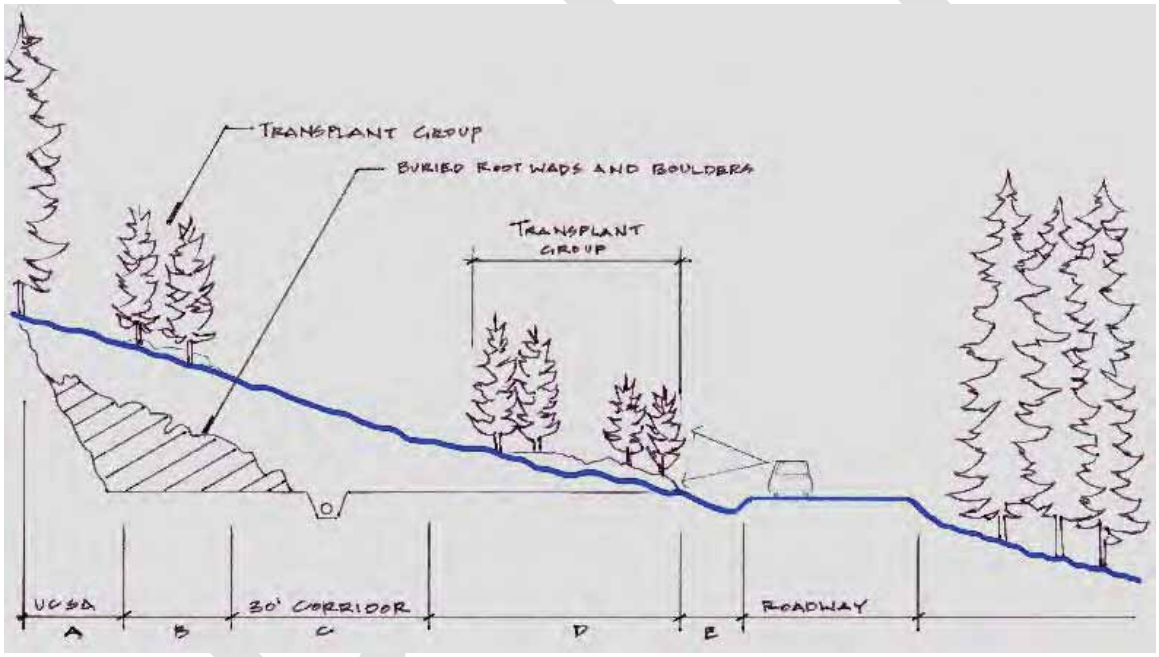


Diagram A –PCGP Above the Roadway

Bury root wads and boulders under the soil used to recontour the excavation zone. Construct transplant groupings as shown in the linear guideline diagram.

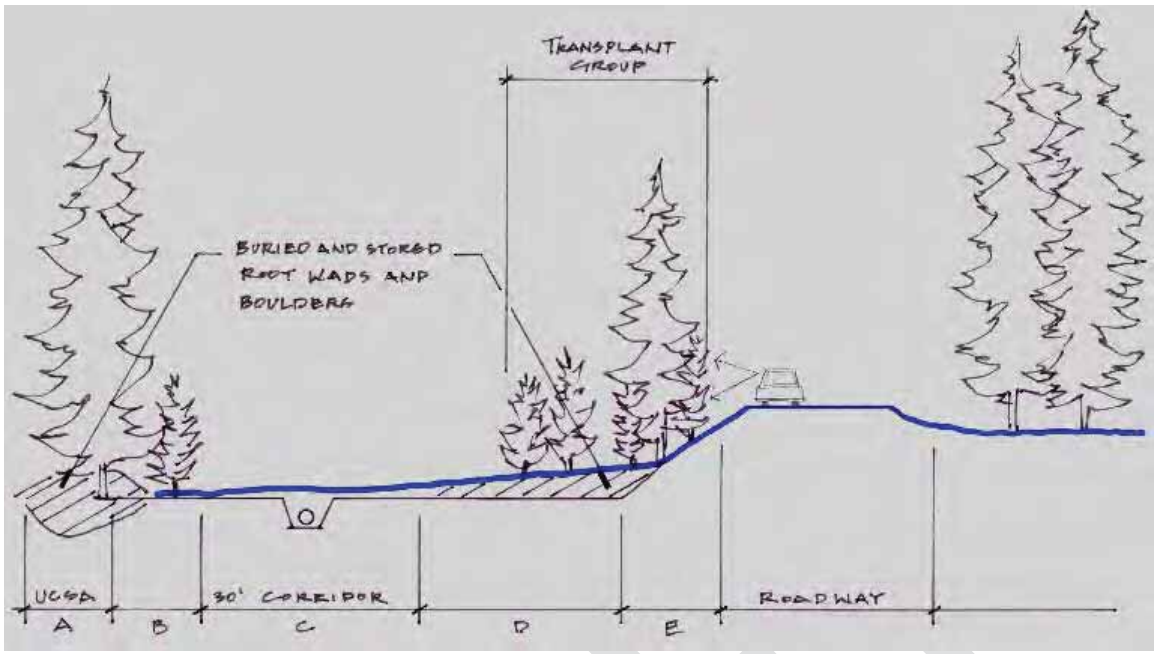


Diagram B –PCGP is below the roadway

Bury and store root wads and boulders where screened from the view of the viewer on the Clover Creek Road. Transplant trees and shrubs in groupings to create diverse spatial patterns, and to break up the strong linear form of the retained vegetation. Retain vegetation on the bank of the roadway.

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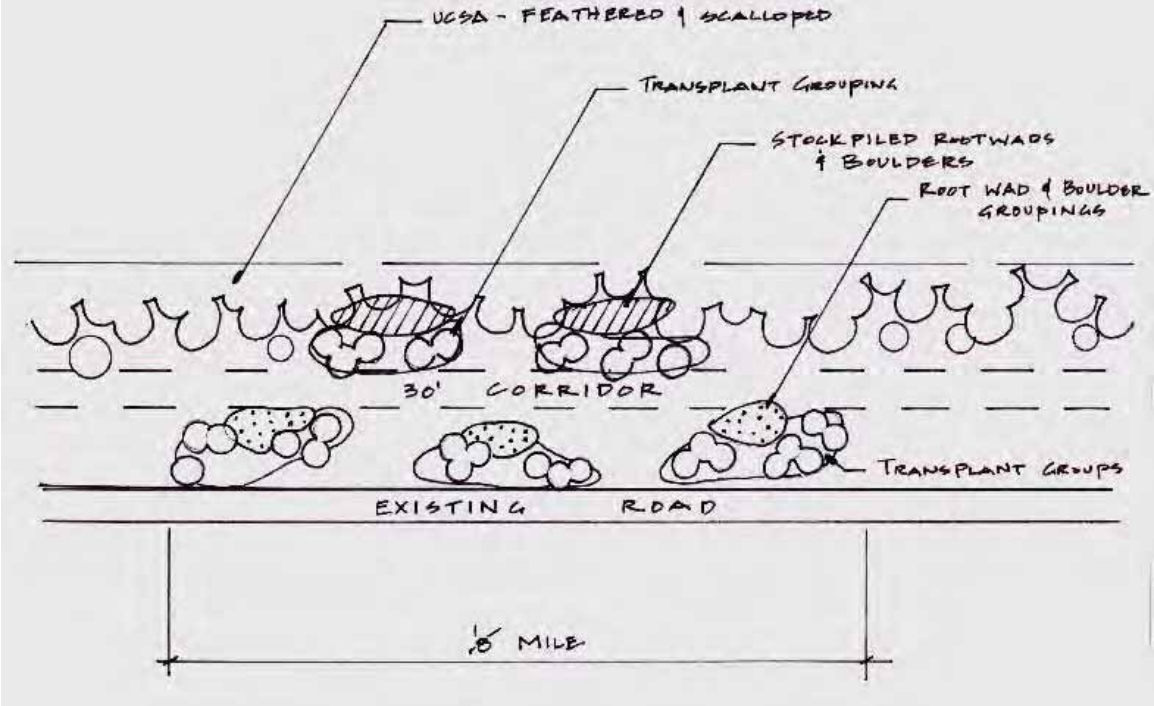


Diagram C – Linear Guideline Template for 1/8th Mile

Construct root wad and boulder groupings behind transplant groups. Feather and scallop the uncleared storage areas, and stockpile root wads and boulders behind transplant groupings. Limit root wad and boulder groupings to approximately 3 per 1/8th mile.

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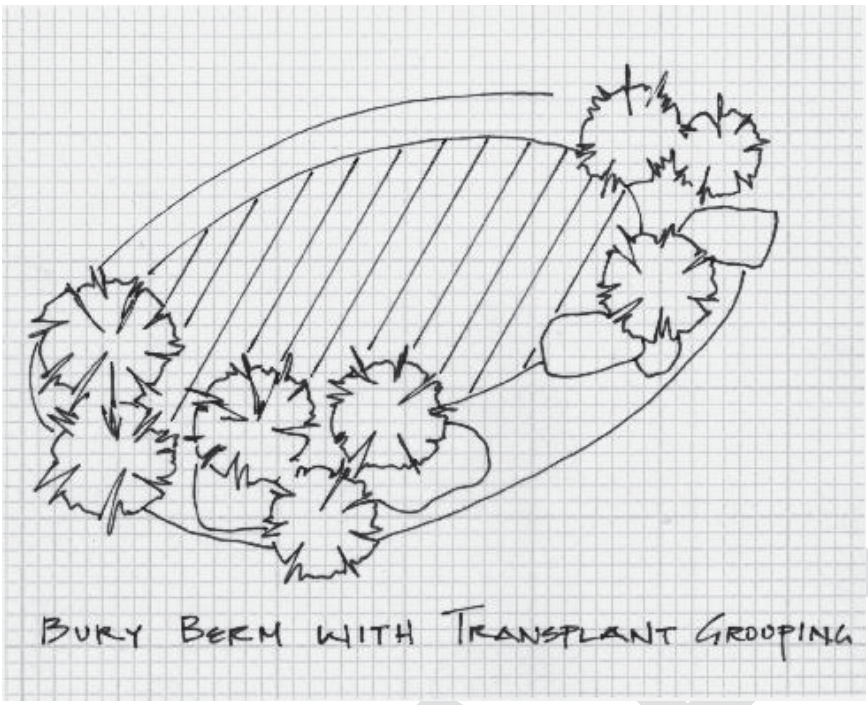


Diagram D – Bury Berm with Transplant Grouping

Bury root wads and boulders and construct a berm with retained topsoil. Plant the edges of the berm with transplanted trees, and place recessed boulders in the designed grouping.

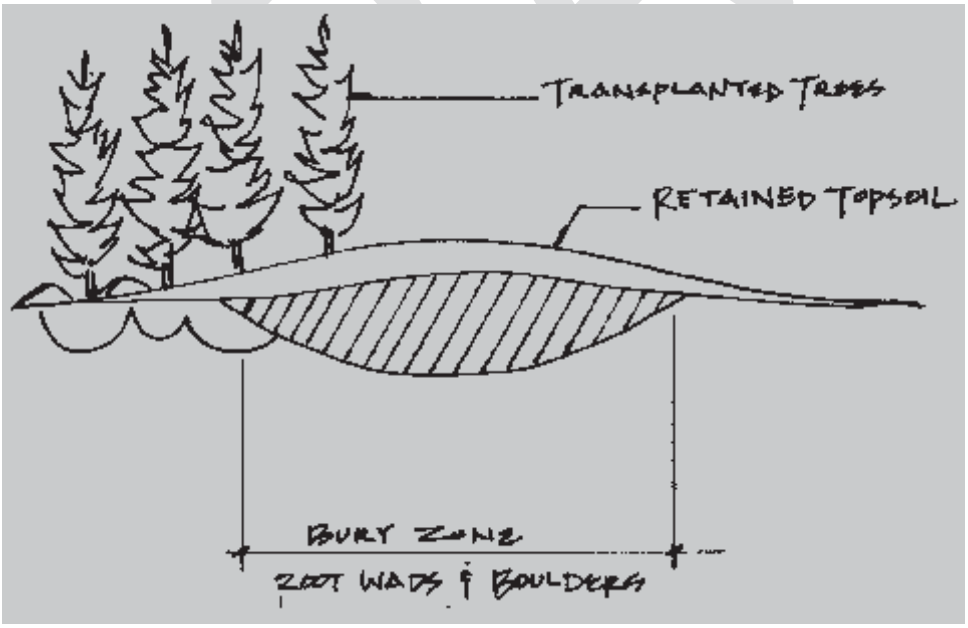


Diagram E – Bury Berm with Transplant Grouping
Plant at edges of bury zone.

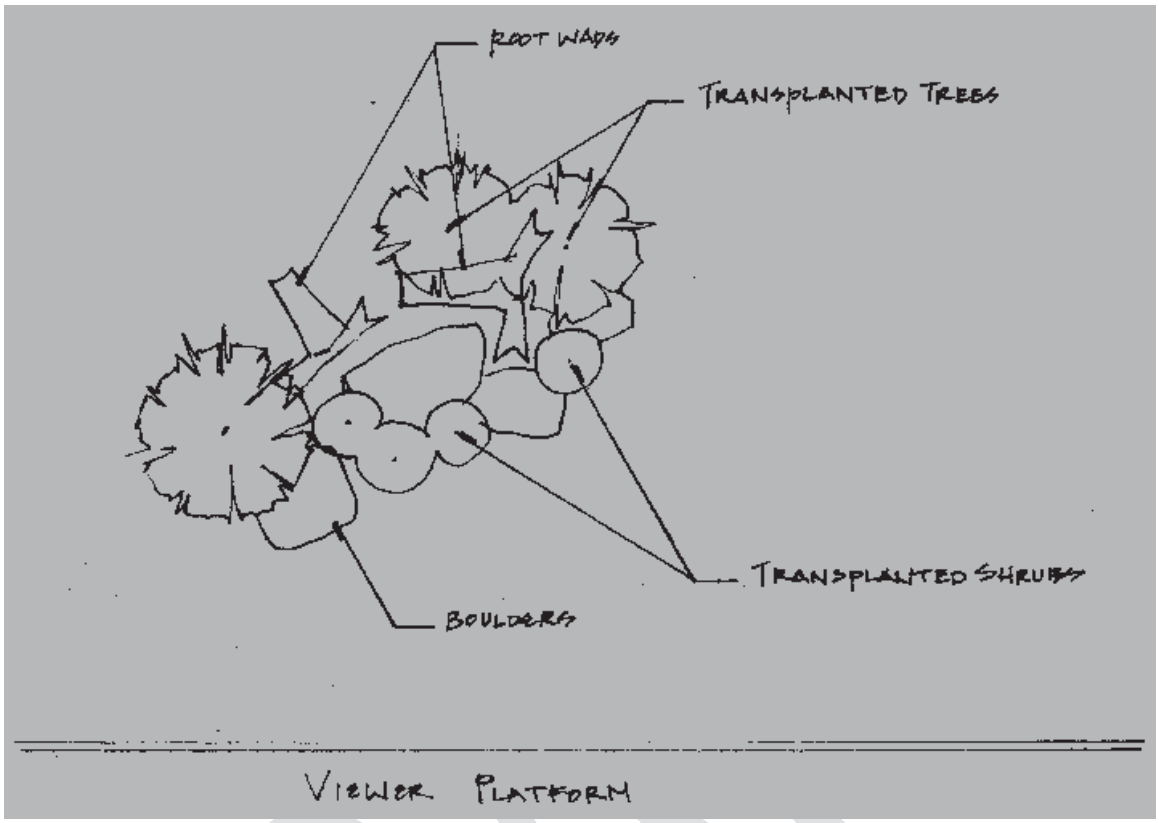


Diagram F – Root Wad and Boulder/Transplant Grouping
Construct groupings to vegetate the cleared ROW.

Expected Results of Mitigation to Meet Modification VQO
The expected results are based on the above mitigations and the specific site designed mitigation by zone and topography.

The immediate foreground of the Clover Creek Road, being heavily modified by pipeline construction would undergo extensive mitigation and over a long period of time will meet modification. Treating the soils by sub soiling, chip and hydro mulching, seeding and planting shrubs and grasses will address the impacts to the forest floor. Screening and burying boulders and root wads, designed berms and transplanted tree groupings will rebuild the foreground view, although the linear 30 foot ROW will always be evident..

It is expected that it will take approximately 10 to 15 years for this to be accomplished. Under the Scenery Management System this is an acceptable time frame, however under the Visual Management System, Partial Retention must be met within the second to third year after completion of the project.

Mitigation to Meet Partial Retention VQO

The forest plan standard for this area is foreground partial retention. This means that impacts "remain visually subordinate to the characteristic landscape".

The continued removal of trees over 15ft and shrubs over 6ft within the immediate foreground of the Clover Creek Rd for the extended length of approximately 18 miles (8 miles being FS lands) would keep a 30ft corridor clear of vegetation less than 15ft in height. This is considered a linear corridor that is inconsistent with the characteristic landscape surrounding the project area. Because this strip is retained throughout the existence of the pipeline in this location, partial retention would not ever be met given the recommended mitigation measures within and along the edge of the ROW.

In order to meet partial retention, the corridor effect must be addressed. Address meaning make the corridor effect "visually subordinate". To do this the surrounding timbered area would need to be sufficiently "opened up" to a degree that the corridor no longer appears as a contiguous linear feature, but is more like openings that are consistent with those in the surrounding characteristic landscape. This means consistent in "size, amount, intensity, direction, pattern, etc." Any introduced form, line, color, or texture that is introduced should remain subordinate to the visual strength of the characteristic landscape."

To do this the surrounding timbered area would need to be sufficiently "opened up" to create a pattern that is both characteristic of natural occurrences, and would blend the 30ft corridor into the modified surrounding landscape. Within the ponderosa pine type vegetation, this could be possible by designing a project that would create open stands of varying sized openings and clusters of trees. This project design would mimic a ponderosa pine stand that has frequent fire occurrences that create an "open park-like stand", where small shrubs and grasses occur on the forest floor. This type of project is consistent with SMS in that it addresses scenic stability issues making the pine stands more resistant to large stand replacement fire. Combined with the all of the recommended mitigation measures of transplanting within the construction zone(B,C, D) and leaving trees in zone E, this approach would screen parts of the contiguous 30ft opening from the viewer while blending the opening into the newly opened up timbered area, making the impacts visually subordinate to the characteristic landscape.

If this type of approach was included in the chosen alternative, then partial retention could be met as soon as soil color contrast mitigation was successful, and transplanted trees within the 75' corridor reached 20ft in height. The transplanted tree density would need to mimic the modified basal area of the surrounding area to blend the corridor into the landscape. Partial retention would not be met within the first year, but could eventually be met.

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These types of approaches were not addressed in the initial analysis, because it was considered beyond the limits of the project boundary. Whether that was an appropriate reason may be questionable but none the less it is why it was not included.

To be sure of achieving the required VQO, it is important to include measures such as:

- Replacement of trees that do not survive transplant
- Replacement of browsed shrubs
- Tilling, reseeding and mulching of areas where grasses do not take root

The survival rate of all transplanted and seeded plantings needs to be sufficient to meet the objectives of the mitigation. A survival rate of 70 percent should be achieved at the 5 year mark to ensure the success of the mitigations.

It is also important to use design features that address the larger project work, such as low cut stumps, slash treatment, skid trail treatments, etc. to ensure that these proposed methods do not compound the initial visual impacts.

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Pacific Connector Gas Pipeline Project
Visual Management Analysis Clarification

Donna M. Mattson
Forest Landscape Architect
February 17, 2009

Dead Indian Memorial Highway Crossing

The forest plan standard for this area is Foreground Retention.
This means that impacts are not visually evident from a foreground view.

The pipeline would have continued effects of a 30' overstory strip opening, meaning that for a distance of 600ft in one direction and 600ft in the other there will be an open sky strip. This is due to the removal of trees over 15ft and shrubs over 6ft. Because this strip is retained through out the existence of the pipeline in this location, retention would not ever be met; given the recommended mitigation measures within and along the edge of the ROW.
Granted this strip would be seen from a moving car only for a short period of time, but the Visual Management system does not address duration of the view of an impact, other than to consider duration in the scenic class inventory. Due to the sensitivity level of this road, along with the scenic attractiveness and viewed distance, this area was assigned a Retention VQO in the Forest Plan standards and guides.
The recommended visual mitigation calls for softening the strip effect by scalloping and feathering the edges (2.1 and 2.2). This would soften the effect but would not make the strip "not visually evident".
In order to meet retention, the strip effect must be addressed. Address meaning make it "not visually evident". To do this the surrounding timbered area would need to be sufficiently "opened up" to allow the open sky to be visible to the viewer traveling along this route, so that when the viewer drives by the crossing the open sky is not differing from the visual experience provided on either side of the crossing. So, this would be a designed project that would create a gradual thinning that increased the open sky view as the viewer approached the crossing point until the opening sky view was no longer a strip within a contiguous forest, but just an open sky view afforded to the viewer that does not appear unnatural in form, line, color, and texture. This is a project that could occur beyond the ROW, probably a ¼ to ½ mile each direction of the crossing point, and for a 600ft on both sides of the road. This kind of project could mimic a natural occurrence such as an insect and disease opening that often occurs in this lodge pole vegetation type. (Please validate with a silviculturist, ecologist, or entomologist)
Over time this type of thinning would have to be maintained or the contiguous forest would "come back", and the strip over the pipeline would once again become visually evident. This type of treatment could also be considered in the form of a fuel break, which would be considered, within SMS appendix J an

action that could improve scenic stability by reducing the potential breadth of a stand replacement fire to a scale that is within the natural range of variability.

If this type of approach was included in the chosen alternative, then retention could be met as soon as soil color contrast mitigation was successful, and transplanted trees within the 75' corridor reached 20ft in height. The transplanted tree density would need to mimic the modified basal area of the surrounding area to blend the corridor into the landscape. Retention would not be met immediately nor within a year or one growing season, but it could eventually be met.

Clover Creek Road

The forest plan standard for this area is foreground partial retention. This means that impacts "remain visually subordinate to the characteristic landscape".

The continued removal of trees over 15ft and shrubs over 6ft within the immediate foreground of the Clover Creek Rd for the extended length of approximately 18 miles (8 miles being FS lands) would keep a 30ft corridor clear of vegetation less than 20ft in height. This is considered a linear corridor that is inconsistent with the characteristic landscape surrounding the project area. Because this strip is retained throughout the existence of the pipeline in this location, partial retention would not ever be met given the recommended mitigation measures within and along the edge of the ROW.

In order to meet partial retention, the corridor effect must be addressed. Address meaning make it "visually subordinate". To do this the surrounding timbered area would need to be sufficiently "opened up" to a degree that the corridor no longer appears as a contiguous linear feature, but is more like openings that are consistent with those in the surrounding characteristic landscape. This means consistent in "size, amount, intensity, direction, pattern, etc." Any introduced form, line, color, or texture that is introduced should remain subordinate to the visual strength of the characteristic landscape."

To do this the surrounding timbered area would need to be sufficiently "opened up" to create a pattern that is both characteristic of natural occurrences, and would blend the 30ft corridor into the modified surrounding landscape. Within the ponderosa pine type vegetation, this could be possible by designing a project that would create open stands of varying sized openings and clusters of trees. This project design would mimic a ponderosa pine stand that has frequent fire occurrences that create an "open park-like stand", where small shrubs and grasses occur on the forest floor. This type of project is consistent with SMS in that it addresses scenic stability issues making the pine stands more resistant to

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large stand replacement fire. Combined with the all of the recommended mitigation measures of transplanting within the construction zone(B,C, D) and leaving trees in zone E, this approach would screen parts of the contiguous 30ft opening from the viewer while blending the opening into the newly opened up timbered area, making the impacts visually subordinate to the characteristic landscape.

If this type of approach was included in the chosen alternative, then partial retention could be met as soon as soil color contrast mitigation was successful, and transplanted trees within the 75' corridor reached 20ft in height. The transplanted tree density would need to mimic the modified basal area of the surrounding area to blend the corridor into the landscape. Partial retention would not be met within the first year, but could eventually be met.

These types of approaches were not addressed in the initial analysis, because it was considered beyond the limits of the project boundary. Whether that was an appropriate reason may be questionable but none the less it is why it was not included.

To be sure of achieving the required VQO, it is important to include measure such as:

- Replacement of trees that do not survive transplant
- Replacement of browsed shrubs
- Tilling, reseeding and mulching of areas where grasses do not take root

The survival rate of all transplanted and seeded plantings needs to be sufficient to meet the objectives of the mitigation. A survival rate of 70 percent should be achieved at the 5 year mark to ensure the success of the mitigations.

It is also important to use design features that address the larger project work, such as low cut stumps, slash treatment, skid trail treatments, etc. to ensure that our methods do not compound the initial visual impacts.

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Scenery Resource Analysis

for

Rogue River –Siskyou NF

Of the PCGP ROW along HWY 140

Prepared by Donna M. Mattson Consulting Forest Landscape Architect

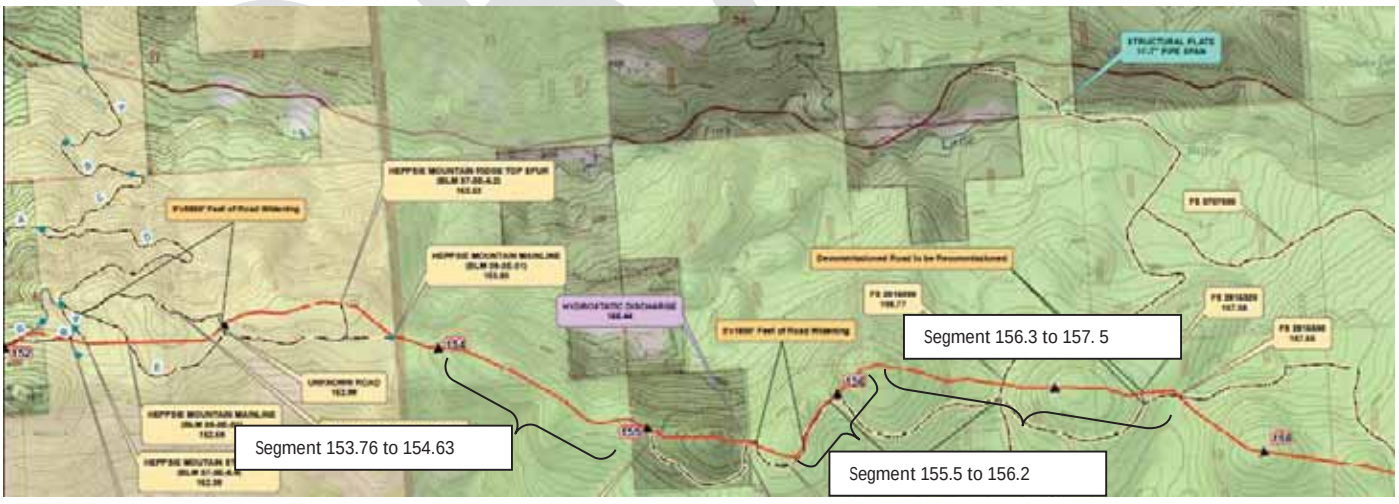
July 6, 2011 541-962-8515

Introduction

This scenery resource analysis review of the Pacific Connector Gas Pipeline was prompted by a previous analysis done by Tetra Tech consultant Lee Anderson. The Tetra Tech analysis noted that there are several sections visible from Hwy 140 known as Lake of the Woods Highway that would not meet the visual quality objectives of the forest plan. However, on site field work had not been done to determine whether the ROW in these sections would be visible from the Highway. An on site review of the sections along Highway 140 revealed that there are some visible segments and some areas that are obscured by landforms. This review is being done to determine if there are segments that will not meet the visual quality standards of the Forest Plan.

The map below (Figure 1) shows the segments in question.

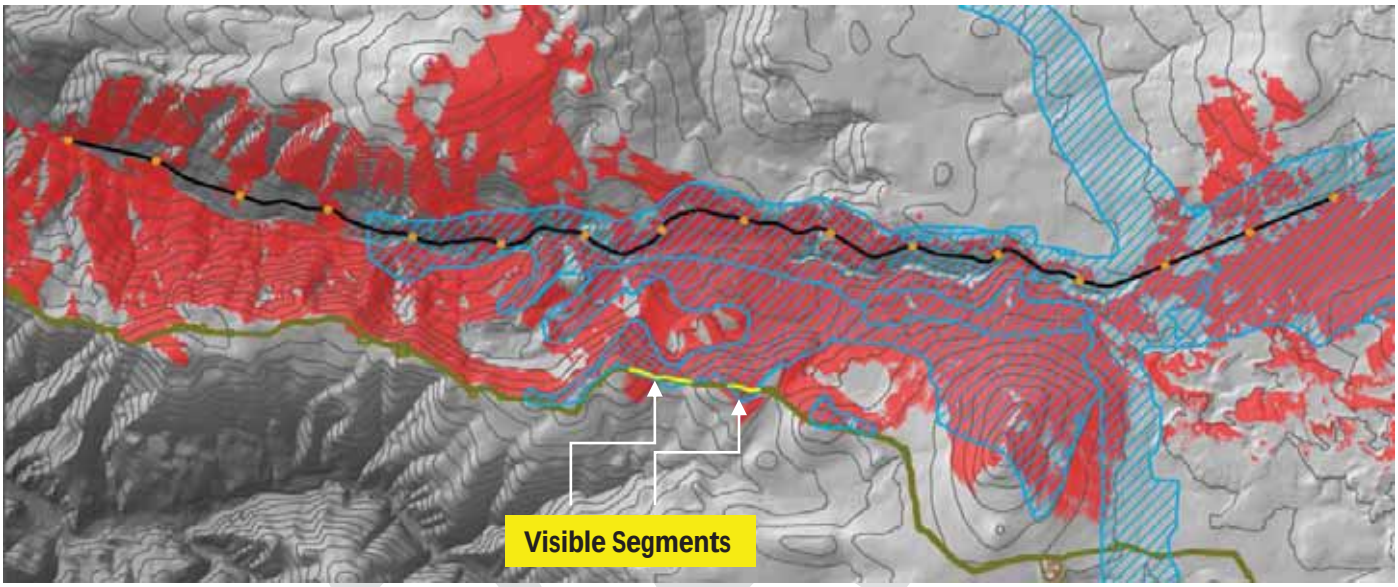
Figure 1 Hwy 140 and PCGP ROW (a)



The achievement of the visual quality objective is determined by what is visible from the viewer platform. Many of these segments are not visible from the viewer platform which has been identified as Hwy 140. The pipeline ROW runs along the top of the ridge that runs parallel to the highway. A visibility analysis was done by North State

Resources to identify the ROW visibility from Hwy 140 (shown below in Figure 2). Via digital mapping a bare earth model was developed using digital elevations. The model is helpful in determining what areas are visible from the highway based on topography only. The visibility analysis below shows two segments (in yellow) that are visible. These segments correlate with my field work as being visible as well. (Segments 156.3-156.8, and 157.2-157.5) Although a bare earth analysis does not consider screening from vegetation, the result is similar to my findings in the field. The ground would not necessarily be visible, however what would be visible is the cut through the trees.

Figure 2 Visibility Analysis



Field work and Google Earth images confirm that these two segments are the only visible segments from Hwy 140. Upon further analysis it has been determined that some of the segments are not visible from Hwy 140 due to the location of the ROW related to the highway and the topography of the landscape between them.

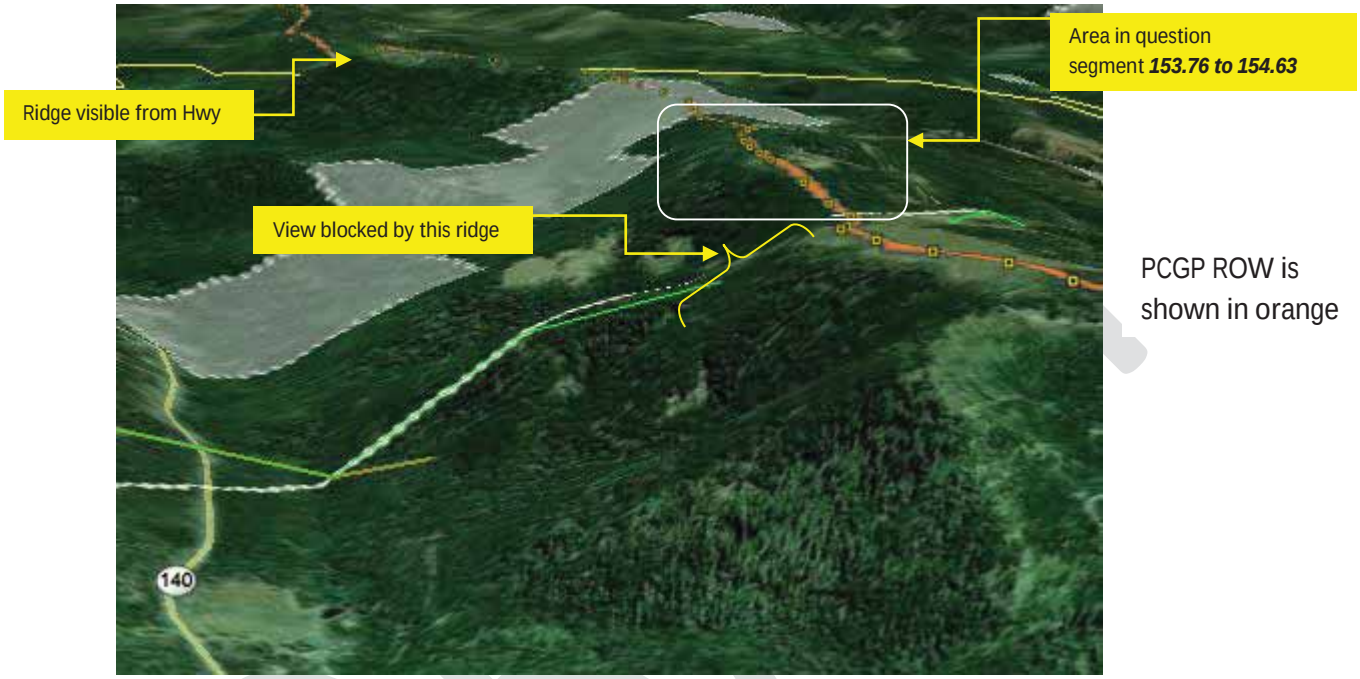
The segments that were remaining in question are ***153.76 to 154.63***, ***155.80 to 155.82***, ***156.25 to 156.82 and 157.13 to 157.39.***

Segment MP 153.76 to 154.63

It appeared from satellite imagery and ROW maps that this segment could be visible from the highway looking southwest for a duration of approximately one mile. If this were the case, the ROW would not meet retention. The segment from ***MP 153.76 to MP 154.63*** of the ROW which lies within spotted owl habitat management area (Management Strategy 19). The visual quality objective for this area is retention; however this Standard & Guideline has been superseded in this case by the Northwest Forest Plan which makes the area a Late Successional Reserves. There is no stated visual quality objective for Late Successional Reserves. This means that maximum modification is allowable in this area. Having said that, it is still important to determine the impacts of the proposed ROW to the scenery resources as seen from the highway.

With the ROW draped over a Google Earth image, the visibility of the ROW was reviewed digitally and in the field. The onsite review in conjunction with a Google image review reveals that the segment in question is not visible from Hwy 140. It is screened by the ridge just west of the area. The angle of view from the Hwy coming from the west gives the viewer a long direct view which is aligned with the angle of the ROW. However, the long ridge coming off Heppsie Mountain, shown in the image below (Figure 3) obscures the ridge in question. The segment of the ROW is not visible from this angle nor is it visible from the east. Therefore, the visual impact of the ROW in this segment from Hwy 140 will meet retention.

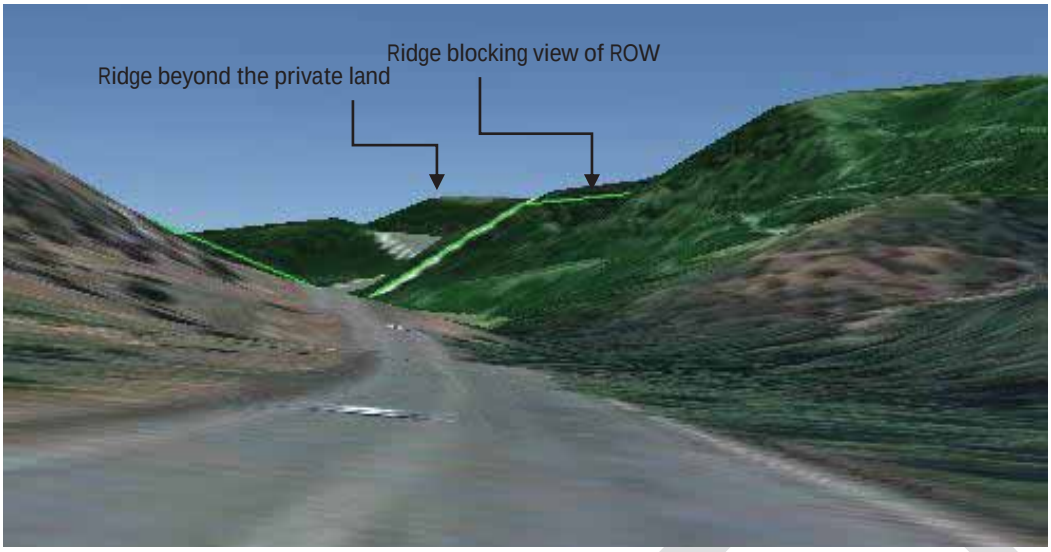
Figure 3 MP 153.76 to MP 154.63 displayed via Google Earth



The photos taken in the field of this segment were actually taken of the ridge east of the private land segment shown in gray. That segment is discussed further in this document. The Google earth image below shows the layout of the landscape as viewed from Hwy 140. The green line is the FS boundary, and the gray area private land.

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Figure 4 Google Earth view from Hwy 140



The segment ***153.76 to 154.63*** is screened from view by the ridge directly west.

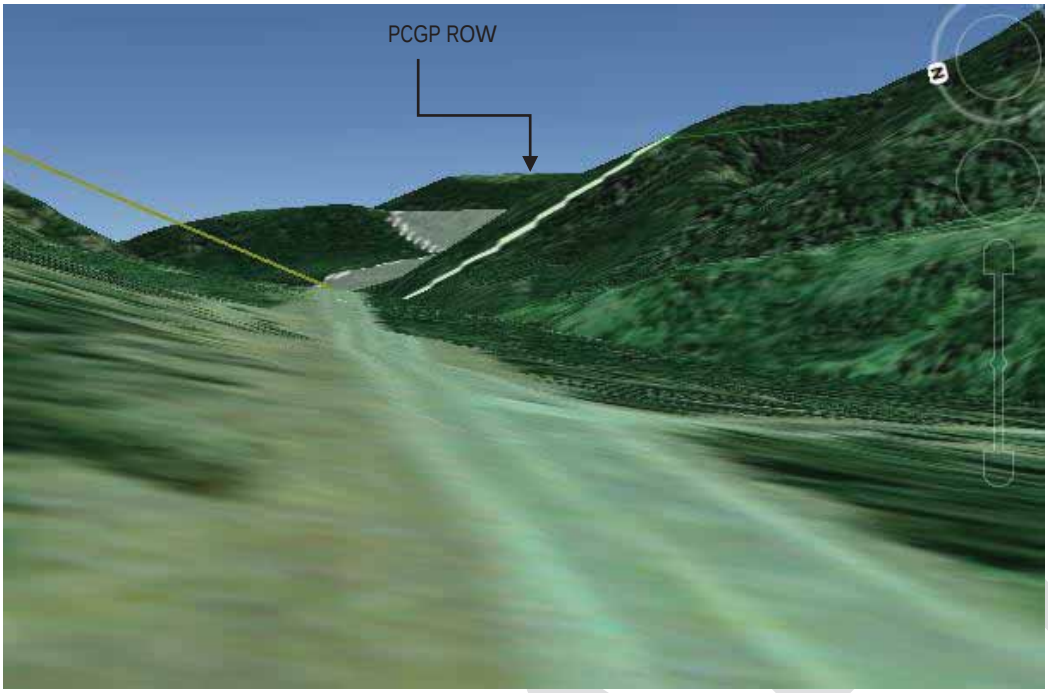
The view from Hwy 140 looks up toward the ridge top from the platform which is below the ridge so the crest of the ridge often blocks the view of the ROW. However, in some cases, from a distant and oblique view the ROW is visible. In other cases the oblique views are blocked by vertical ridges that lie somewhat perpendicular to the angle of view as in the case of the segment ***155.80 to 156.20.***

Segment 155.80 to 155.20

The remaining segment in question is section that lies with ***155.80 to 156.20***. By using Google Earth and viewing the area in the field, it has been determined that this segment is not visible from Hwy 140. The view from the Hwy 140 is an upward angle to the crest of the ridge that is 3.5 to 4 miles away. From a Google Earth image it appears that there is potential for clearing impacts of the ROW to be slightly visible from the Highway. However, the route is not aligned with the angle of sight which was an initial concern, nor does the Google image display any vegetation height that could screen the project impacts. The ROW traverses the slope at an oblique angle from the line of sight and appears to be 200'-400' behind the crest of the ridge.

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Figure 5 View from Hwy 140 via Google Earth as taken from photo point



This image above (Figure 3) shows the ROW showing up on the ridge to the east of the private land which is shown in gray with the sketchy white border. The visual quality objective of this area is partial retention from the crest of the ridge down toward the highway. It appears that the ROW is back from the crest, outside of partial retention, and would not be visible.

The photo below (Figure 4) shows the ridge on which the ROW would lie. The ROW, as shown in Figure 5; lies a distance ranging from 200 to 400 feet behind (south) of the crest of the ridge. This location of the ROW would allow enough room to leave an adequate screen of timber. It is expected that if this screening were retained the ROW would not be visible from Hwy 140.

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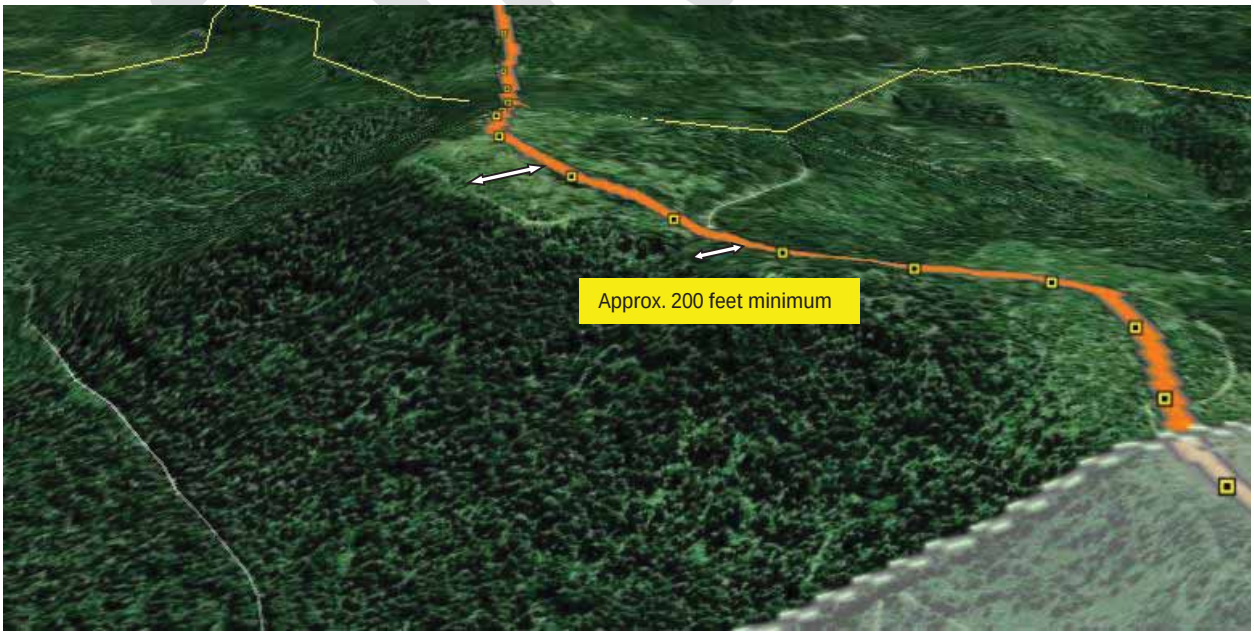
Figure 6 Views from Hwy 140



View to ROW from Hwy 140 (42°23,786, 122°30,534)

The following images (Figure 7 and 8) show the location of the ROW along the ridge tops via Google Earth between ***155.80 to 156.20.*** The visibility of the ROW is determined by the line of sight from the view platform being Hwy 140. Therefore, if the crest of the ridge is in front of and between the viewer and the ROW then the line of sight is stopped or broken, and the ROW is not visible. It is recommended that the ROW be located as far to the south on this ridge as possible.

Figure 7 Google Earth Image showing distance from crest of the ridge



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Figure 8 Google Earth image from 5284 ft elev.



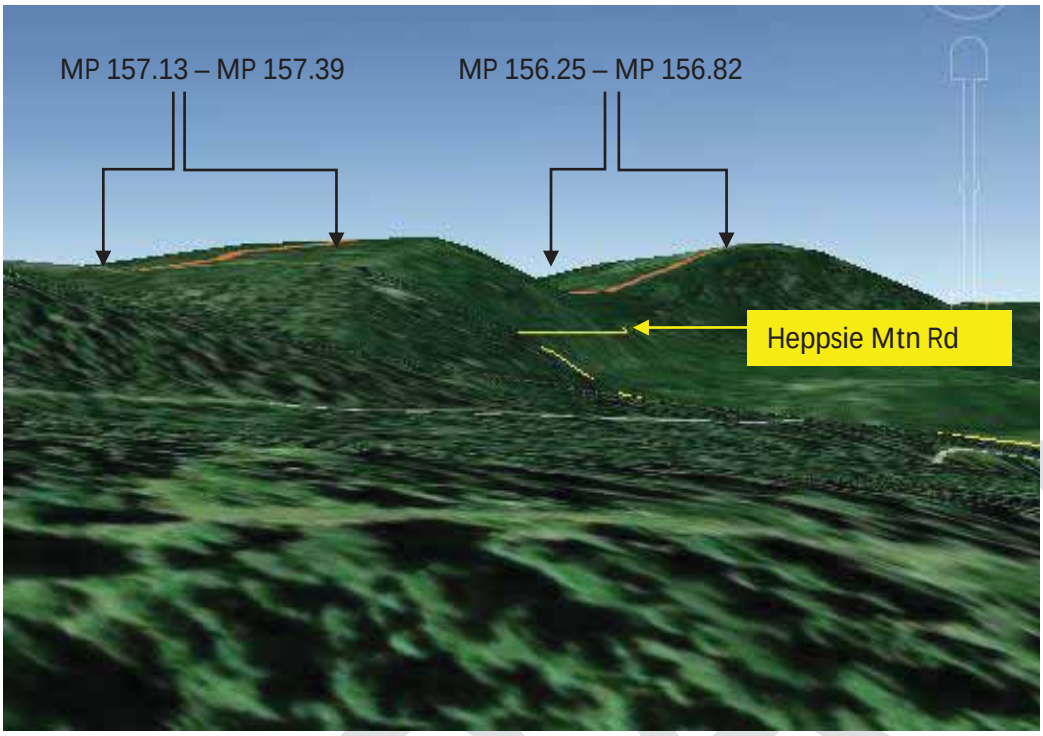
This Google Earth image above (Figure 8) shows the location of the ROW being south of the top of the ridge as viewed from an elevation of 5248ft. The viewer on Hwy 140 is at an elevation of approximatelty 2545ft.

The Google Earth image above (Figure 8) shows the ROW just south of the ridge crest which is outside the view from Hwy 140. This segment would meet Partial Retention because it would be screened by the existing timber between the ROW and the crest of the ridge.

Segment 156.25 to 156.82 and 157.13 to 157.39

The segment ***156.25 to 156.82*** is located within a partial retention VQO. This segment would be visible from Hwy 140. The images below (Figure 9 & 10) show the ROW on a Google earth image and a similar view from a photo point located on the shoulder of Hwy 140. It is predicted that the visual impacts of the proposed ROW would create the equivalent of unacceptable modification at the point of project completion, (construction completed). The restoration efforts including revegetation within the 95ft ROW will eventually reduce the visual impact of the pipeline corridor. The timber on the northern edge of the ROW will eventually screen a majority of the pipeline corridor. However, the timeframe in which the visual quality objective of partial retention is to be met is within one year. (pg. 32 Natl Forest Landscape Management, Vol. 2) The vegetation screening is not expected to be in place within one year. The timber would need to reach a height of approximately 20ft to effectively screen the corridor in a manner that would reduce the visual impact enough to meet partial retention. The remaining 30ft corridor which will be "kept void of trees to facilitate corrosion and leak surveys and protect the pipeline from root damage" (ECRP) would be significantly screened and from this angle would eventually meet partial retention. The remaining 30ft corridor would essentially appear as a"straight linear gap" from the treetops in front of the ROW to the treetops behind the ROW. It is my judgement that this linear feature would be visually subordinate to the characteristic landscape.

Figure 9 Google Earth image of segments visible from Hwy 140



Segment ***157.13 to 157.39*** is also visible from Hwy 140 at an oblique angle. Prior to restoration it is expected that this segment would appear as a linear feature that would draw the eye to the area and thus the construction ROW is not expected to meet partial retention until timber in front of the 95 ft ROW reached a height of 20 feet in height whereas the remaining 30 foot cooridor would be effectively screened. The remaining 30ft corridor is expected to meet partial retention due to screening of the trees to the north of the ROW. Once again, this achievement will not occur within one year of construction completion.

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Figure 10 Segments Viewed from Hwy 140

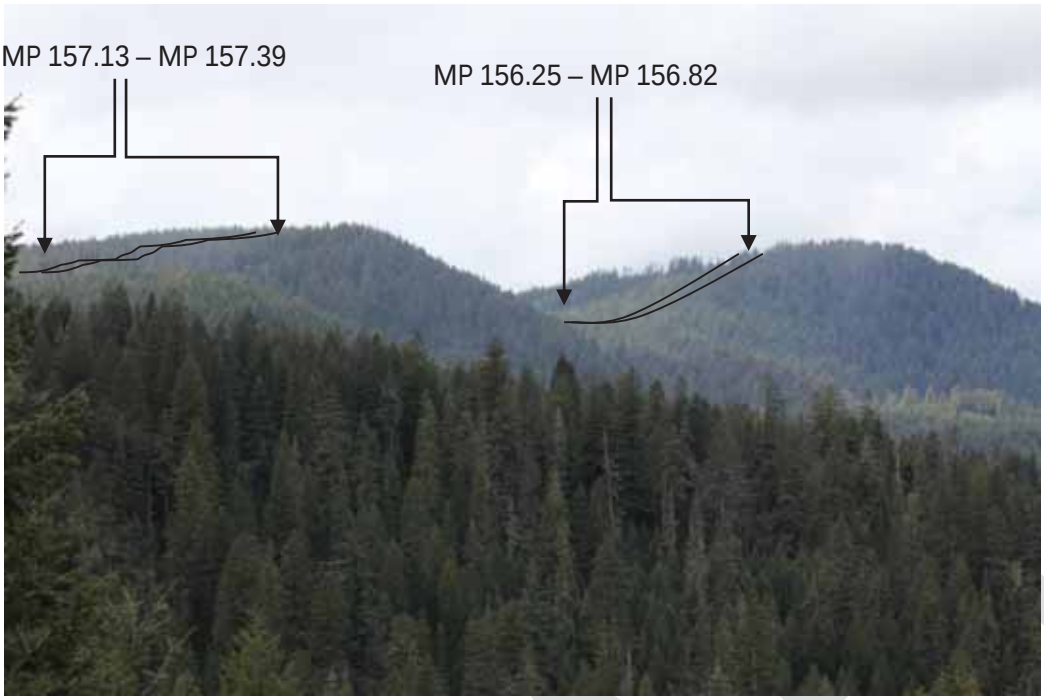


Photo taken from Hwy 140 (42° 23.204, 122°23.056)

All other segments are not expected to be visible from Hwy 140.

Conclusion

Segments ***153.76 to 154.63*** and ***155.80 to 156.20*** of the proposed ROW are not expected to be visible from Hwy 140. Therefore, the project would meet the visual quality objectives assigned for those areas.

There are two segments (***156.25 to 156.82 and 157.13 to 157.39***) of the proposed ROW expected to be visible as shown above. These two segments lie within an area of partial retention. Partial retention is not expected to be achieved within one year of project completion. Restoration efforts are expected to eventually achieve partial retention but not within a one year period. These segments will require a site specific Forest Plan amendment for the duration in which it is necessary for restoration efforts to effectively screen the pipeline corridor.

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

Appendix R-2

Analysis of Potential Impacts to Wilderness, Inventoried Roadless Areas, Potential Wilderness Areas and Other Undeveloped Areas from the Construction and Operation of the Proposed PCGP Project

Pacific Connector Gas Pipeline

Umpqua, Rogue River, and Winema National Forests

Prepared for:

USDA Forest Service

Prepared by:

North State Resources

Draft EIS

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Figure 3-5. Map of roaded areas in relation to the PCGP Project on the Winema NF 10

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1.0 INTRODUCTION AND DEFINITION OF TERMS

This section describes and analyzes the effects of the PCGP project on the characteristics which define Wilderness areas, inventoried roadless areas (IRA), potential Wilderness areas (PWA) and other undeveloped areas on National Forest System Lands. This section also describes the step-by-step methods used to identify any PWA that could be impacted by the proposed PCGP Project.

Wilderness areas, IRAs and PWAs, are discussed together because they share a set of terminology and interrelated history. In contrast, a wide range of terms and references have been used by respondents, the courts, and the Forest Service when referring to topics such as roadless, unroaded, non-inventoried roadless, and undeveloped areas. The terms and definitions as stated below will be used in this site-specific analysis. They are based on current law, regulation, agency policy, and the Land and Resource Management Plans as amended, for the Umpqua, Rogue River, and Winema National Forests.

1.1 WILDERNESS

A Wilderness area is designated by congressional action under the Wilderness Act of 1964 and other Wilderness acts. The Wilderness Act of 1964, Section 2(c) defines Wilderness, in part, as:

> [A]n area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements of human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; …

1.2 INVENTORIED ROADLESS AREAS

IRAs were identified in the 2001 Roadless Area Conservation Rule in a set of inventoried roadless area maps, contained in the Forest Service Roadless Area Conservation Final Environmental Impact Statement, volume 2, dated November 2000, which are held at the National headquarters office of the Forest Service, or any subsequent update or revision of those maps (36 CFR 294.11). These areas were set aside through administrative rulemaking and have provisions, within the context of multiple use management, for the protection of IRAs.

1.3 POTENTIAL WILDERNESS AREAS

This is not an official inventory. Official inventories of PWA areas are completed during forest planning. This document identifies PWAs only for purposes of assessing potential effects of the PCGP Project activities on Wilderness characteristics. PWAs are not a land designation decision (does not change current land management allocations), they do not imply or impart any particular level of management direction or protection, they are not an evaluation of potential Wilderness (FSH 1909.12, Chapter 72), and they are not preliminary administrative recommendations for Wilderness designation (FSH 1909.12, Chapter 73). The inventory of PWAs does not change the administrative boundary of any IRA or any congressionally designated Wilderness. The original designated management area (e.g., Matrix) would remain the land designation even if areas in the PCGP project planning area meet the handbook criteria for PWA. PWAs are evaluated (in regard to making recommendations to Congress for inclusion in the National Wilderness Preservation

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System) during the development or revision of land management plans, in other words at the forest planning level and not at the project planning level.

PWAs qualify for placement on the inventory if they meet one or more of the following criteria

(FSH 1909.12, Chapter 71.1):

1. The area contains 5,000 acres or more.
2. Areas contain less than 5,000 acres, but can meet one or more of the following criteria:
    a. Area can be preserved due to physical terrain and natural conditions.
    b. Areas are self-contained ecosystems, such as an island, that can be effectively managed as a separate unit of the National Wilderness Preservation System.
    c. Areas are contiguous to existing Wilderness, primitive areas, Administration endorsed Wilderness, or potential Wilderness in other Federal ownership, regardless of their size.
3. Areas do not contain forest roads (36 CFR 212.1) or other permanently authorized roads, except as permitted in areas east of the 100th meridian.

Areas may meet either criteria 1 and 3, or criteria 2 and 3. If the criteria in section 71.1 of FSH 1909.12 are met, criteria in section 71.11 of FSH 1909.12 (criteria for including improvements) must also be met. This analysis used the following project specific criteria to delineate areas characterized as undeveloped and roadless, yet included improvements:

- Roads (as defined in 36 CFR 212.1) were excluded per FSH 1909.12, section 71.1. Mapped areas were at least 300 feet from NFS roads. This distance was selected because tree harvest is commonly permitted within 300 feet of open forest roads for personal-use firewood. In addition, danger tree removal occurs at various distances from open forest roads depending on tree height, topographic slope, and other factors.
- Timber harvest areas where logging, as evidenced by stumps, and prior skid trails or roads are substantially unrecognizable, or areas where clearcuts have regenerated to the degree that canopy closure is similar to surrounding uncut areas per FSH 1909.12, section 71.11.

1.4 OTHER UNDEVELOPED AREAS

Other undeveloped areas refer to those areas that do not meet inventory criteria as PWAs, and are not an IRA or designated Wilderness area. There are no forest-wide or management area standards and guidelines specific to other undeveloped areas in the Umpqua, Rogue River and Winema NF LMPs. All lands, including undeveloped areas, are managed consistent with forest-wide standards and guidelines and by designated LMP management area allocations. Other undeveloped areas are identified because they may contain special resource values that warrant an evaluation differently than other parts of the project area.

2.0 METHODOLOGY

The analysis for PWAs within the PCGP Project area was conducted through a series of GIS map making, a review of aerial photography, and the use of professional judgment. The methodology utilized the application of specific PWA inventory criteria (described in Section 1 above). For each national forest crossed by the proposed PCGP Project the first step was to define the analysis area for identifying any PWAs that could be impacted by the PCGP Project. The analysis area included the consideration of any other adjacent federal lands (e.g. BLM lands).[1] The second step applied GIS map layers to each analysis area depicting the proposed pipeline corridor, existing Wilderness and IRAs, and the existing system roads on Federal lands.[2]

Forest roads have associated permitted uses and maintenance activities which have removed trees and created visible stumps within the road corridor. During initial road construction trees were felled within a clearing limit to provide for safe and efficient construction. Past clearing of trees along forest roads created stumps that are evident and recognizable. Road maintenance occurs to varying degrees along each road according to an assigned maintenance level and available funding. Road maintenance includes the periodic clearing of brush and falling of danger trees that present a hazard to forest visitors, employees, and contractors. Past removal of danger trees along forest roads created stumps that are evident and recognizable. Personal-use firewood gathering is generally permitted within 300 feet of open forest roads consistent with project NEPA decisions and motorized travel and access management plan decisions. Past firewood gathering along open forest roads created stumps that are evident and recognizable. Based on local knowledge, and professional judgment regarding the evidence of recognizable stumps, skid trails, etc. which occur to varying degrees adjacent to forest roads, and to facilitate easy on-the-ground identification of a uniform, measurable boundary along a semi-permanent, human-made feature, the boundary was set at 300 feet on each side of forest roads.

Step 3 consisted of utilizing aerial photography of each analysis area to evaluate other man-made improvements such as timber harvest areas.[3] Step 4 consisted of identifying any resulting undeveloped areas that would be impacted by the PCGP Project and meet the criteria for PWA. The Forest Service used professional judgment and local knowledge regarding any unique, site-specific conditions of each area being considered for placement on the inventory of potential Wilderness.

[1] FSH 1909.12 section 71.1 directs the Forest Service when identifying PWAs to consider areas that are contiguous to existing Wilderness, primitive areas, Administration endorsed Wilderness, or potential Wilderness in other Federal ownership. There are BLM lands adjacent to these areas of the Umpqua, Rogue River, and Winema NFs. In the fall of 2012 the BLM updated its inventory of lands with wilderness character. These updates were part of the Analysis of the Management Situation process associated with the proposed revisions of BLM LMPs for Western Oregon. The results of this most recent inventory were compared to the proposed pipeline route and no areas of overlap were discovered. The adjacent BLM lands along the proposed route of the PCGP Project have been evaluated and were found to not have Wilderness character. There are no other adjacent Federal lands. Therefore there are no contiguous potential Wilderness areas in other Federal ownership along the proposed PCGP route.

[2] The current travel management plans for each Forest were used to identify the roads on the transportation system. In some areas there may be older roads that are no longer on the transportation system but may still be identifiable on the ground.

[3] Timber harvest areas were identified by locating the most visible and recognizable areas using aerial photographs (dating as far back as 1994), and generally represent the more recent or clear-cut harvested areas. Past human activities in these areas are easily recognized by stumps, skid trails, and landing areas. Older or less identifiable harvested areas based on aerial photography are not included here and as a result the amount of past timber harvesting in these areas may be underestimated.

3.0 ANALYSIS

3.1 UMPQUA NATIONAL FOREST

This section discusses the PWA analysis in relation to the PCGP Project on the Umpqua NF. Figure 3-1 displays the area of analysis and the location of the pipeline corridor, existing roads, and any existing Wilderness or IRAs. The analysis area is a logical portion of the Umpqua NF in relation to the proposed PCGP project and extends to the Forest boundary to the North, South, and West of the PCGP Project and to areas of non-federal lands to the East.

The map in figure 3-1 demonstrates the proposed PCGP Project would generally follow existing roads through the Umpqua NF with the exception of one short section (less than 1/2 mile long) in the north end of the project area within the Umpqua NF. This area is the only occurrence on the Umpqua NF where the proposed pipeline would impact an area that is relatively undeveloped. The undeveloped area polygon that would be affected by the proposed PCGP Project is displayed in figure 3-2 along with past timber harvesting areas as evidenced by aerial photography. This short section of proposed pipeline construction is at the far western edge of the polygon near the Forest boundary.

Undeveloped area Polygon #1 on the Umpqua NF is 1,792 acres in size. Because this undeveloped area is less than 5,000 acres in size it does not meet PWA criteria #1. This area also does not meet criteria #2 for PWA less than 5,000 acres in size [FSH 1909.12, section 71.1(2)] for the following reasons. Using local knowledge and professional judgment, this area is not an area that can be preserved due to physical terrain or natural conditions. The boundaries of this undeveloped polygon traverses varied terrain and portions are bounded by private property lines that do not follow physical terrain features or natural conditions. This area is also not a self-contained ecosystem, and is not contiguous to existing Wilderness or IRAs, or potential Wilderness in other Federal ownership.

3.2 ROGUE RIVER NATIONAL FOREST

This section discusses the PWA analysis in relation to the PCGP Project on the Rogue River NF. Figure 3-3 displays the area of analysis and the location of the pipeline corridor, existing roads, and any existing Wilderness or IRAs. The analysis area is a logical portion of the Rogue River NF in relation to the proposed PCGP project and extends to the Forest boundary to the East, South, and West of the PCGP Project and to the IRA and Wilderness to the North.

The map in figure 3-3 demonstrates the proposed PCGP Project generally follows or is near existing roads with the exception of one short section (approximately 1.5 miles long) at the west end of the project area within the Rogue River NF. This area is the only occurrence on the Rogue River NF where the proposed pipeline would impact an area that is relatively undeveloped. This undeveloped area polygon is displayed in Figure 3-4 along with past timber harvesting areas as evidenced by aerial photography. The other areas impacted by the proposed project in the Rogue River NF present a landscape that has been managed and is developed in nature due to the road system density and past timber harvest activities (see figure 3-4).

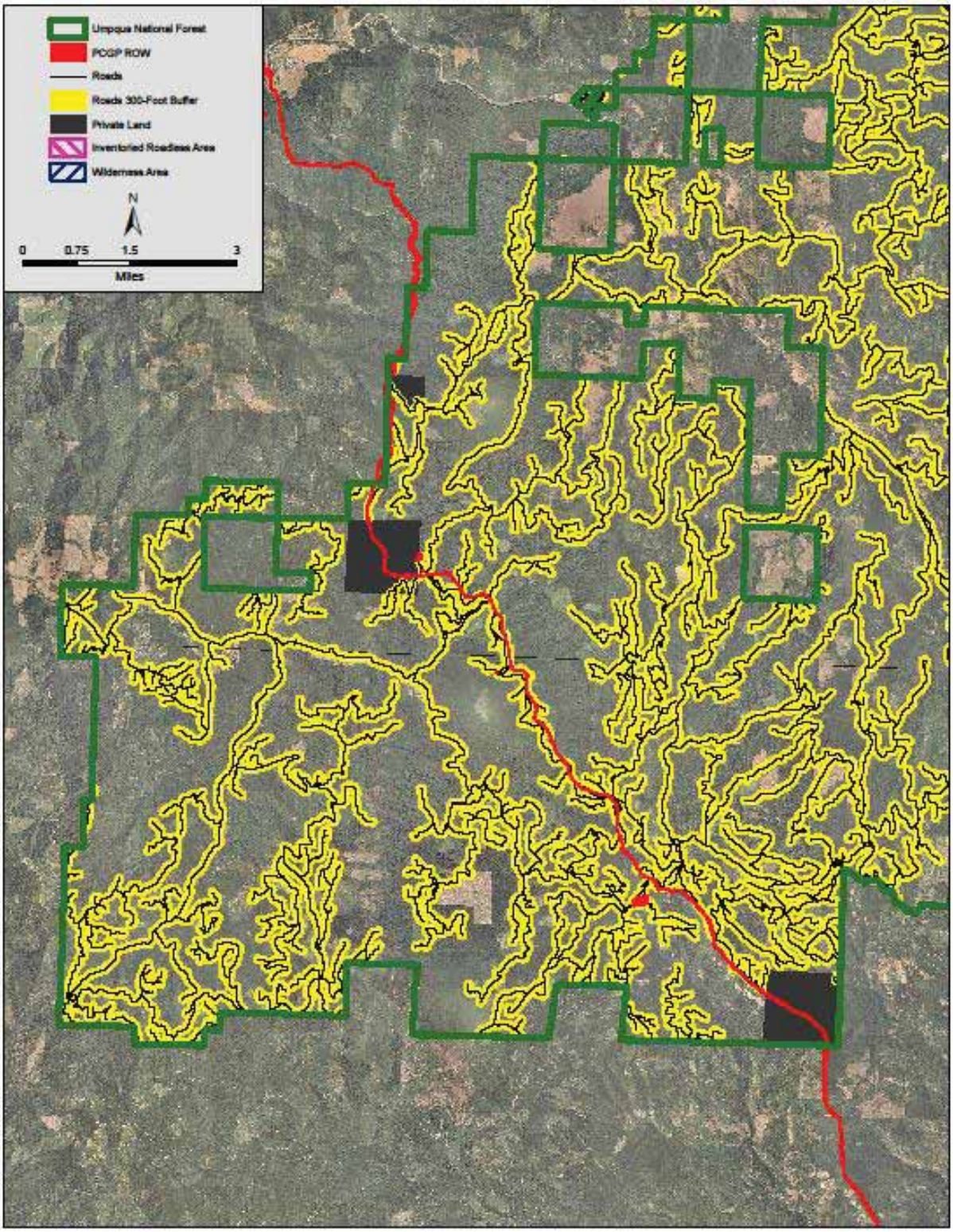


Figure 3-1. Map of roaded areas in relation to the PCGP Project on the Umpqua NF

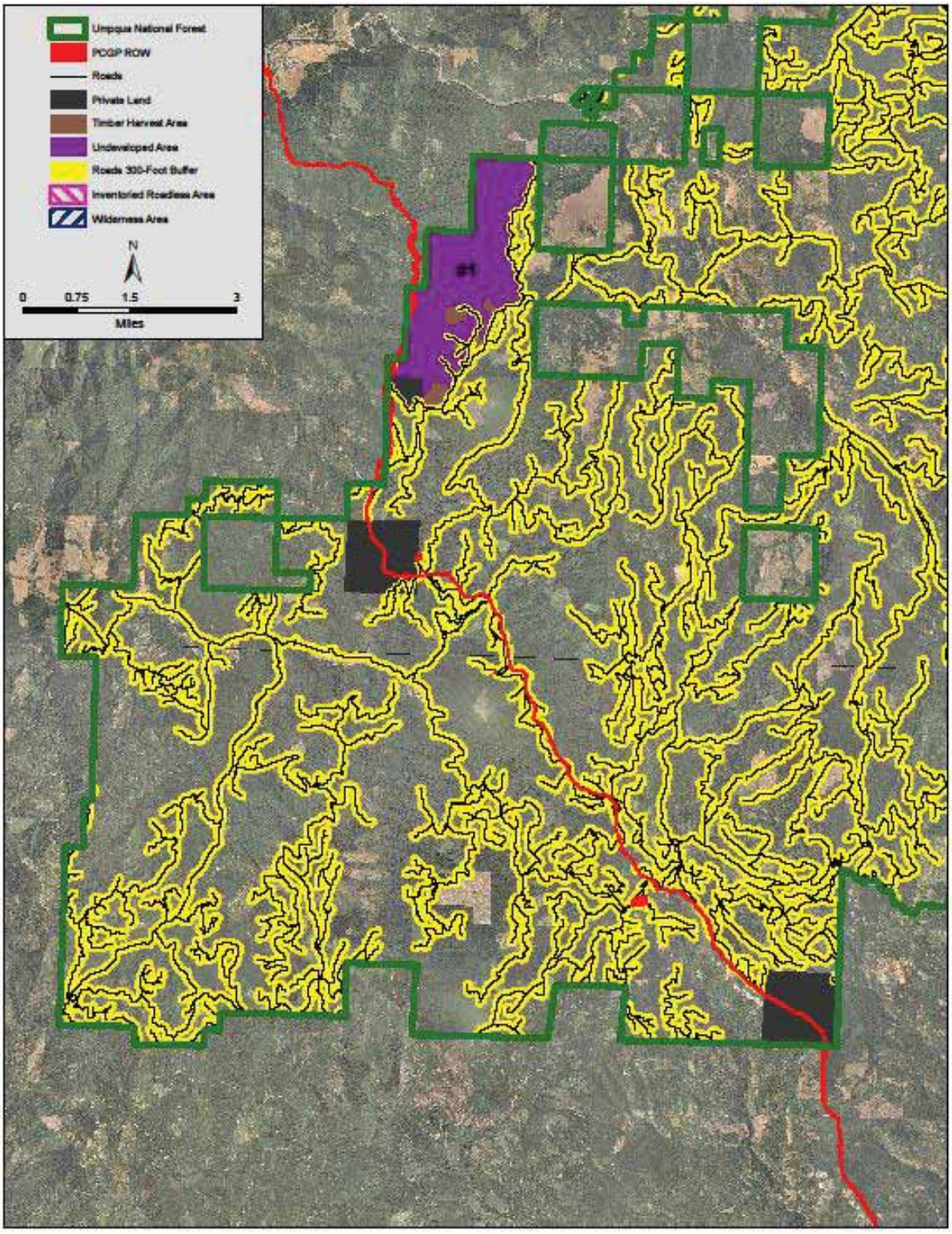


Figure 3-2. Map of other undeveloped areas and the PCGP Project on the Umpqua NF

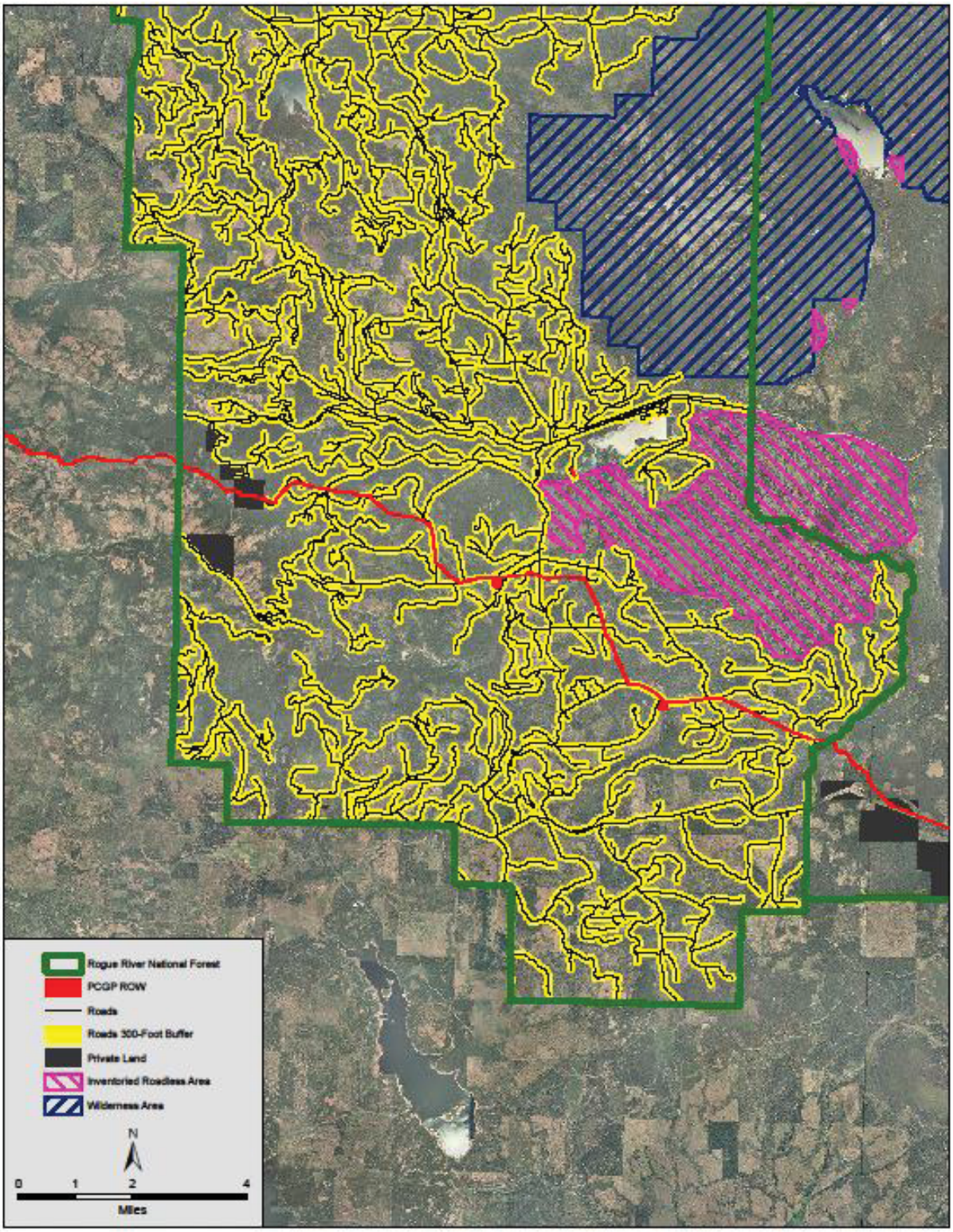


Figure 3-3. Map of roaded areas in relation to the PCGP Project on the Rogue River NF

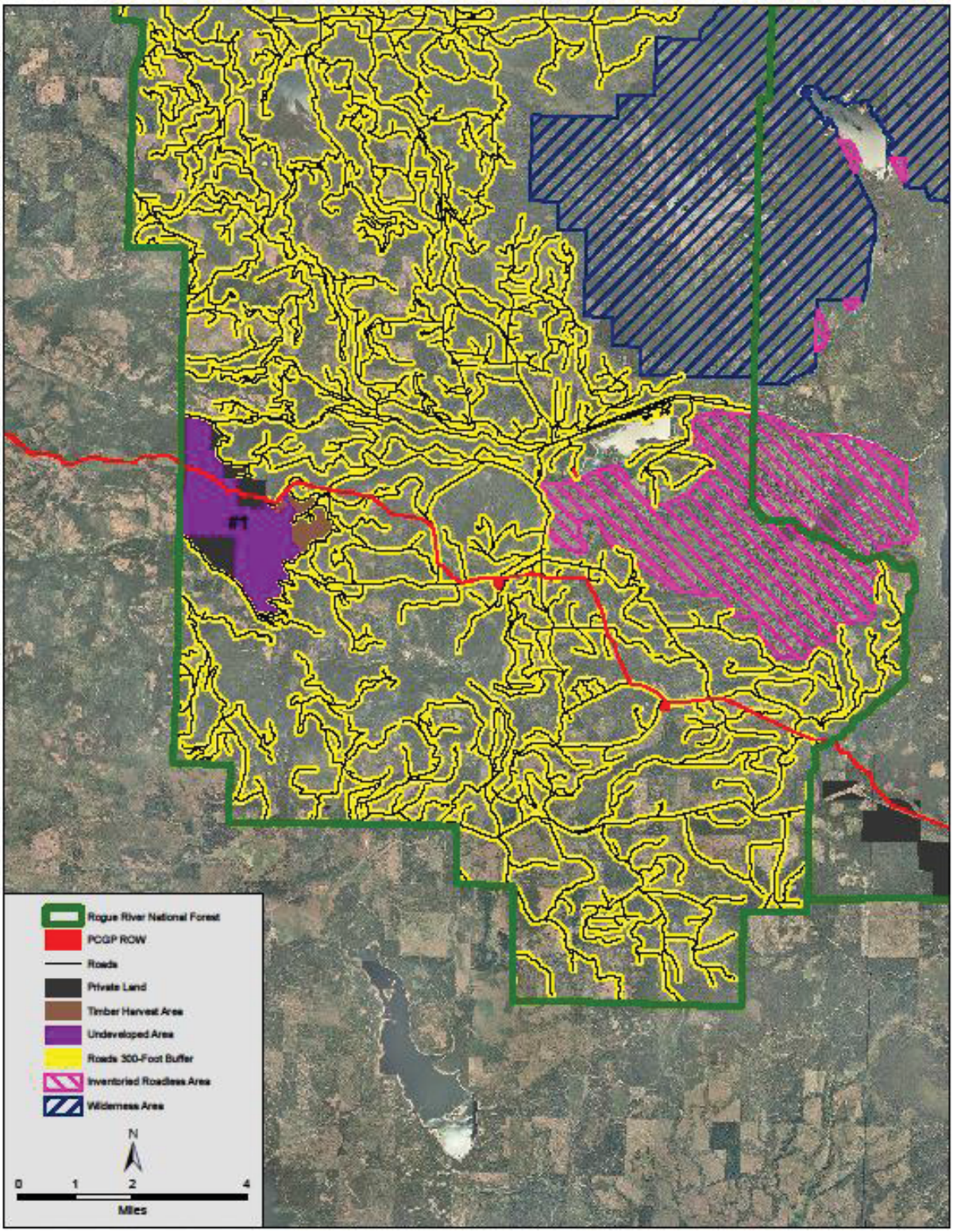


Figure 3-4. Map of other undeveloped areas and the PCGP Project on the Rogue River NF

Undeveloped area Polygon #1 on the Rogue River NF is 1,955 acres in size. Because this undeveloped area is less than 5,000 acres in size it does not meet PWA criteria #1. This area also does not meet criteria #2 for PWA less than 5,000 acres in size [FSH 1909.12, section 71.1(2)] for the following reasons. Using local knowledge and professional judgment, this area is not an area that can be preserved due to physical terrain or natural conditions. The boundaries of this undeveloped polygon traverses varied terrain and portions are bounded by private property lines that do not follow physical terrain features or natural conditions. This area is also not a self-contained ecosystem, and is not contiguous to existing Wilderness or IRAs, or potential Wilderness in other Federal ownership.

3.3 WINEMA NATIONAL FOREST

This section discusses the PWA analysis in relation to the PCGP Project on the Winema NF. Figure 3-5 displays the area of analysis and the location of the pipeline corridor, existing roads, and any existing Wilderness or IRAs. The analysis area is a logical portion of the Winema NF in relation to the proposed PCGP project and the Forest boundary. There were no undeveloped lands in this area on the adjacent Rogue River NF (see figure 3-4 above). Figure 3-5 demonstrates that the proposed PCGP Project would follow existing roads through the Winema NF and there would be no undeveloped areas affected.

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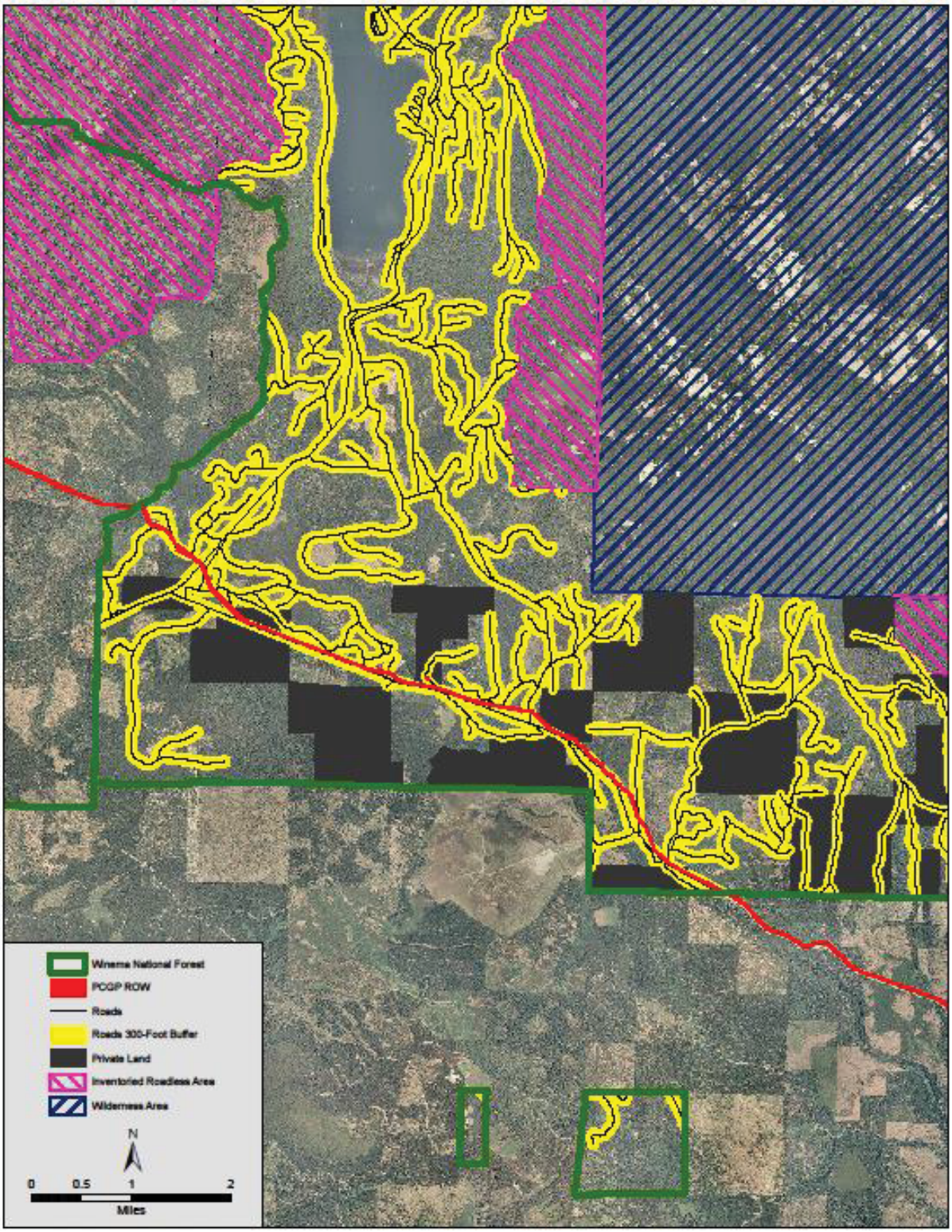


Figure 3-5. Map of roaded areas in relation to the PCGP Project on the Winema NF

4.0 EVALUATION OF EFFECTS

4.1 WILDERNESS

4.1.1 Existing Condition

Two Wilderness Areas are in proximity to the proposed PCGP alignment; Sky Lakes Wilderness (113,590 acres) is in both the Winema and Rogue River National Forests and its southern tip is approximately 3.7 miles north of the pipeline alignment at MP 162.0; and Mountain Lakes Wilderness (23,071 acres), in the Winema National Forest, is approximately 2.3 miles north of MP 173.0 (see figures 3-3 and 3-5 above).

4.1.2 Environmental Effects

No project activities would occur within or adjacent to a Wilderness area. There would be no effects on designated Wilderness or Wilderness characteristics because the closest Wilderness (Mountain Lakes) is over 2 miles away. Because of this distance, project activities would typically not be seen or heard by anyone recreating in the Wilderness. The exceptions could be short duration views of smoke during burning activities. Smoke management mitigation measures would minimize the risk of smoke drifting into the Wilderness.

4.2 INVENTORIED ROADLESS AREAS

4.2.1 Existing Condition

The nearest IRA is the Brown Mountain IRA, located on the Rogue River National Forest approximately 0.6 mile north of MP 162.0. On the Winema National Forest, the West Boundary IRA is about 2.2 miles northeast of MP 172.2 (see figures 3-3 and 3-5 above).

4.2.2 Environmental Effects

No project activities would occur within or adjacent to an IRA. There would be no effects on IRAs.

4.3 POTENTIAL WILDERNESS AREAS

4.3.1 Existing Condition

No undeveloped areas greater than 5000 acres would be crossed by the PCGP project on National Forest System Lands. All of the undeveloped areas crossed by the PCGP project are less than 5000 acres in size, are not contiguous to existing Wilderness or IRAs, and do not meet the PWA criteria for areas less than 5000 acres (see Section 3 above).

4.3.2 Environmental Effects

The PCGP project would not affect any PWA.

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4.4 OTHER UNDEVELOPED AREAS

4.4.1 Existing Condition

There are approximately 3,747 acres of other undeveloped areas not meeting PWA criteria that would be crossed by the PCGP Project (see Section 3 above). Other undeveloped areas may have intrinsic ecological and social values because they do not contain roads (or the roads are no longer system roads) and evidence of past timber harvest. These values can include intrinsic physical and biological resources (soil, water, wildlife, recreation, fisheries, etc.), and intrinsic social values (apparent naturalness, solitude, remoteness).

Human influences have had limited impact to long-term ecological processes within these other undeveloped areas. Disturbance by insects and fire have likely been the factors with the most potential to have impacted the area. Opportunities for primitive recreation include camping, hiking, hunting, wildlife watching, and photography. Opportunities for a feeling of solitude, the spirit of adventure and awareness, serenity, and self-reliance are limited by the size and shape of the polygons. Distance to roads and topographic screening are also factors. The size of the area necessary to feel a sense of solitude varies by individual. However areas that are long and narrow offer less opportunity for solitude due to less distance from noise at their midpoint. Nearby sounds of roads and timber harvest can often be heard and sometimes seen from within these undeveloped areas because they are all within approximately one mile or less of the nearest road from their midpoints.

4.4.2 Environmental Effects

There are two "other undeveloped areas" that would be impacted by the PCGP Project on Forest Service lands. One is on the Umpqua NF and the other is on the Rogue River NF (see figures 3-2 and 3-4 above). Table 4.4.2-1 provides a summary of the undeveloped areas and the acres that would be impacted by the PCGP Project on National Forest System lands.

TABLE 4.4.2-1

Summary of other undeveloped areas and acres impacted by the PCGP Project a/

National Forest	Polygon #	Acres Undeveloped	Acres impacted by the PCGP Project	Acres Unchanged
Umpqua NF	1	1,792	20	1,772
Rogue River NF	1	1,955	22	1,933
Winema NF	None	0	0	0
Totals	**2**	**3,747**	**42**	**3,705**

a/ Acres impacted include the pipeline corridor, temporary extra work areas, and acres used as un-cleared storage areas.

4.4.3 Intrinsic physical and biological resources (soil, water, wildlife, recreation, fisheries, etc.)

For other undeveloped areas within the PCGP Project area where proposed pipeline construction and operation would occur, the impacts to soil, water quality, air quality, forage, plant and animal communities, habitat for threatened, endangered, and sensitive species, developed recreation, noxious weeds, and cultural resources, etc. are essentially the same as disclosed in Chapter 4 of the DEIS and are not reiterated here.

4.4.4 Intrinsic social values (apparent naturalness, solitude, remoteness)

The proposed PCGP Project would impact the apparent naturalness, and solitude within these areas. Pipeline construction would alter the apparent naturalness on approximately 42 acres of these other undeveloped areas. Pipeline construction would increase the number of visible stumps, and the linear nature of the pipeline corridor clearing would be the most apparent visual change resulting from implementation. The linear nature of the cleared corridor would likely adversely affect the visual recreational experience of anyone using this area for dispersed recreation. This impact would be long-term due to a portion of the ROW being maintained as a low vegetation area for the life of the project. Although the proposed pipeline construction and operation would adversely affect visual resources in these areas it would not be inconsistent with the standards and guidelines for visual quality in the respective LMPs.

The sounds, smells, and sights of mechanical activities associated with the construction of the pipeline in and adjacent to these other undeveloped areas would reduce the sense of solitude and remoteness during construction activities. Other sights and sounds of ongoing and previously approved activities in areas adjacent to these other undeveloped areas would continue to have short-term effects on opportunities for solitude and remoteness. Overall there would be little change to the current availability of solitude or primitive recreation within these areas because only a very small amount (about 1% percent) would be impacted by the proposed PCGP Project (see table 4-1 above).

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

Appendix R-3
Winter Range Standard and Guideline Compliance

Rogue River National Forest

Prepared for:

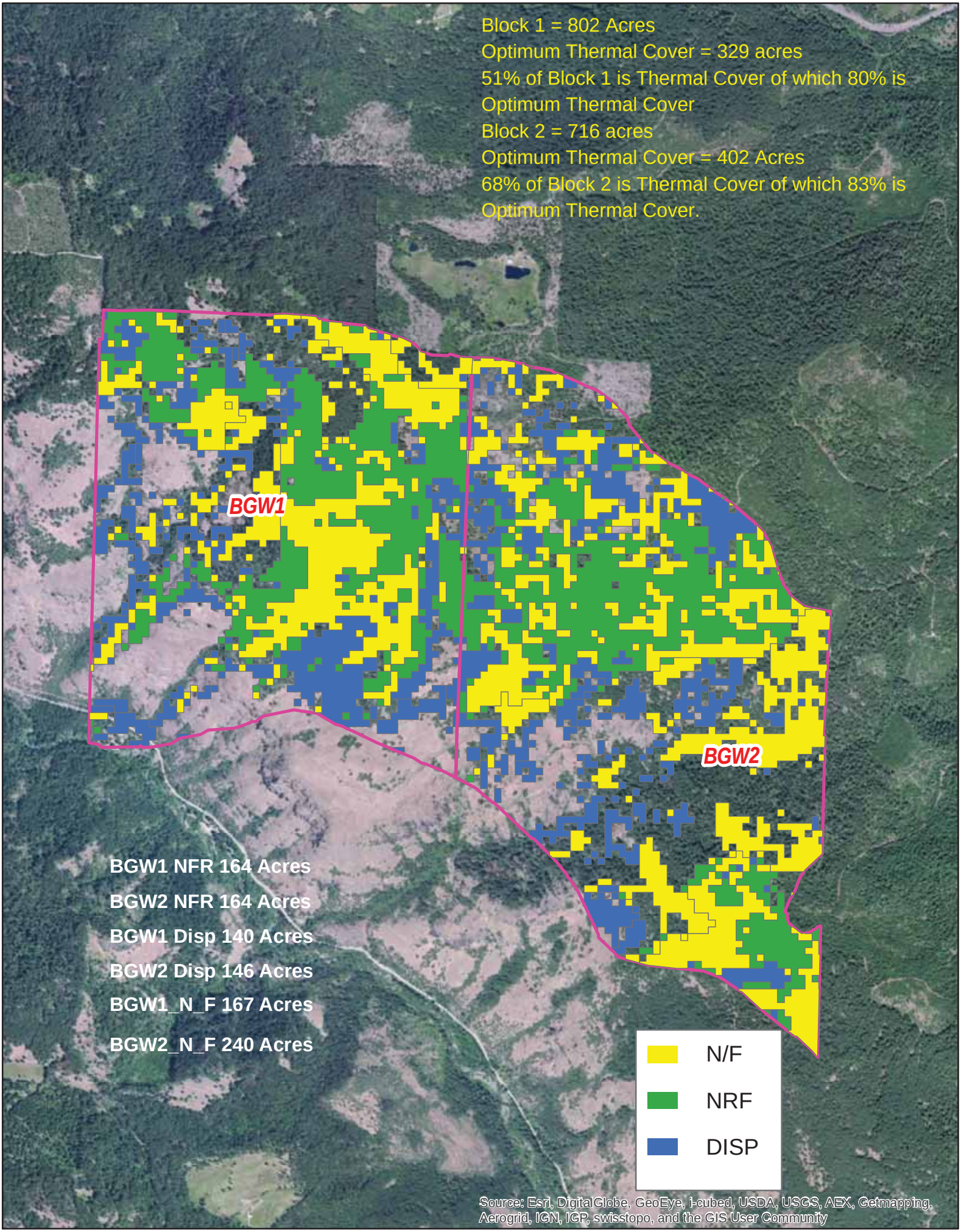
USDA Forest Service

Prepared by:

North State Resources in Cooperation with RRNF

Draft EIS

DRAFT


Block 1 = 802 Acres
Optimum Thermal Cover = 329 acres
51% of Block 1 is Thermal Cover of which 80% is Optimum Thermal Cover
Block 2 = 716 acres
Optimum Thermal Cover = 402 Acres
68% of Block 2 is Thermal Cover of which 83% is Optimum Thermal Cover.
BGW1
BGW2
BGW1 NFR 164 Acres
BGW2 NFR 164 Acres
BGW1 Disp 140 Acres
BGW2 Disp 146 Acres
BGW1_N_F 167 Acres
BGW2_N_F 240 Acres
N/F
NRF
DISP
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Pacific Connector Gas Pipeline Project

Draft EIS

Appendix R-4

Connectivity and Diversity Block Assessment

Coos Bay and Roseburg Districts

Bureau of Land Management

Prepared for:

Coos Bay and Roseburg Districts, BLM

Prepared by:

North State Resources

Draft EIS

DRAFT

Summary Table – Effects of PCGP ROW on LSOG in Connectivity/Diversity Blocks						
NSR Block No.	BLM Block No.	BLM Acres	Acres > 80 Years of Age	Acres > 80 Years of Age Removed by ROW	Resulting Acres > 80 Years of Age	Resulting % Acres > 80 Years of Age
1	1	621.20	489.47	1	488.47	78.6
3	3	218.80	218.80	3	215.80	98.6
4	12	882.82	382.76	4	378.76	42.9
5	11	1146.49.	807.19	4	803.19	70.0
6	38	638.56	224.35	1	223.35	35.0
7	39	319.26	223.50	0	223.50	70.0

Connectivity and Diversity Assessment

Roseburg District, South River RA, Connectivity Blocks

Block #	Total Acres	>80 Acres	% >80
1	621.20	489.47	79%
2	292.12	229.82	79%
3	218.80	218.80	100%
4	709.42	300.86	42%
5	762.05	752.63	99%
6	519.48	297.93	57%
7	811.16	664.55	82%
8	694.40	507.99	73%
9	503.24	221.56	44%
10	731.17	607.04	83%
11	1146.49	807.19	70%
12	882.82	382.76	43%
13	1730.37	1302.02	75%
14	371.33	255.88	69%
15	835.94	363.99	44%
16	986.63	767.30	78%
17	528.68	379.24	72%
18	200.41	71.42	36%
19	623.86	204.75	33%
20	582.13	232.98	40%
21	610.93	255.95	42%
22	631.36	299.39	47%

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23	639.45	310.70	49%
24	612.51	509.28	83%
25	581.63	349.00	60%
26	598.42	246.57	41%
27	644.85	228.23	35%
28	637.60	299.90	47%
29	640.13	218.66	34%
30	638.28	343.36	54%
31	657.07	253.13	39%
32	640.09	496.47	78%
33	684.64	617.13	90%
34	501.85	76.56	15%
35	598.94	101.43	17%
36	645.27	271.90	42%
37	597.79	325.92	55%
38	638.56	224.35	35%
39	319.26	223.50	70%
40	647.85	229.09	35%
41	632.87	513.48	81%
42	356.85	259.45	73%
43	566.82	244.16	43%
44	250.45	201.56	80%
45	466.06	316.80	68%
46	616.04	169.42	28%
47	691.81	433.81	63%
48	524.49	293.87	56%
49	611.08	339.42	56%
50	605.31	317.17	52%
51	339.72	306.97	90%
52	628.88	354.90	56%
53	661.54	447.41	68%
54	650.00	313.55	48%
55	307.09	199.25	65%
56	608.87	385.26	63%
57	629.24	502.71	80%
58	642.37	202.61	32%
59	633.07	468.31	74%
60	34.40	0.00	0%
61	152.65	74.10	49%
62	662.85	358.05	54%
63	399.72	218.41	55%
64	635.58	260.05	41%
65	317.77	203.78	64%
66	563.53	114.78	20%

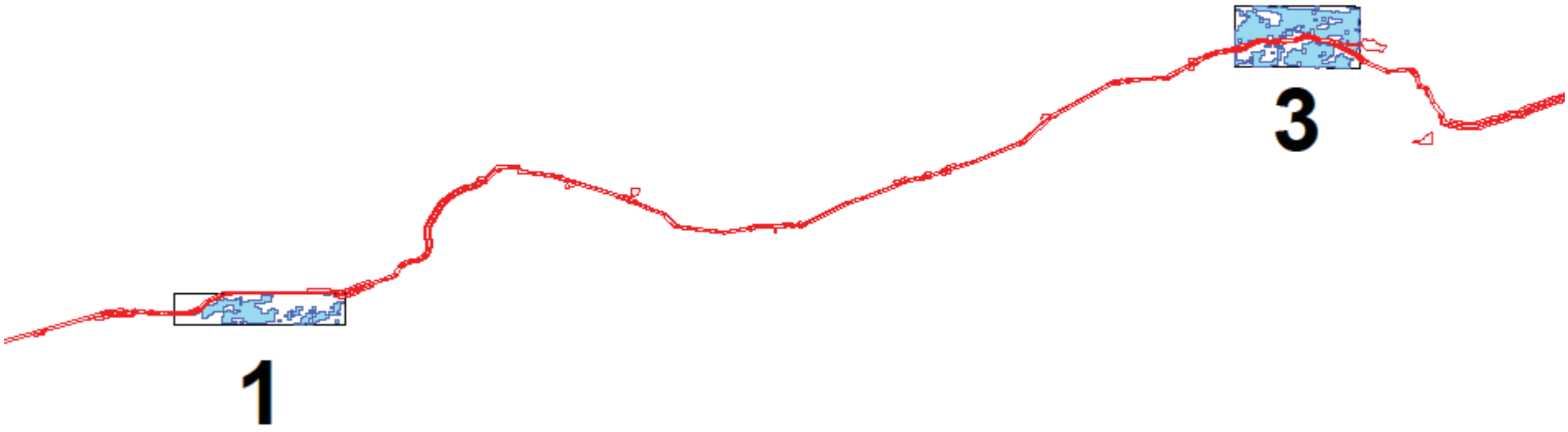
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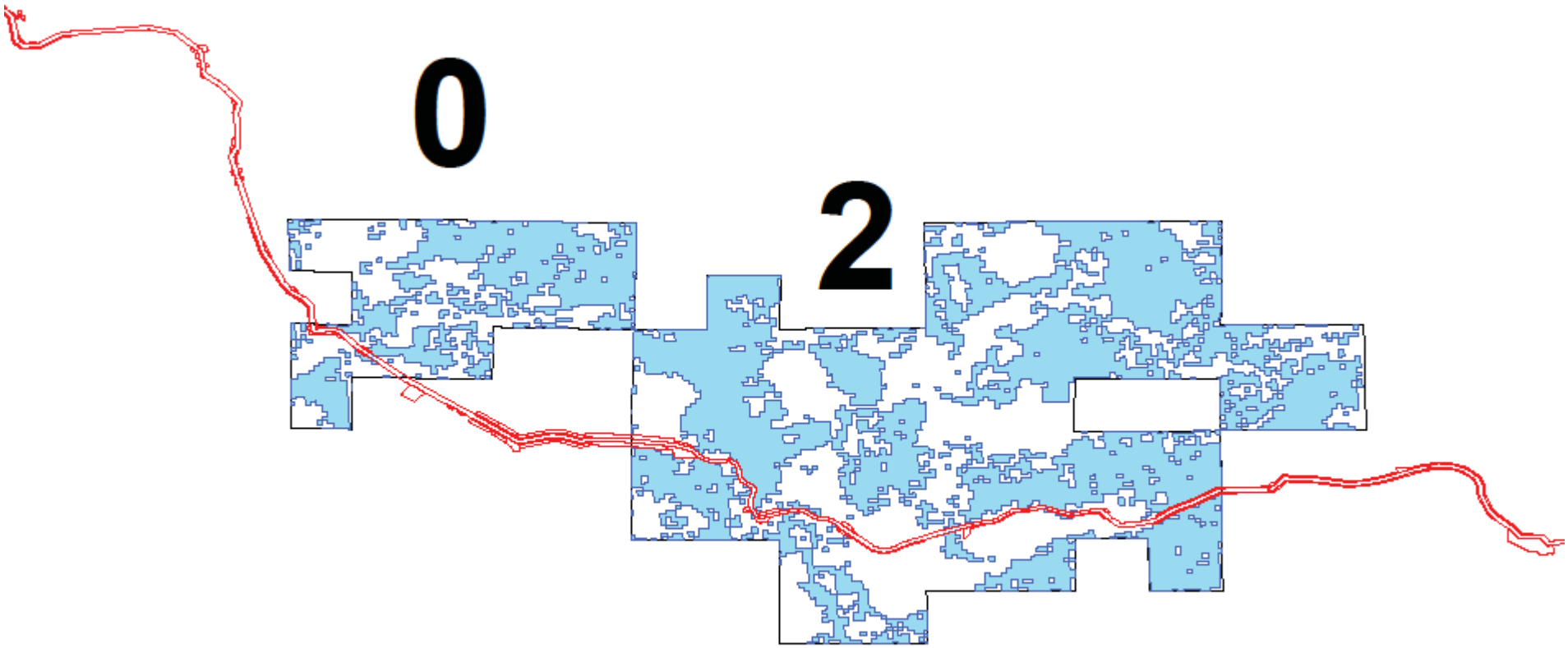
67	631.84	318.32	50%
68	637.44	330.29	52%
69	624.39	507.40	81%
70	643.32	335.92	52%
71	570.72	436.21	76%
72	587.45	206.28	35%
totals	**42,802.42**	**24,572.38**	**57%**

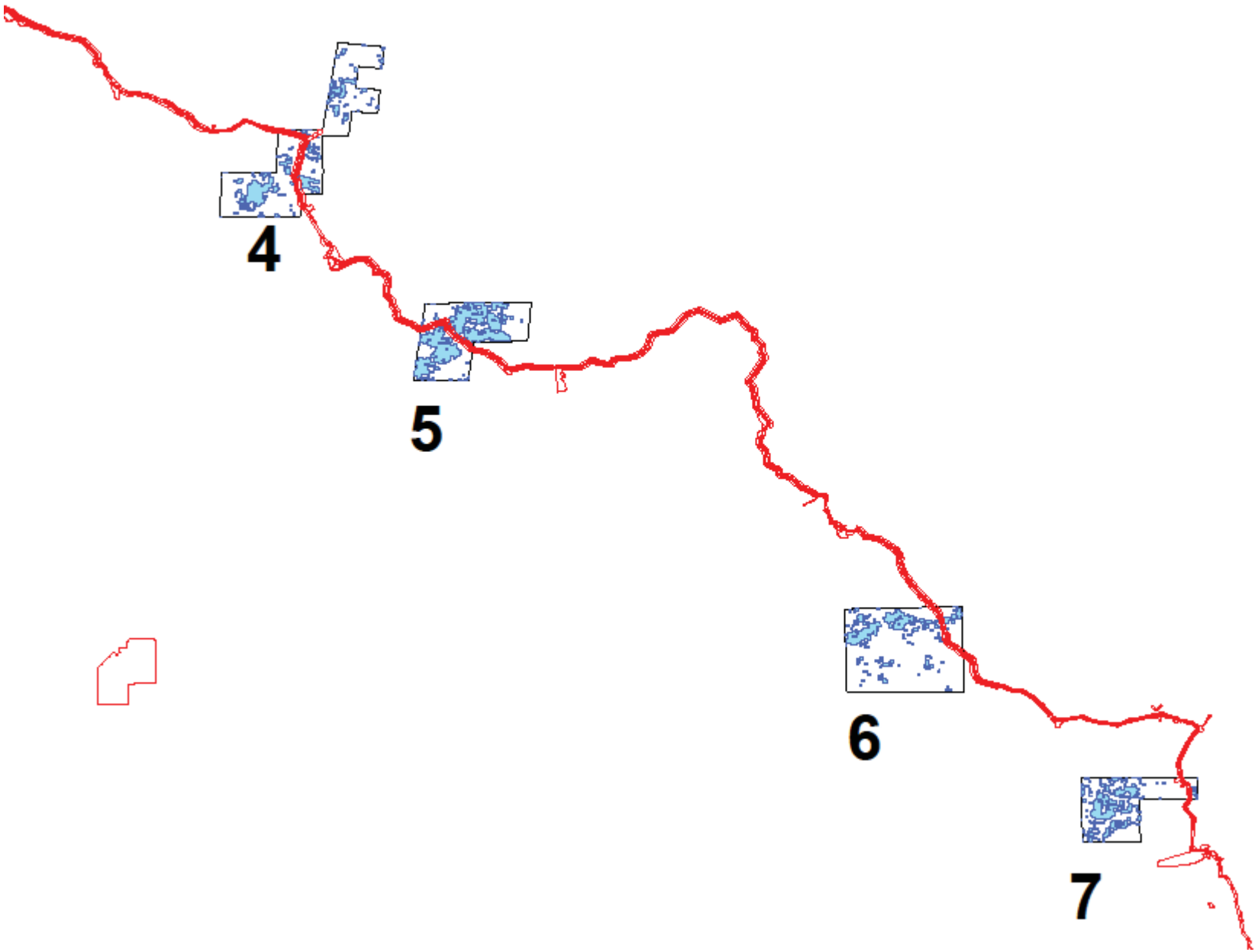
Coos Bay CD Blocks

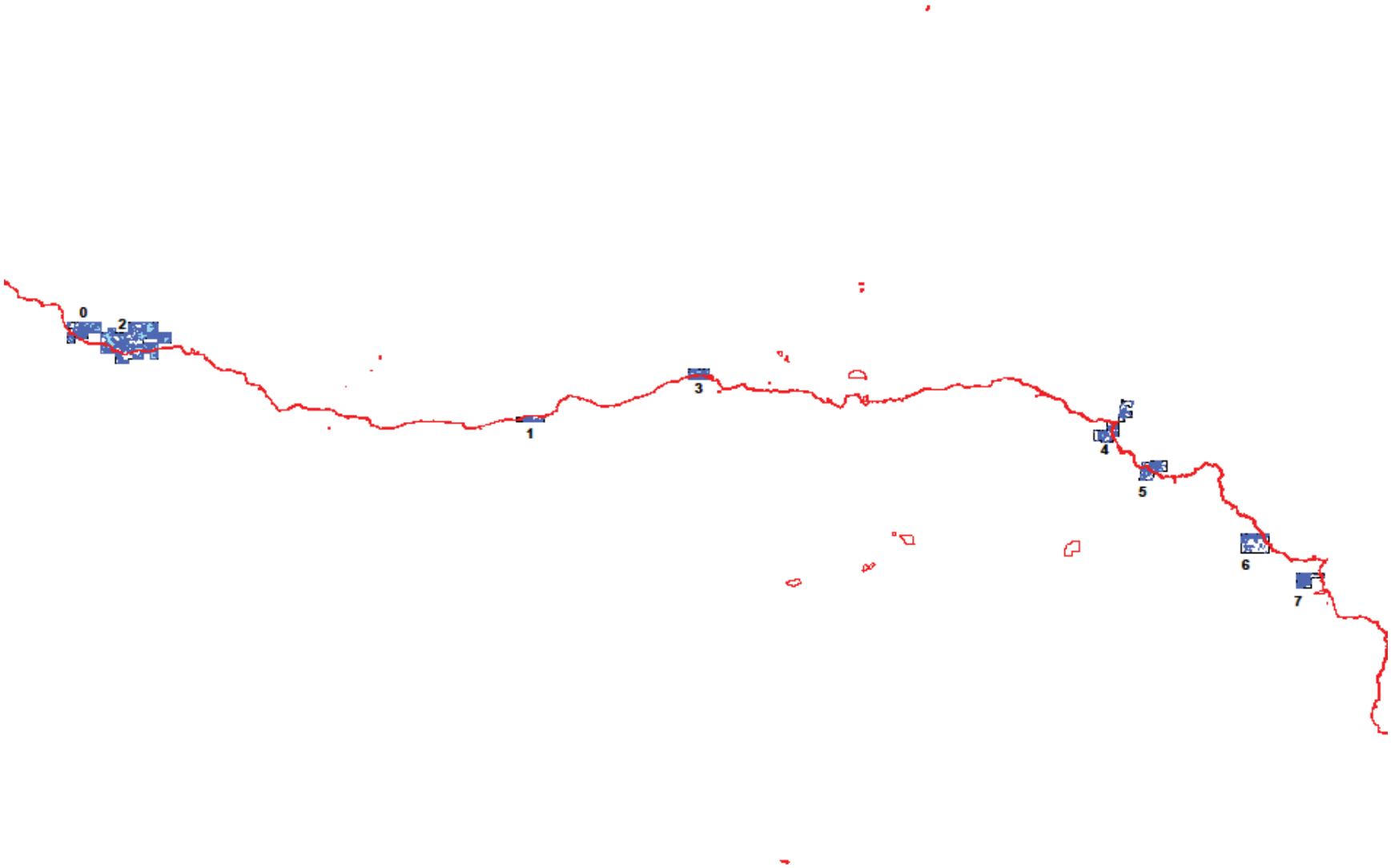
Area	Area Acres	LSOG Acres (w/o ROW)	% LSOG by Area	LSOG Acres (w/ROW)	%LSOG w/ROW
0	502	256	51%	254	51%
1	161	52	32%	51	32%
2	2069	1086	52%	1077	52%
3	235	141	60%	138	59%

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3
1


0
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0
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Appendix R-5

Analysis of Bureau of Land Management Areas with Wilderness Characteristics

Coos Bay, Roseburg, and Medford Districts and the Klamath Falls Resource Area of the Lakeview District, Bureau of Land Management

Prepared By: Oregon State Office, BLM

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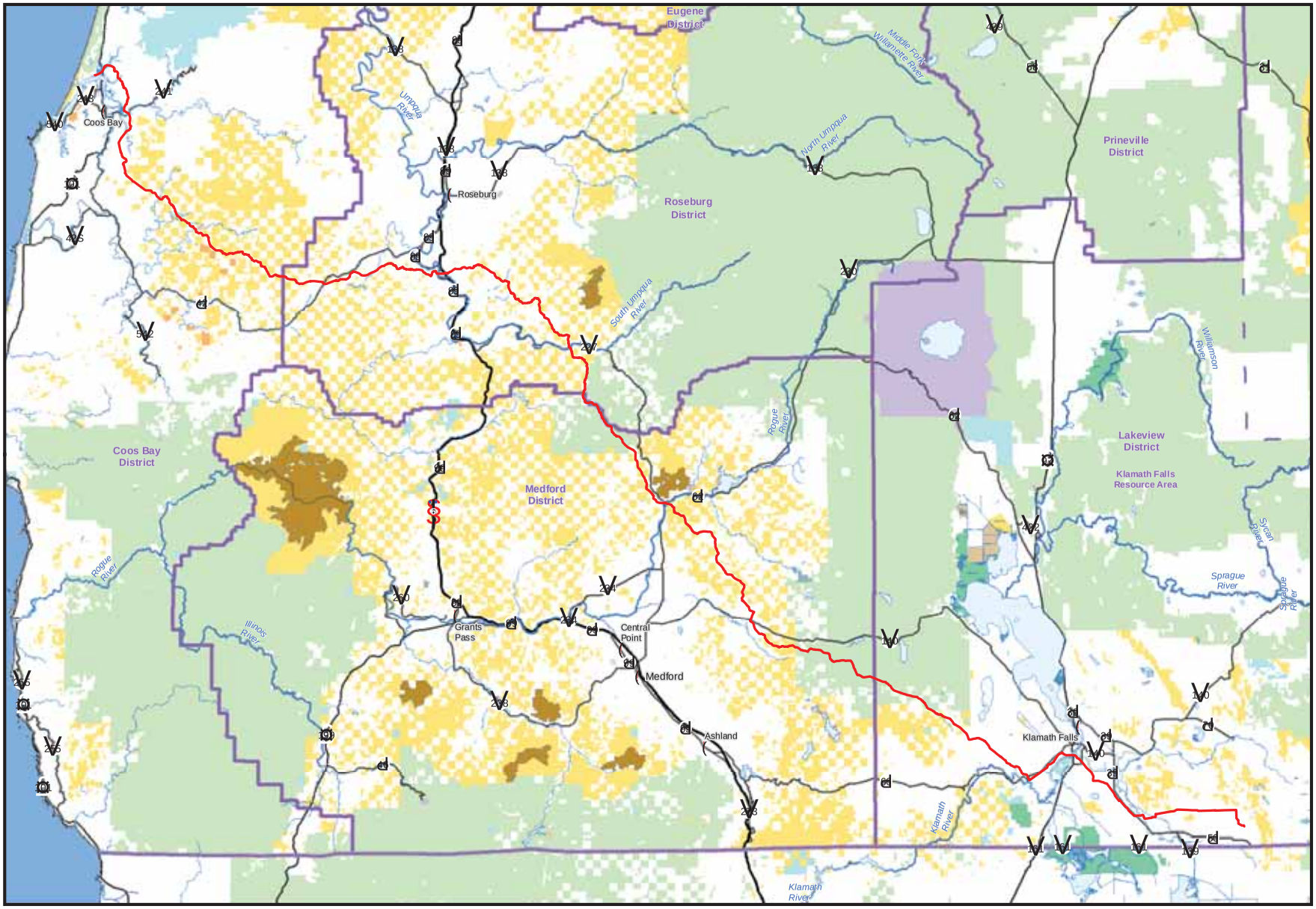
To Project Files

4.7.4 BLM Lands with Wilderness Character

In the fall of 2012 the BLM updated its inventory of lands with wilderness character. These updates were part of the Analysis of the Management Situation process associated with the RMPs for Western Oregon. The inventory covered BLM managed lands in the Salem, Eugene, Roseburg, Coos Bay and Medford Districts and the Klamath Falls Resource Area of the Lakeview District.

The results of this most recent inventory were compared to the proposed pipeline route and no areas of overlap were discovered. Therefore the proposed PCGP is not anticipated to impact land with wilderness character.

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Legend

- Cities and Towns
- PCGP Proposed Route 2012
- Wilderness Characteristics
- District Area Boundaries
- Bureau of Land Management
- U.S. Forest Service
- National Park Service
- U.S. Fish and Wildlife Service
- Bureau of Indian Affairs
- Other Federal
- State
- Local Government
- Private/Unknown

8

For internal use only.



Wilderness Characteristics and PCGP

0 10 20 40 Miles
0 15 30 60 Kilometers
1:750,000

No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of this data for individual or aggregate use with other data.

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

Appendix R-6

Consistency Determination, Pacific Connector Gas Pipeline Project and Upper Rock Creek Area of Critical Environmental Concern

Pacific Connector Gas Pipeline

Coos Bay District BLM

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Coos Bay District Office
1300 Airport Lane, North Bend, OR 97459
Web Address: http://www.blm.gov/or/districts/coosbay
E-mail: BLM_OR_CB_Mail@blm.gov
Telephone: (541) 756-0100 Toll Free: (888) 809-0839 Fax: (541) 751-4303

IN REPLY REFER TO

2880 (ORC000)
OR 63542

To: Note to Official File

From: Patricia Burke, District Manager, Coos Bay District BLM

Subject: Consistency determination between Pacific Connector pipeline project and Upper Rock Creek Area of Critical Environmental Concern.

The proposed Pacific Connector Gas Pipeline would cross the extreme southwest corner of the Rock Creek Area of Critical Environmental Concern (ACEC). Pacific Connector provided an assessment of impacts in the Rock Creek ACEC in their Plan of Development (POD) dated January 2013. In their review, Pacific Connector concluded that the values for which the ACEC was established would not be affected by the PCGP if it is constructed.

This 472-acre ACEC located in Section 5 of T. 29 S., R. 9 W. was designated to maintain, protect, and restore Relevant and Important values of the area's natural systems and botanical values which include approximately 300+ year-old western red cedar and western hemlock (approximate birthdate c. 1700), and skunk cabbage as well as sedge-dominated wetlands.

Approximately 1.1 acres of 40 year-old regenerating forest on the southwest corner of the ACEC would be would be affected by the PCGP if constructed. Based on a review of records for this ACEC, the area affected was not originally part of the ACEC because it was younger, regenerating forest and did not contain the Relevant and Important values found in the older forest / wetland areas. The boundary was later moved to the Rock Creek Road presumably to provide for simpler administration and mapping of the area. This boundary change added the area impacted by the PCGP to the ACEC. Since the affected area is a young, planted forest resulting from past timber harvest, the affected area does not contain the R&I values for which the ACEC was established.

I concur with Pacific Connector's assessment that the PCGP, if constructed, would not affect the Relevant and Important values for which the Rock Creek ACEC was established.

Patricia M. Burke
Coos Bay District Manager

8-19-14
Date

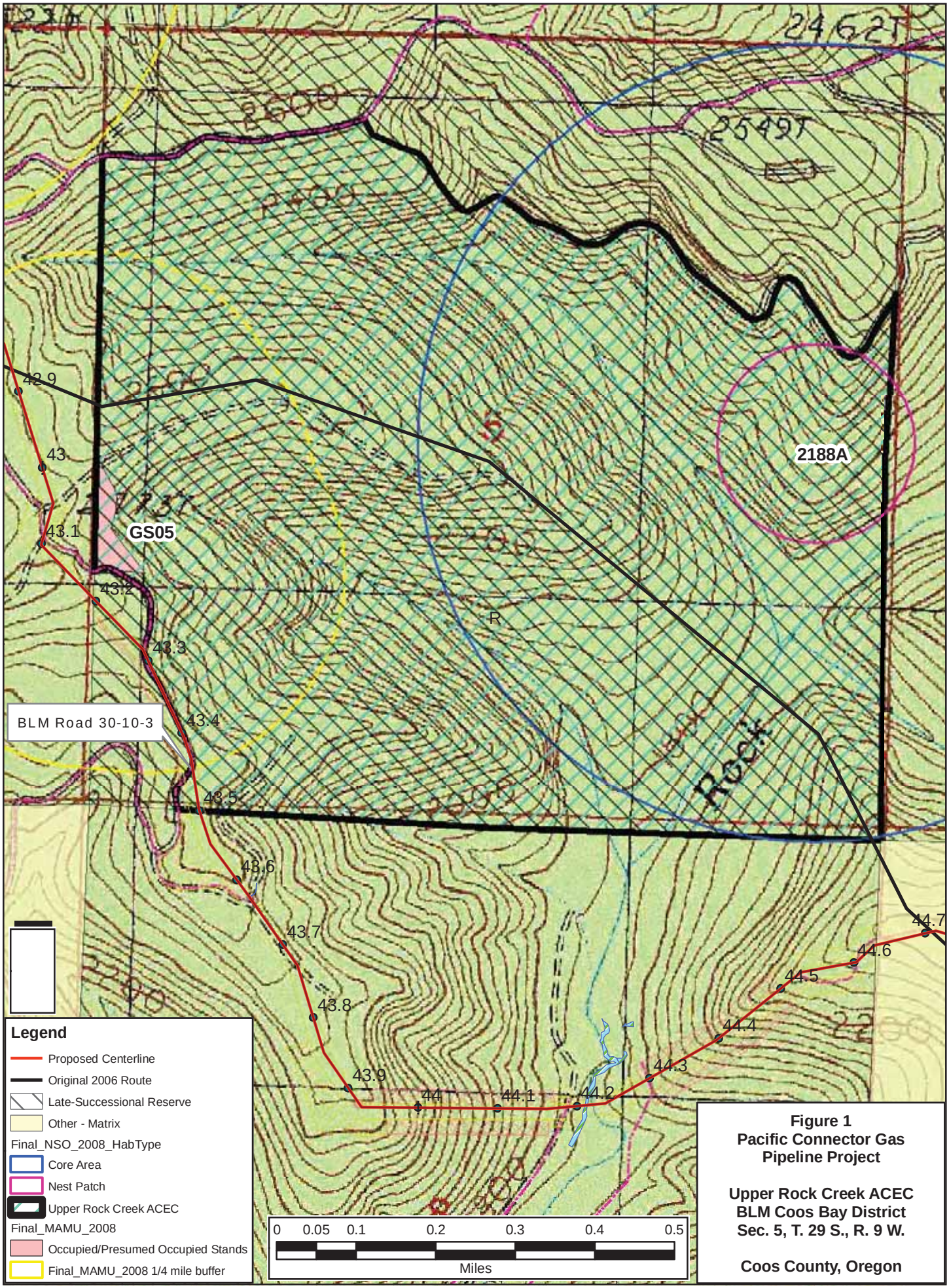


Figure 1
Pacific Connector Gas Pipeline Project

Upper Rock Creek ACEC
BLM Coos Bay District
Sec. 5, T. 29 S., R. 9 W.

Coos County, Oregon

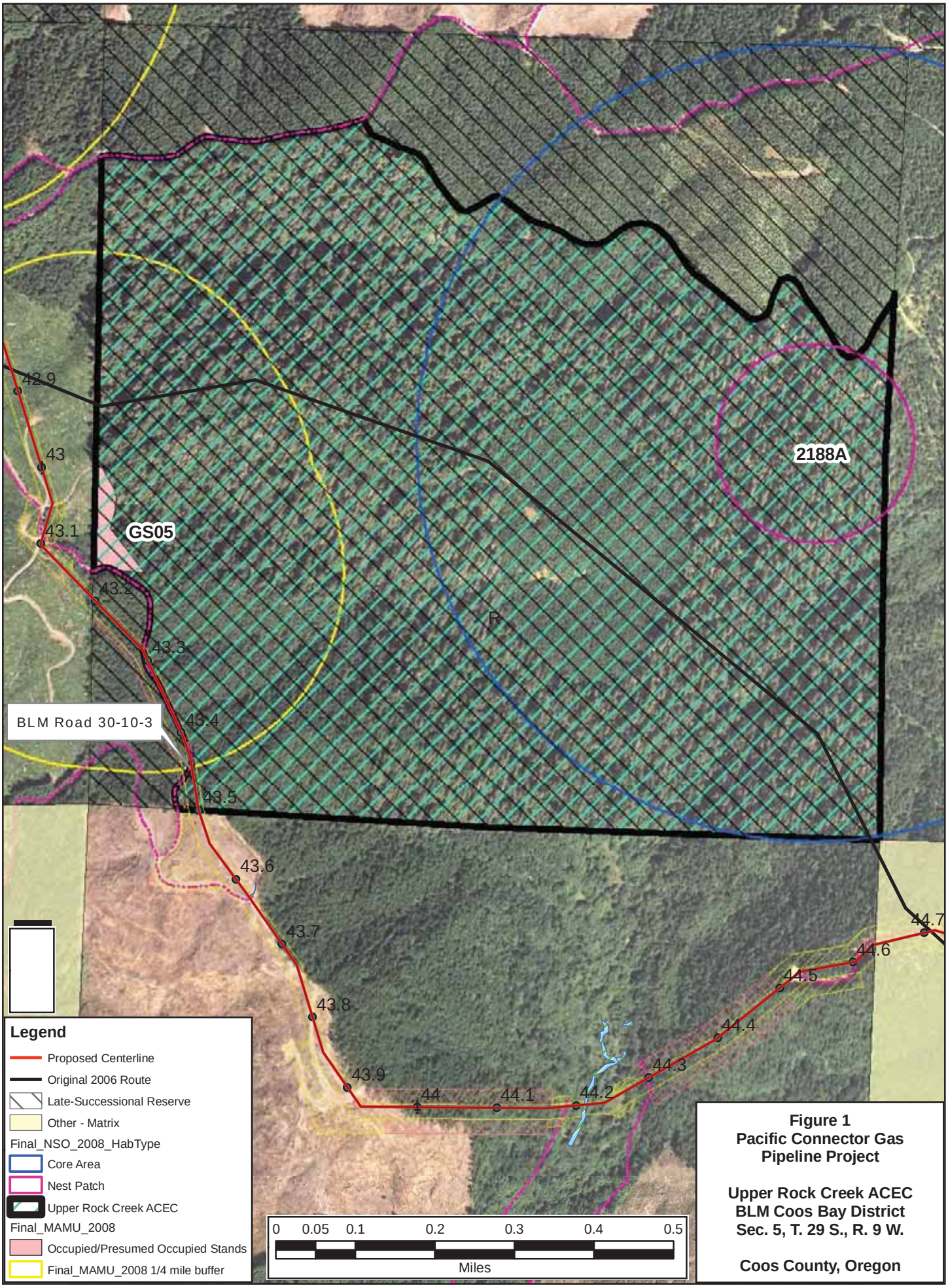


Figure 1
Pacific Connector Gas Pipeline Project

Upper Rock Creek ACEC
BLM Coos Bay District
Sec. 5, T. 29 S., R. 9 W.

Coos County, Oregon

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

Appendix R-7

Risk Assessment for the Proposed Pacific Connector Gas Pipeline
For Compliance with the Requirements of
Resource Management Plans of the
Coos Bay, Roseburg and Medford Districts as Amended by the
Record of Decision and Resource Management Plan Amendment for
Management of Port-Orford Cedar in Southwest Oregon,
Coos Bay, Roseburg and Medford Districts
Coos, Curry, Douglas and Josephine Counties

DRAFT

Prepared for:

USDI Bureau of Land Management

Prepared by:

North State Resources in Collaboration with
Coos Bay and Roseburg Districts, BLM

Port-Orford-Cedar Risk Key

The *Record of Decision and Resource Management Plan Amendment for Management of Port-Orford-cedar in Southwest Oregon, Coos Bay, Medford, and Roseburg Districts* (BLM 2004)[i] provides direction for assessing risk and controlling spread of *Phytophthora lateralis*, a root disease, in order to maintain Port-Orford cedar as an integral component of the vegetative communities of which the species is a part. This risk key is used for site-specific analysis to access the need for application of additional management practices. This assessment of the PCGP Right of Way indicates no special mitigation to limit the spread of *Phytophthora lateralis* is required on the PCGP Right of Way or haul routes, because:

- There are no known uninfected Port-Orford-cedar within, near or downstream of the proposed PCGP Right of Way or anticipated haul routes whose ecological, Tribal, or product use or function measurably contributes to meeting resource management objectives;

- There are no known uninfected Port-Orford-cedar within, near or downstream of any part of the proposed PCGP Right of Way or anticipated haul routes that, were they to become infected, would likely spread infections to trees whose ecological, Tribal, or project use or function measurably contribute to meeting land and resource management plan objectives; and

- No part of the proposed PCGP Right of Way is located within uninfested 7th-field watersheds (drainages). The *Record of Decision and Resource Management Plan Amendment for Management of Port-Orford-cedar in Southwest Oregon, Coos Bay, Medford, and Roseburg Districts* (BLM 2004) documented that there are no uninfested 7th field watersheds on the Coos Bay or Roseburg BLM Districts. There are uninfested 7th field watersheds on the Medford District BLM, however they are not crossed by the PCGP Right of Way or haul routes.

Although no additional mitigation is indicated, measures to reduce the risk of further spread of *Phytophthora lateralis* would be implemented if uninfected stands whose ecological, Tribal, or project use or function measurably contribute to meeting land and resource management plan objectives are discovered within or adjacent to the proposed PCGP Right of Way or adjacent to haul routes. These protection measures would include: equipment washing as previously described with respect to noxious weed control; restricting road construction, improvements, renovation, maintenance and decommissioning to the dry season (June 1 to October 31); restricting hauling on unsurfaced roads to the dry season; scheduling operations in uninfested areas prior to work in infested areas and decommissioning and blocking unsurfaced BLM roads upon completion of construction operations, including all PCGP Temporary Access Routes on BLM lands.

---

[i] Bureau of Land Management, 2004. Record of Decision and Resource Management Plan Amendment for Management of Port-Orford-Cedar in Southwest Oregon, Coos Bay, Medford, and Roseburg Districts. Coos, Curry, Douglas and Josephine Counties. U.S. Department of the Interior, Bureau of Land Management, 333 SW 1st Avenue, Portland, OR 97208. May 2004

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

Appendix R-8

Visual Resource Analysis

Coos Bay, Roseburg and Medford Districts and Klamath Falls Resource Area of the Lakeview District, Bureau of Land Management

Prepared by:

USDI Bureau of Land Management

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Medford District Office
3040 Biddle Road, Medford, Oregon 97504
Email address: BLM_OR_MD_Mail @blm.gov

IN REPLY REFER TO:
2880 (ORM050)
OR-63542
FERC Docket CP13-492-000

Memorandum

To: Loraine Salas, PCGP Project Manager

From: Jon Raby, Butte Falls Field Manager
Don Holmstrom , Klamath Falls Field Manager

Subject: Visual Resources Analysis

This memo is to clarify and summarize the visual resources analysis of BLM lands for the Pacific Connector Gas Pipeline project.

Staff review of the June 2013 Resource Report No. 8 verifies that the inaccuracies of the previous versions have been corrected, and it now accurately describes the visual impacts of the PCGP.

Professional assessments of the project's impacts were done by Recreation Planners in the Coos Bay, Roseburg, Medford and Klamath Falls offices at several Known Observation Points (KOPs) in sensitive viewsheds. Although the project will not fully meet the VRM Class II objectives in the short-term at the Trail Post Office KOP (Butte Falls Resource Area) or on the BLM portion of Clover Creek Road (Klamath Falls Resource Area), Class II objectives at those locations will be met in the long-term by using mitigation efforts described in the January 2013 Aesthetics Management Plan.

Using guidance from the Aesthetics Management Plan for these and other sensitive viewsheds along the PCGP will reduce visual impacts to the point that land use plan amendments of the Medford District and Klamath Falls RMPs are not necessary for the project. The project does not meet VRM Class II objectives in the short-term (less than 5 years) at these two locations, but plan amendments are not needed because the areas in question are very short, and mitigation developed in the Aesthetics Management Plan will help the areas reach VRM Class II objectives in the long term (5-10 years).

cc: Mike Hupp
PO Box 1533
Mount Shasta, CA 96067
mhupp@mdhnet.com

APPENDIX S

Wildlife Habitat Mitigation Plan

Jordan Cove Energy Project

Wildlife Habitat Mitigation Plan in accordance with OAR 635-415-0000 through 0025

Prepared for:

125 Central Avenue, Suite 380

Coos Bay, OR 97420

Prepared by:

DAVID EVANS AND ASSOCIATES INC.

2100 SW River Parkway

Portland, OR 97201

May 2014

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1. INTRODUCTION

The Jordan Cove Energy Project (JCEP) is comprised of three components: the Jordan Cove Liquefied Natural Gas (LNG) Terminal Project, the Pacific Connector Gas Pipeline Project (PCGP), and the Slip and Access Channel Project. Jordan Cove Energy Project, L.P. (JCEP L.P.), the Oregon International Port of Coos Bay (Port), and Pacific Connector Gas Pipeline, L.P. (Pacific Connector) are seeking to construct, operate, and maintain these three project components. Figure 1, Project Vicinity, shows the primary elements of the JCEP discussed in this plan. The PCGP is not shown on Figure 1 because this plan does not cover the PCGP as mitigation for the PCGP will be addressed separately by Pacific Connector.

Natural gas will be delivered to the LNG terminal site (via the gas pipeline, which will connect the terminal with existing Pacific Gas and Electric Company [PG&E] intrastate pipeline and interstate natural gas pipeline systems), where it will be conditioned, cooled into a liquid, stored in two full-containment 160,000 m3 LNG storage tanks, and loaded on to LNG carriers for export at newly constructed marine facilities.

Such marine facilities include an access channel and a slip that the Port will seek authorization to construct, operate, and maintain. The Slip and Access Channel will connect the existing Coos Bay Navigation Channel and the Jordan Cove LNG Terminal Project site at approximately Coos Bay Navigation Channel Mile 7.3. Based on the estimated size of the LNG carriers expected to call upon the terminal, it is anticipated that approximately 90 ships per year will be required to transport the LNG from the terminal. The Project footprint is defined as the area that will be both temporarily and permanently impacted by the Jordan Cove LNG Terminal Project and the Slip and Access Channel Project.

Impacts resulting from the Jordan Cove LNG Terminal Project and the Slip and Access Channel Project have been minimized, to the greatest extent practicable, as discussed in the Federal Energy Regulatory Commission (FERC) Resource Reports available on line at the Jordan Cove Energy Project, L.P. FERC website:
http://www.jordancoveenergy.com/ferc_application_and_resource_reports_1-13.htm#rr3

Please refer to the FERC Resource Reports for additional information on how the Project design was evaluated and selected as proposed.

JCEP L.P. contracted with David Evans and Associates, Inc. (DEA) to develop a plan to mitigate unavoidable impacts to wildlife habitat. This mitigation plan is intended to thoroughly describe the manner in which the impact of the project will be reduced or eliminated over time, avoided, and/or minimized; and the affected environment, including fish and wildlife habitat, monitored, restored, rehabilitated, repaired and/or replaced or otherwise compensated for in accordance with Oregon Administrative Rule (OAR) 635-415-0000 through 0025.

Meetings with three Oregon Department of Fish and Wildlife (ODFW) representatives and three JCEP team members took place in Coos Bay on July 23 and August 26, 2013. The purpose of these meetings was to discuss habitat mapping for the Jordan Cove LNG Terminal Project and the Slip and Access Channel Project components, and formulate an overall mitigation strategy that meets the ODFW Habitat Mitigation Policy. DEA presented a summary of existing conditions and unavoidable impacts to habitat resulting from proposed project development.

The group reviewed and edited the draft ODFW habitat categorization for the project, discussed potential strategies and locations for mitigating impacts, and visited potential mitigation sites to further refine these concepts. The results of these discussions are included in this document.

ODFW concurred with the habitat mapping within project elements described in the Final ODFW Habitat Categorization Technical Memo (dated September 10, 2013) on October 30, 2013. This mitigation plan was reviewed by ODFW and their input has been incorporated.

2. ALTERNATIVES

The alternatives to the proposed development action are provided in detail in Resource Report10 (Docket No. CP13-483), which was produced by SHN Consulting Engineers & Geologists (SHN) in May 2013 and is available online.

3. IMPACTS

3.1 IMPACT SUMMARY

The location, physical and operational characteristics, and duration of the proposed development action and wetland impacts are described in the permit applications submitted to the Oregon Department of State Lands (DSL) on March 20, 2014 and the US Army Corps of Engineers (USACE) on June 11, 2013 with recent updates sent on March 28, 2014. These documents are available on DSL's website:
http://www.statelandsonline.com/index.cfm?fuseaction=Comments.AppListLF&county=Coos

The DSL permit application (#54908-RF) was deemed complete by DSL on April 18, 2014. Since mitigation for wetland and estuarine resources is overseen by DSL and USACE, it is not emphasized in this document, and the remainder of this document focuses on upland habitat mitigation.

The habitat types that may be affected by the proposed development action are shown in Figure 2. They are described by mitigation site in the following sections and in detail in FERC Resource Report 3 (RR3), which is available online, and is summarized below:

> The Project is not expected to have a long-term significant impact to vegetation resources, as the areas that will be graded and cleared for construction are relatively common and widespread throughout the North Spit and the Project vicinity. The Project footprint was selected on the basis of avoiding, to the extent practical, unique vegetation communities and higher value wetlands. Selection of temporary construction staging sites was primarily restricted to upland areas to avoid impacting wetlands.

The fish and wildlife species which will be affected are described in detail in RR3, as summarized below:

> A number of habitats exist on the Project site that support a variety of wildlife species as temporary or permanent residents. Approximately 178 tetrapod species (amphibians, reptiles, birds, and mammals) were recorded on or adjacent to the Project site during surveys conducted in October 2012 and during previous surveys from June to December 2005 and in early 2006. Terrestrial species include approximately 115 species. Approximately 151 seasonal or year-round resident bird species occur in the Project site area, and a variety of habitats suitable for migratory birds exists within the Project site boundaries. Species types and densities are directly related to season of year, preferred habitats, food resources, and protective cover.
>
> The proposed Project site provides suitable habitat for a number of wildlife species associated with the coastal, mid-coastal, interior foothills, and mountain terrains that construction and operation of the proposed Project could affect. The majority of wildlife species detected on or adjacent to the Project site during the 2005/2006 and 2012 surveys were birds. Twenty-nine federal or state-listed threatened or endangered species, and one proposed species, potentially occur in the proposed Project area.

Although these species potentially occur, the report goes on to say that, based on available knowledge, consultation with agencies, and focused surveys for particular species, no listed terrestrial species are known or expected to occur within the study area. Please refer to RR3 for greater detail.

In order to decrease impacts to wildlife from construction, the Draft Jordan Cove Energy Project Wildlife Salvage Plan was assembled using best available information regarding salvage of a variety of species, and has been included as Appendix C. ODFW provided input for this plan, and they and other agencies are invited to comment and provide additional on-site guidance as the project nears initiation.

The nature, extent, and duration of impacts expected to result from the proposed development action are described in detail in RR3. These impacts have been incorporated into Figure 3, which shows post-construction habitat categories. Function of these areas before and after construction is described below.

3.2 EXISTING HABITAT FUNCTION

3.2.1 Category 2 and 3 Habitats

As indicated by their assigned number, Category 2 and 3 habitats currently function at a high level for wildlife. Category 2 habitats are limited to wetland and estuarine resources. Category 3 habitats include dune forest, un-vegetated sand, and riparian forest. The mitigation goal for Habitat Category 2 is: “if impacts are unavoidable, [mitigation] is no net loss of either habitat quantity **or** quality **and** to provide a net benefit of habitat quantity **or** quality”. The mitigation goal for Habitat Category 3 is: “if impacts are unavoidable, [mitigation] is no net loss of either habitat quantity **or** quality” (OAR 635-415-0015).

3.2.2 Category 4 Habitats

Category 4 habitats, on the other hand, are not currently functioning at a high level for wildlife (compared to less-disturbed habitats in the vicinity). The vast majority of Category 4 habitats that would be impacted by the project lie on dredge spoils covered by very weedy herbaceous and shrub habitat (Photos 1-8, Appendix A). The mitigation goal for Habitat Category 4 is: "if impacts are unavoidable, [mitigation] is no net loss of either habitat quantity **or** quality" (OAR 635-415-0015). These habitats have been degraded extensively historically, and only provide habitat for generalist species such as deer, small mammals, and a limited suite of songbirds. No sensitive species are known to use these habitats, as discussed in RR3. In fact, at the Mill Site, much of the Category 4 habitat lies on top of historic development and waste dumping areas and on top of currently permitted landfills, all of which are required to be capped in the future as part of the Oregon Department of Environmental Quality (DEQ) approved site cleanup process.

Photos representing typical Category 4 habitat have been provided in Appendix A to inform the discussion. As shown, the herbaceous habitat type is found primarily on historically leveled areas (and to a lesser degree on recently colonized dunes) where pioneering species (mainly European beachgrass, [*Ammophila arenaria]*) have established themselves. Dominant species include European beachgrass, tall fescue (*Schedonorus arundinaceus*), sweet vernal grass (*Anthoxanthum odoratum*), Queen Ann's lace (*Daucus carota*), and hedgehog dogtail grass (*Cynosurus echinatus*).

Other species include velvet grass (*Holcus lanatus*), English plantain (*Plantago lanceolata*), tall orchardgrass (*Dactylis glomerata*), colonial bentgrass (*Agrostis capillaris*), hairy catsear (*Hypochaeris radicata*), small-head clover (*Trifolium microcephalum*), hop clover (*T. dubium*), and red and white clover (*T. pratense and repens*). Some of these areas were planted with pasture species. Native species are generally limited to yarrow (*Achillea millefolium*) and pearly everlasting (*Anaphalis margaritacea*), with American dunegrass (*Elymus mollis*) present in very limited areas. Himalayan blackberry (*Rubus armeniacus*) and scattered trees and shrubs (cultivated as well as native) are present in some places along the edges of the habitat near developed areas, and have been included in this habitat type due to their low cover overall. Some of these areas were planted with pasture species.

In Herbaceous/Shrub and Shrub habitat, several species of shrub, primarily Scotch broom (*Cytisus scoparius*), and Himalayan blackberry, as well as some native shrub species and trailing blackberry (*Rubus ursinus*) provided greater cover, but understory species were similar to Herbaceous habitat. In many places, Scotch broom has formed dense thickets, excluding most other species, as is the case in most of the Shrub habitat. Nearly all Category 4 habitats within the project footprint have been re-contoured historically.

The least-disturbed Category 4 habitats within the project footprint occur in the leveled area along the western edge of the project. This area is used by a variety of generalist species, and also by elk. Species such as peregrine falcon are known to forage over the habitat, and human disturbance is generally limited to occasional foot traffic and vehicles. The habitat at the North Point Workforce Housing Project (NPWHP) site is similarly little-disturbed, but similarly dominated by non-native species, and less accessible to species such as elk due to its geographic isolation.

The remaining Category 4 areas are more frequently disturbed, occurring at the edge of Roseburg forest industrial property, and at the Mill Site interspersed with paved and gravel lots. As mentioned, active (but covered) landfill occupies the western edge of the Mill Site (west of the two ponds near the center of the site). In addition, the Mill Site contains large quantities of buried hazardous materials left over from mill activities, which don't directly affect existing wildlife function, but limit potential for restoration activities. Vehicular and foot traffic from property management activities is present at times, but the areas retain some function for wildlife due to their position adjacent to Jordan Cove. These habitats would be converted to herbaceous habitat post-construction, and would be mitigated for at a 1:1 ratio.

No Category 5 habitats were present within the study area. Category 6 habitats require avoidance and minimization, but no mitigation, and were not included in mitigation calculations.

3.3 DIRECT IMPACTS AND HABITAT FUNCTION POST-CONSTRUCTION

Project impacts include both long-term and short-term impacts. Long-term impacts include portions of the landscape that are converted to structures, pavement, or gravel, rendering the habitat essentially useless to wildlife. Short-term impacts include activities such as grading and re-vegetation of dune habitats adjacent to project facilities, which would likely occur for several weeks or months in duration. These impacts are shown in Figure 3, with long-term impacts (Category 6) in orange and short-term impacts (Category 4) in yellow.

Since long-term impact areas have low potential to become essential or important habitat for fish and wildlife, they would be considered Category 6. The majority of the project footprint would consist of Category 6 habitat post-construction. Areas that were mapped as Category 6 (pink) prior to project impacts were not included in mitigation calculations.

Only areas that were mapped in orange and yellow in Figure 3 were included in mitigation calculations. For instance, placement of underground water lines along the Trans Pacific Parkway was not mapped, and was not included in impact calculations for several reasons. First, the existing habitat although classified as Category 4, is extremely degraded by weeds and disturbance due to its location between the Trans Pacific Parkway and the railroad. Second, impacts would be extremely short-term (require less than one week in duration, with impacts occurring along each portion of the water line for only several hours at a time). Finally, since the waterline area would be re-vegetated with native species following installation, condition of impacted areas would be improved over existing condition, resulting in in-situ mitigation for impacts. Similarly, since wetland impacts are dealt with in the joint permit application and wetland mitigation process, they were not included in impact calculations, since that would mean that mitigation would occur twice for the same impact.

During the July 23, 2013 meeting, ODFW indicated that OAR 615-415-000 through 0025 does not differentiate between short-term and long-term impacts. Instead, ODFW considers the magnitude, duration, and geographic size of proposed mitigation in context with the magnitude, duration, and geographic size of the proposed impacts and with the specific mitigation goals defined for each Habitat Category. The project specific short-term impact areas, (which would be graded and re-vegetated with native seed) may retain minimal function for a few species of wildlife and would therefore typically be considered Category 4. However, these areas would

lose nearly all of their function for wildlife due to re-contouring and disturbance from proximity to project elements (compared to existing conditions). Therefore, for simplicity, JCEP has assumed conservatively that all habitats that are impacted, whether short-term or long-term (post-construction Habitat Category 4 or Category 6) would be considered to have no function post-construction (zero percent function), and would be mitigated for at a 1:1 ratio.

Since all habitats shown to be impacted in Figure 3 would be considered to have no function post-construction, and since JCEP will provide 1:1 mitigation for all these impacted areas, it is assumed that no additional future mitigation would be required for subsequent project activities within habitats shown to be impacted in Figure 3.

Areas mapped in olive indicate habitats that are currently Category 6, but would be converted to Category 4 (level grassy areas) following construction. Although the function of this habitat would improve slightly, the mitigation calculations do not take credit for this increase in function. In other words, it is assumed that the slightly improved habitat would still provide zero function for wildlife post-construction due to disturbance from adjacent project elements.

As mentioned previously, wetland impacts and mitigation is is overseen by DSL and USACE, and is not emphasized in this document. However, as shown in Figure 3, impacts to non-jurisdictional wetlands would occur (shown in purple), which would not be included in that mitigation. Therefore, mitigation for those impacts would be provided at the Panhandle in the form of preservation, with net uplift provided for the overall parcel. Mitigation locations are shown in Figures 4 and 5.

3.4 INDIRECT IMPACTS

Regarding indirect impacts, the July 2013 meeting attendees agreed that due to the complexity and mitigation implications, JCEP would not attempt to quantify mitigation for indirect impacts, and that ODFW would discuss this internally and comment on indirect impacts as the process evolves. However, it should be assumed that some form of additional mitigation may be required for indirect impacts outside the project footprint, especially for indirect impacts to less-disturbed wildlife areas near the project.

3.5 TEMPORAL LOSS

It is assumed that activities resulting in ecological uplift at the mitigation sites would occur prior to or concurrent with construction, which would result in no temporal loss of function for wildlife habitat. If this were to become impossible due to timing of financing or implementation, additional mitigation would be required to offset temporal loss of function.

4. MITIGATION SITE SELECTION

In order to meet the fish and wildlife habitat mitigation goals for the project, DEA worked with ODFW to identify essential wildlife habitat to be protected from future disturbance and development, and to be enhanced to provide improved wildlife habitat function. DEA investigated numerous potential mitigation strategies, beginning in 2007. The first effort identified possible habitat enhancement projects on Bureau of Land Management (BLM) land on the North Spit. These ideas were developed for several months, but abandoned due to lack of

support from BLM management. The next strategy was to provide funding for protection of Forest Service lands threatened by off-highway vehicle (OHV) use within the Oregon Dunes National Recreation Area (ODNRA). However, this plan was not possible due to administrative requirements.

In 2010 and 2011, DEA investigated the opportunities and constraints involved in mitigation on private lands adjacent to the ODNRA. Research was based on aerial photography interpretation, and site visits and conversations with Stuart Love, ODFW Wildlife Biologist, and Chris Claire, ODFW Fish Biologist. At the time, numerous sites were investigated, but with no success because no private landowners within suitable parcels were willing to sell their property (Parcels A-H). Several suitable Coos County parcels were found (Parcels L-O), but it was uncertain whether the County would commit to selling the parcels. JCEP was able to obtain two large parcels suitable for some portions of the mitigation plan (Parcels P and W), but sufficient acreage for in-kind mitigation for forested habitats was still lacking.

In 2013 and 2014, investigation of private and Coos County parcels was renewed, and coordination with ODFW continued, but neither Coos County nor private landowners in the vicinity were willing to sell, and the search was widened to include areas further north and south of the project. In April, 2014, a parcel deemed suitable for in-kind mitigation for forested habitats and also available for sale was found (Parcel S).

Figure 4 provides an overview of parcels investigated, which are discussed in detail below and shown in Figure 5. Table 1 provides a summary of opportunities and constraints for all parcels that were investigated.

Table 1: Jordan Cove Energy Project Mitigation Opportunities/ Constraints by Parcel

Map ID	Taxlot	Owner/ Site Name	Site Acres	Comments
A-D	Various-see Figure 4	Sand Hills Gun Club, Inc.	>100	Good opportunites, but owner not interested.
E-H	Various-see Figure 4	McKeown, Joseph, et al.	>100	Good opportunites, but owner not interested..
I	24S13W28TL0 030000	U.S.A	39	Federal parcel surrounded by private lands. Unlikely opportunity for mitigation due to ownership.
J	24S13W03TL0 030000	Coos County	84	Split by USFS-designated main OHV route North-South which limits suitability.
K	23S13W14TL0 020000	Coos County	58	A designated main OHV route runs through the center of parcel, but western portions may provide protection for unique wildlife habitats. ODFW verified suitability.
L	23S13W22TL0 010000	Coos County	22	Contains unique wildlife habitats along Tenmile Creek. ODFW verified suitability of habitat for mitigation.
M	24S13W02BBT L009000	Coos County	28	Good opportunity for protection from development which is occurring north and south of parcel. Potential wildlife corridor to east from ODNRA.

Map ID	Taxlot	Owner/ Site Name	Site Acres	Comments
N	24S13W02TL0 040000	Coos County	86	Portions of the parcel could provide opportunities for protection and enhancement.
O	24S13W11TL0 040000	Coos County	17	Good potential conservation opportunity. Potential wildlife corridor to east from ODNRA.
P	24S13W32TL0 020000	Panhandle site	105	Parcel connects public trailhead to ODNRA lands and and contains high quality wetland and upland habitats. Good opportunity.
Q	24S13W16TL0 0100, 200	Adamek	68	Parcel is primarily suitable for out-of-kind mitigation and therefore not as desirable for the project.
R	21121700400, 21121700700	Roseburg North and South	150	Dune forest logged 5-15 yrs ago, located north of the Umpqua River. Confirmed suitable by ODFW, but sold before it could be acquired.
S	26S14W09TL0 010000	North Bank	161	Dune forest located on the north bank of the Coquille River, adjacent to the Bandon Marsh National Wildlife Refuge, with opportunities for complementary mitigation.
W	25S13W06TL0 010100, 25S13W07TL0 010100	Weyerhauser Lagoons	315	Located on the North Spit between Coos Bay and the ocean. Heavily used by wildlife and recreationists, and therefore a good mitigation opportunity, though primarily out-of-kind.

5. MITIGATION SITE BASELINE CONDITIONS AND MITIGATION CONCEPTS

This section provides a detailed description of mitigation site conditions and mitigation concepts for parcels selected from Table 1 for use in the JCEP mitigation. The parcels that were selected were chosen based on their suitability for mitigation, availability, and composition of habitats that could meet the in-kind and out-of-kind mitigation needs of the project. Habitat types and categories in each of these parcels were mapped using the same methodology used for other project elements, and are shown in Figure 5.

The overall mitigation concept is to protect high quality habitats through implementation of a conservation easement. In addition, habitat enhancement (uplift) would be provided at each site, as described individually by site below.

5.1 THIRD-PARTY MANAGER CONCEPT

JCEP L.P. has entered negotiations with the Coos Watershed Association (CWA), a local non-profit organization established in 1993 meeting the requirements of ORS 271.715(3)(b), to provide long-term management and maintenance of all mitigation sites associated with the JCEP (including estuarine and freshwater wetland mitigation). JCEP L.P. would endow CWA to provide these services through the life of the Project (estimated approximately 30 years post construction). In doing so, JCEP LP, via CWA, can steer the mitigation sites toward substantial compliance with permit conditions and provide the required ecological uplift. In addition, a long-term maintenance plan is being written to provide guidance for the third-party manager.

If negotiations with CWA fail, JCEP L.P. would create and endow a third party entity meeting the requirements of ORS 271.715(3)(b) to provide management and maintenance services for the mitigation projects for the life of the Project.

5.2 THE PANHANDLE SITE (PARCEL P)

The Panhandle Site (Figure 5) lies north of the Trans Pacific Parkway and is part of a larger natural area that extends north into the ODNRA. The area has exceptional ecological features that are difficult to replace. For this reason, it was purchased in 2012 to be used for mitigation. The site is used by hikers from the Weyerhaeuser North Spit Overlook trailhead west of the site, and such use, which is supported by ODFW, would be allowed to continue.

5.2.1 Existing Conditions

The site contains several upland vegetation communities, as shown in Figure 2 and described below.

5.2.1.1 Coastal Dune Forest Habitat

Coastal dune forest habitat consists of forest areas established on fully stabilized sand dunes in the region. It is found throughout the study area in various successional stages. Dominant species include Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), shore pine (*Pinus contorta spp. contorta*), and Port Orford cedar (*Chamaecyparis lawsoniana*), with scattered Sitka spruce (*Picea sitchensis*). In some places, patchy canopy promotes vigorous shrub growth and cover, ranging from dense to nearly impenetrable.

Dominant shrubs are evergreen huckleberry (*Vaccinium ovatum*), salal (*Gaultheria shallon*), bearberry (*Arctostaphylos uva-ursi*), and Pacific rhododendron (*Rhododendron macrophyllum)* with scattered California wax myrtle (*Myrica californica*) and hairy Manzanita (*Arctostaphylos columbiana*). The understory is generally lacking herbaceous species due to dense canopy cover, although portions of the forest are less dense than others.

Project specific coastal dune forest habitat parcels would be considered Category 3, due to the essential function they provide (based on ODFW policy definition). Species such as American marten, bats, and some songbirds depend upon it for species survival, and loss of the habitat could result in depletion of some of these species on a local scale. However, the habitat is not limited since similar habitats are found north and east of the project and provide alternate functional habitat for these relatively mobile species.

5.2.1.2 Herbaceous Habitat

The herbaceous habitat type is found on recently colonized dunes where pioneering species have established themselves. Dominant species include European beachgrass and colonial bentgrass, tall fescue, sweet vernal grass, and other non-native species, with some cover by native species such as seashore lupine (*Lupinus littoralis*), small-head clover, and beach strawberry (*Trifolium microcephalum*). Scotch broom is present in places, but is fairly limited.

This habitat type would not be considered essential (based on ODFW policy definition) because no species are known to depend upon it exclusively for their survival, and loss of the habitat would not likely result in depletion of any species. The habitat is not limited since similar habitats are found in the vicinity. Therefore the habitat is classified as Category 4 because it is not essential, or limited, but is important to wildlife.

5.2.1.3 Shrub Habitat

This habitat type is located on more stabilized dunes and has been colonized by shrubs and young trees, primarily Scotch broom and young shore pine. Overall shrub cover is 25% or more in this habitat type. The herbaceous species include mainly the non-native species described above such as European beachgrass, sweet vernal grass, and colonial bentgrass. The habitat is classified as Category 4 because it is not essential, or limited, but is important to wildlife.

5.2.1.4 Un-vegetated Sand Habitat

This habitat type includes areas of moving sand that have not been colonized by vegetation, except for very scattered herbaceous pioneer species such as European beachgrass. Although the habitat formed by these dunes is generally devoid of vegetation, it provides important habitat for a variety of wildlife, including songbirds that forage on seeds blown into this habitat, and raptors and small mammals that use the edges for foraging. ODFW considers the habitat to be limited on a local scale, since it is present only on a small strip of land between Highway 101 and the ocean. By ODFW definition, it is non-essential, but important to wildlife and limited, and would therefore be classified as Category 3.

5.2.1.5 Forested Wetland

The forested wetland habitat type consists of wetlands that have remained undisturbed long enough to develop a consistent tree canopy. It is dominated primarily by shore pine with some areas of tree-sized Hooker willow (*Salix hookeriana*). Mature red alder (*Alnus rubra*) and Sitka spruce also occurs in places, typically at the wetland boundary or on upland hummocks within the wetlands. The shrub layer is dominated by common coastal wetland species such as Pacific crabapple (*Malus fusca*), Hooker willow, Douglas' spirea (*Spirea douglasii)* and twinberry (*Lonicera involucrata*) in places. The herbaceous layer is typically dominated by slough sedge (*Carex obnupta*). The habitat is classified as Category 2 because it is essential for wildlife, and limited, but can be replaced through mitigation.

5.2.1.6 Scrub-Shrub Wetland

This habitat type is commonly dominated by Hooker willow, with salmonberry and other common coastal wetland species such as slough sedge and skunk cabbage (*Lysichiton americanus*). Pacific crabapple was also a dominant shrub species in some areas. The habitat is classified as Category 2 because it is essential for wildlife, and limited, but can be replaced through mitigation.

5.2.1.7 Emergent Wetland

This habitat type is typically dominated by slough sedge. In places, other typical species include spreading rush (*Juncus patens*), water parsley (*Oenanthe sarmentosa*), Pacific silverweed (*Potentilla anserina*), and salt grass (*Distichlis spicata*), among others. Wetter portions of this habitat type consisted of aquatic floating and emergent plants in relatively shallow seasonally or perennially inundated areas, including pond lily (*Nuphar polysephalum*), water parsley, cattail (*Typha latifolia*), and small-fruited bulrush (*Scirpus microcarpus*). The emergent wetland habitat is classified as Category 2 because it is essential for wildlife, and limited, but can be replaced through mitigation.

5.2.1.8 Open Water

Open water habitat is present in steep-sided interdunal areas and within deeper portions of wetland areas, where no vegetation was present. This habitat is classified as Category 2 because it is essential to wildlife and limited.

5.2.1.9 Unique Habitats Present

The Panhandle site contains unique qualities determined to be of significant importance to the State of Oregon, in the Coast Range Ecosystem. Information regarding the presence of these qualities has been gathered from resources found in the Oregon Conservation Strategy (ODFW, 2006) and from information provided by the Oregon Biodiversity Information Center (ORBIC) website. Important qualities observed at the mitigation site include the following:

1. Significant populations of rare plants or animals;
2. Rare wetland type;
3. Native, mature forest wetland and;
4. Preserves a wetland type disproportionally lost

1. Significant populations of the rare amphibian Northern red-legged frog (*Rana aurora*) have been observed in multiple locations throughout and adjacent to the site. Northern red-legged frogs are listed by the ODFW as “Sensitive – Vulnerable,” federally as a “Species of Concern” and listed by ORBIC as “List 4.”

2. Two rare wetland types based on rare plant associations have been observed at the site. Rare plant associations are listed on the Oregon Wetlands Explorer National Resources Digital Library (http://oregonexplorer.info/wetlands/AtriskWetlandPlantAssociations).

The first plant association at the site includes *Salix hookeriana* - (*Malus fusca*) / *Carex obnupta* - *Lysichiton americanus* (coast willow - (crabapple) / slough sedge - skunk cabbage shrub swamp). This plant association has a state rank of S2, defined as imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences. This wetland type was observed in patchy distribution throughout the area defined in the wetland delineation as scrub-shrub wetland (DEA, 2013). This includes approximately 6.4 acres wetlands.

The second at-risk plant association observed at the site is shore pine / slough sedge. This plant association has a state rank of S1, defined as critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences. This wetland type was observed in the majority of forested portions of the site defined in the wetland delineation as forested wetland (DEA, 2013). This includes approximately 3.2 acres of wetlands.

3. A mature forested wetland is defined as a wetland in which mean diameter of trees (d.b.h., FACW and FAC species only) exceeds 18 inches, and/or the average age of trees exceeds 80 years, or there are >5 trees/acre with diameter >32 inches. Although no data has been collected, the site appears to meet this criterion.

4. Historical evidence suggests that this site is a remaining portion of a much larger complex of interdunal wetlands that once occurred on the North Spit. Interdunal wetlands are considered by the state to be an area of "special areas of concern". An interdunal wetland is defined as a seasonally inundated wetland, usually without a naturally-occurring inlet or outlet, located between sand dunes where wind has scoured the sand down to the water table (deflation plain), and often with significant cover of native species.

5.2.2 Mitigation Concept

In addition to permanent preservation of the parcel, an ecological uplift is required. Several ecological uplift concepts have been discussed with ODFW during meetings and site visits to discuss project mitigation. The uplift concepts are presented as a portfolio of potential options; although not all these activities would occur, they have been vetted by ODFW as acceptable forms of uplift for the project. In order to document uplift (thereby making the parcels eligible as mitigation under OAR 635-415-0000 through 0025), some combination of uplift alternatives that results in measurable functional uplift at each proposed mitigation parcel would be required.

In order to limit disturbance from mitigation, implementation at the Panhandle is anticipated to be completed with hand-tools and small-equipment to the extent possible. Activities would focus on upland habitat, and would include the following:

- 1.6 acres of un-vegetated sand currently exists at the Panhandle. In order mitigate for impacts to 3.4 acres of un-vegetated sand (Category 3), at least 1.8 acres of European beachgrass and Scotch broom would be returned to un-vegetated sand condition by use of herbicide or other methods over a period of time sufficient to ensure that existing beachgrass does not re-sprout.

Activities would also include one or more of the following:

- Removal of invasive Scotch broom and replanting with native species. Scotch broom is currently present in patches (Photo 9) and the site would benefit from control to prevent further establishment. Control would focus on the western edge of the property, and would begin with mapping of Scotch broom, followed by documented reduction of cover over time.

- Where Scotch broom is removed, bare ground would be planted with native species. American dunegrass culms and other native species such as coast buckwheat (*Eriogonum latifolium*) would be used. Where possible, invasive European beachgrass could be removed and planted with natives as well. Although it is uncertain whether American dunegrass would survive in the long-term, or whether European beachgrass could be controlled by hand methods (rather than heavy equipment), the approach would be to use best available science to conduct restoration in small areas, followed by monitoring and adaptive management.
- Enhancement of habitat for American marten. Activities could include increasing coarse woody debris and snags to improve denning and foraging opportunities for the species. Methods could include placement of slash debris and topping of live trees to form snags. This approach would need to be discussed more thoroughly with ODFW prior to potential implementation.

5.3 THE NORTH BANK SITE (PARCEL S)

5.3.1 Existing Conditions

Parcel S (161 acres) lies on the north bank of the Coquille River adjacent to the Bandon Marsh National Wildlife Refuge (Figure 5). It is currently owned by Roseburg Forest Products, and contains primarily conifer forest atop stabilized sand dunes (Category 3) that was harvested between 14 and 58 years ago, which are scheduled to be harvested at 40-50 year rotations. Scrub-shrub wetlands (Category 2) lie along the eastern edge of the parcel, and a small drainage mapped as scrub-shrub wetland runs through the center of the parcel. Timber roads that have been reclaimed by vegetation (including large populations of noxious weeds) run throughout the parcel.

5.3.2 Mitigation Concept

The proximity of the parcel to Bandon Marsh provides opportunities for complementary mitigation between the two areas. Bandon Marsh consists primarily of wetlands and contains relatively little upland, forested habitat. Enhancement of Parcel S for wildlife could increase use of the parcel and travel through it. If suitable, educational opportunities could be coordinated as well.

Uplift methods would be aimed at improving native plant composition and improving habitat function for wildlife, and would include one or more of the following:

- Removal of weeds, including Scotch broom, gorse, and blackberry (Photo 11).
- Native plant enhancement.
- Coarse woody debris and snag enhancement.

5.4 THE LAGOON SITE (PARCEL W)

5.4.1 Existing Conditions

Parcel W lies on the North Spit just west of the Trans Pacific Parkway near the project area. It is a 315-acre parcel composed primarily of Category 2 wetland habitats, with Category 4 upland habitats up slope of the wetlands (Figure 5). Otherwise known as the Weyerhauser lagoons, the site is used heavily by songbirds and waterbirds, as well as by recreationists and birdwatchers, who access the lagoons and the beach by gated gravel roads on the north side of the parcel. Similar to the Panhandle, JCEP intends to allow for public use and enjoyment of the site, while enhancing portions of the site for wildlife. The North Spit sand road runs along the southern edge of the parcel and provides additional recreational and education opportunities.

5.4.2 Mitigation Concept

Uplift methods would be aimed at improving native plant composition and improving habitat function for wildlife, and would include one or more of the following:

- Wetland buffer enhancement.
- Scotch broom and other weed removal (Photo 12).
- Native plant enhancement.

6. MITIGATION CALCULATIONS

The number of acres required for mitigation for each habitat type, and the number of acres to be used for 1:1 mitigation, are shown in Table 2. As described in the ODFW policy, in-kind, in-proximity mitigation is required for Habitat Category 2 and 3. Therefore, impacted Category 2 and 3 habitats are mitigated by protecting and enhancing the same kind of habitat that was impacted. Other habitats may be mitigated by preserving habitats other than those that were impacted.

Acreage requirements were determined by comparing existing habitat mapping with the post-construction mapping provided in Figure 3. Since all areas to be either temporarily or permanently impacted by the project would be considered to retain zero function post-construction, this resulted in a requirement of 259.4 acres of mitigation.

The majority of in-kind mitigation would occur in Parcel P and Parcel S. Out-of-kind mitigation would also occur, preserving and enhancing wetlands as mitigation for impacts to Category 4 herbaceous and shrub habitats. Wetland types used for out-of-kind mitigation includes freshwater wetland and open water, and estuarine wetlands.

As discussed, in order to mitigate in-kind for impacts to 1.8 acres of un-vegetated sand, at least 1.8 acres of herbaceous habitat covered by European beachgrass at the Panhandle would be returned to un-vegetated sand (dune) condition through application of herbicides, manual removal, or a combination of techniques. This is in addition to the 1.6 acres of existing sand being used for in-kind mitigation at the Panhandle (Parcel P).

Table 2: Mitigation Acreage Calculations

DRAFT JCEP Upland Habitats	Acres needed	In-Kind Mitigation, in Acres			Out-of Kind Mitigation, in Acres*			Acres Used
		Parcel P	Parcel W	Parcel S	Parcel P	Parcel W	Parcel S	
Coastal Dune Forest	**102.4**							
Acres available at site		33.1	0.0	137.0				
Acres used at site		33.1		69.3				**102.4**
Riparian Forest	**1.1**							
Acres available at site			0.0	5.2				
Acres used at site				1.1				**1.1**
Shrub	**8.7**							
Acres available at site		3.7	5.1					
Acres used at site		3.7	5.0					**8.7**
Herbaceous Shrub	**53.0**							
Acres available at site		0.4	22.9					
Acres used at site		0.4	22.9		29.7			**53.0**
Herbaceous	**90.8**							
Acres available at site		12.3	11.8					
Acres used at site		12.3	11.8		22.5	44.2		**90.8**
Unvegetated Sand	**3.4**							
Acres available at site	**	3.4						
Acres used at site		3.4						**3.4**
Total	**259.4**	**52.9**	**39.7**	**70.4**	**52.2**	**44.2**	**0.0**	**259.4**

* Wetland types used for out-of-kind mitigation include freshwater and estuarine wetlands, and open water.

** 1.8 acres of weedy herbaceous habitat at the Panhandle will be converted to sand as in-kind mitigation in addition to 1.6 acres of existing sand.

7. COMPLEMENTARY MITIGATION

As required by the OARs, all these actions complement and do not diminish mitigation provided for previous development actions. This is especially true at the Panhandle Site, where previous wetland mitigation on adjacent Weyerhaeuser property will be augmented by upland habitat mitigation, and at North Bank, where complementary mitigation could occur in coordination with Bandon Marsh. Mitigation at the Panhandle would also expand existing protection of the adjacent ODNRA lands.

8. MONITORING PLAN

Per OARs, monitoring efforts shall continue for the duration and at a frequency needed to ensure that the goals and standards in OAR 635-415-0025 are met, unless the Department determines that no significant benefit would result from such monitoring. Monitoring efforts should include protocols and methods, and a reporting schedule for monitoring the effectiveness of mitigation measures. This plan proposes a monitoring period of no more than five years. Monitoring Year 1 shall begin upon substantial completion of mitigation construction/implementation.

8.1 AS-BUILT SURVEY (YEAR 1)

An as-built survey will be conducted to document appropriate contours have been attained (where grading may be proposed) and plantings were installed as designed. An as-built report will be prepared including the as-built survey, photos, and a brief synopsis of work completed including any design changes.

8.2 PHOTO DOCUMENTATION (YEARS 1 THROUGH 5)

Photo locations will be established as appropriate within the mitigation sites to document conditions within the first five years. Supplemental photos will be taken as appropriate to document enhancement and any problem areas.

8.3 PERFORMANCE STANDARDS

Performance standards common to all sites for each objective are presented below.

Objective 1: Permanent preservation of parcel.

- **Performance Standard 2.1:** Legal protection instrument in place.

Objective 2: The preserved parcel is demonstrably managed for conservation for the life of the project.

- **Performance Standard 2.1:** A third-party conservation entity will be endowed to monitor and maintain the parcels, demonstrate that an ecological uplift has been provided at each site, provide monitoring reports for the first five years after implementation of proposed mitigation measures, and maintain the sites throughout the life of the Project. In addition, a long-term maintenance plan, which will be in place prior to JCEP L.P.'s issuing Notice to Proceed for construction of the Jordan Cove Energy Project, is being written to provide guidance for the third-party manager.

Objective 3: An ecological uplift has been provided at each mitigation site.

Panhandle Site (Parcel P)

- **Performance Standard 3.1:** Ecological uplift (such as noxious weed removal, native plantings, or habitat enhancement for marten) has been completed and is reflected in monitoring reports for five years.

North Bank Site (Parcel S)

- **Performance Standard 3.3:** Ecological uplift (such as noxious weed removal or native plantings) has been completed for five years based on annual monitoring reports.

Lagoon Site (Parcel W)

- **Performance Standard 3.4:** Ecological uplift (such as creation of unvegetated sand from Scotch broom monoculture, wetland buffer enhancement, or other native plantings) has been completed for five years based on annual monitoring reports.

8.4 CONTINGENCY PLAN

Contingency plans will be developed by the endowed conservation entity and coordinated with ODFW should the performance standards not be met. The nature of the contingency plan will depend on the problems that arise and would likely be related to weed control and plant establishment.

9. LONG-TERM PROTECTION AND FINANCIAL SECURITY INSTRUMENTS

9.1 PROTECTION INSTRUMENT

JCEP L.P. will prepare a conservation easement (rather than a deed restriction) to provide long term protection for the mitigation sites for the life of the project. The conservation easement will be vetted with ODFW, and will be in place prior to JCEP L.P.'s issuing Notice to Proceed for construction of the Jordan Cove Energy Project.

9.2 LONG-TERM MAINTENANCE PLAN

9.2.1 Anticipated Ownership

The mitigation site would be owned by Fort Chicago LNG II U.S. L.P. (a wholly owned and controlled subsidiary of JCEP L.P.'s parent company Veresen, Inc.).

9.2.2 Anticipated Long-term Maintenance Actions

Long-term maintenance will include the activities described for each site above. Other activities may include garbage/debris removal and installation of protective signage and/or other deterrents if vandalism or inappropriate activities are found to occur.

9.2.3 Entity Responsible for Maintenance

JCEP L.P. will be responsible for maintenance of the mitigation sites, and long-term maintenance will be performed by third-party manager endowed by JCEP L.P.

9.2.4 Anticipated Funding Source

JCEP L.P. will create an endowment to fund long term maintenance of the mitigation sites by the third-party manager.

10. PREPARERS AND CONTRIBUTORS

Phil Rickus, DEA Ecologist, authored this report. Ethan Rosenthal, Ecologist, and Art Martin, Energy Coordinator, Wildlife Division, Oregon Department of Fish and Wildlife, and Sean Sullivan, DEA Project Manager, provided the quality reviews. Dawn Afman, DEA Project Assistant, prepared the report drafts, and Sara Gilbert, DEA GIS Project Manager, provided graphics.

11. APPENDICES

APPENDIX A: Photographs



Photo 1: Looking south along the eastern edge of the Mill Site:



Photo 2: Looking north along the eastern edge of the Mill Site:



Photo 3: Looking west from the south-central portion of the Mill Site.



Photo 4: Herbaceous shrub habitat atop the landfill at the Mill Site.



Photo 5: Typical weedy shrub habitat on the north side of the Mill Site.



Photo 6: Looking south at weedy Herbaceous habitat west of Ingram Yard.



Photo 7: Looking northwest from the west side of the North Point Workforce Housing Project property at weedy Herbaceous and Shrub habitat.



Photo 8: Typical upland conditions on top of fill pad in the eastern portion of the North Point Workforce Housing Project. Photo from center of site looking north.



Photo 9: Looking east from ridge at western edge of the Panhandle Scotch broom that that can be removed to provide uplift.



Photo 10: Looking north at habitats in the northern portion of the Panhandle to be preserved.

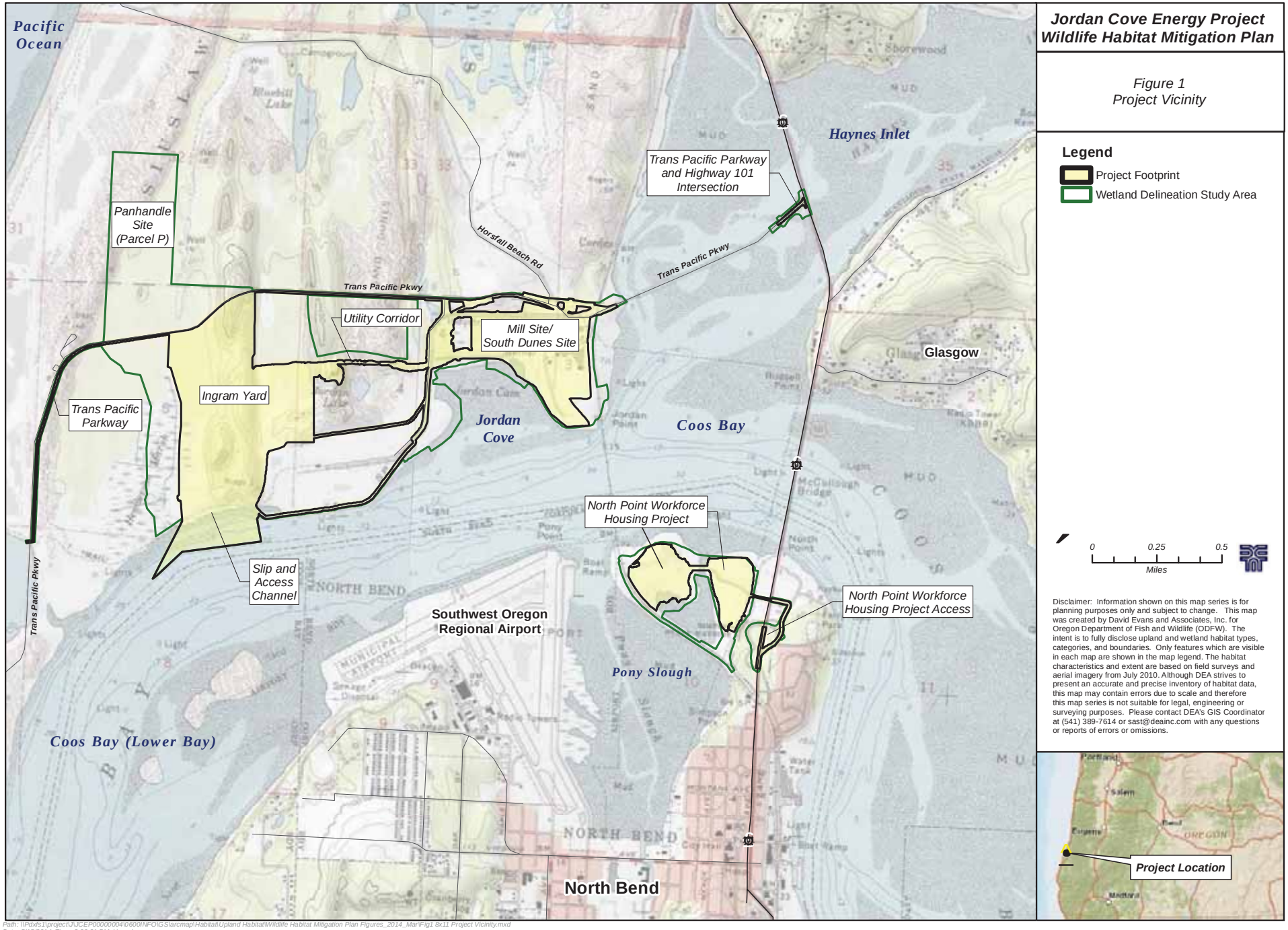


Photo 11: Parcel S- Looking northwest from North Bank Lane at old, re-vegetated access road with patches of gorse that can be removed to provide uplift.



Photo 12: Parcel W- Looking west toward the ocean from the south end of the parcel at Scotch broom that can be removed to provide uplift.

APPENDIX B: Figures



Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Figure 1
Project Vicinity

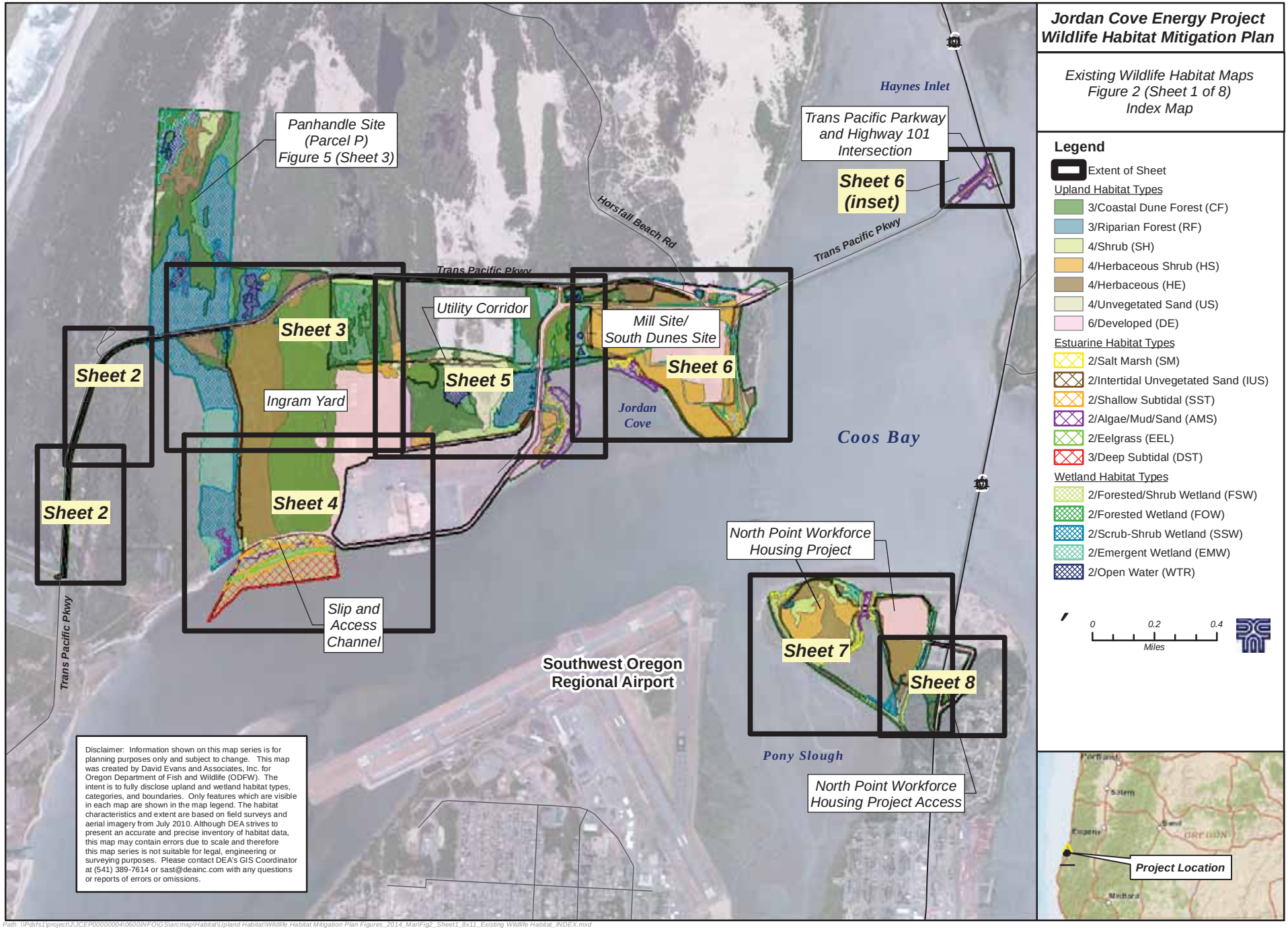
Legend

- Project Footprint
- Wetland Delineation Study Area

0 0.25 0.5
Miles

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Existing Wildlife Habitat Maps
Figure 2 (Sheet 1 of 8)
Index Map

Legend

- Extent of Sheet

Upland Habitat Types
- 3/Coastal Dune Forest (CF)
- 3/Riparian Forest (RF)
- 4/Shrub (SH)
- 4/Herbaceous Shrub (HS)
- 4/Herbaceous (HE)
- 4/Unvegetated Sand (US)
- 6/Developed (DE)

Estuarine Habitat Types
- 2/Salt Marsh (SM)
- 2/Intertidal Unvegetated Sand (IUS)
- 2/Shallow Subtidal (SST)
- 2/Algae/Mud/Sand (AMS)
- 2/Eelgrass (EEL)
- 3/Deep Subtidal (DST)

Wetland Habitat Types
- 2/Forested/Shrub Wetland (FSW)
- 2/Forested Wetland (FOW)
- 2/Scrub-Shrub Wetland (SSW)
- 2/Emergent Wetland (EMW)
- 2/Open Water (WTR)

0 0.2 0.4
Miles

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Existing Wildlife Habitat Maps
Figure 2 (Sheet 2 of 8)
Trans Pacific Parkway

Legend

- Project Footprint
- Wetland Delineation Study Area

Upland Habitat Types

- 4/Shrub (SH)
- 4/Herbaceous (HE)
- 6/Developed (DE)

Wetland Habitat Types

- 2/Emergent Wetland (EMW)
- 2/Scrub-Shrub Wetland (SSW)

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Existing Wildlife Habitat Maps
Figure 2 (Sheet 3 of 8)
Ingram Yard

Legend

- Project Footprint
- Wetland Delineation Study Area

Upland Habitat Types

- 3/Coastal Dune Forest (CF)
- 4/Shrub (SH)
- 4/Herbaceous Shrub (HS)
- 4/Herbaceous (HE)
- 4/Unvegetated Sand (US)
- 6/Developed (DE)

Wetland Habitat Types

- 2/Forested Wetland (FOW)
- 2/Scrub-Shrub Wetland (SSW)
- 2/Emergent Wetland (EMW)
- 2/Open Water (WTR)

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Existing Wildlife Habitat Maps
Figure 2 (Sheet 4 of 8)
Slip and Access Channel

Legend

- Project Footprint
- Wetland Delineation Study Area

Upland Habitat Types
- 3/Coastal Dune Forest (CF)
- 4/Shrub (SH)
- 4/Herbaceous Shrub (HS)
- 4/Herbaceous (HE)
- 6/Developed (DE)

Estuarine Habitat Types
- 2/Salt Marsh (SM)
- 2/Intertidal Unvegetated Sand (IUS)
- 2/Shallow Subtidal (SST)
- 2/Algae/Mud/Sand (AMS)
- 2/Eelgrass (EEL)
- 3/Deep Subtidal (DST)

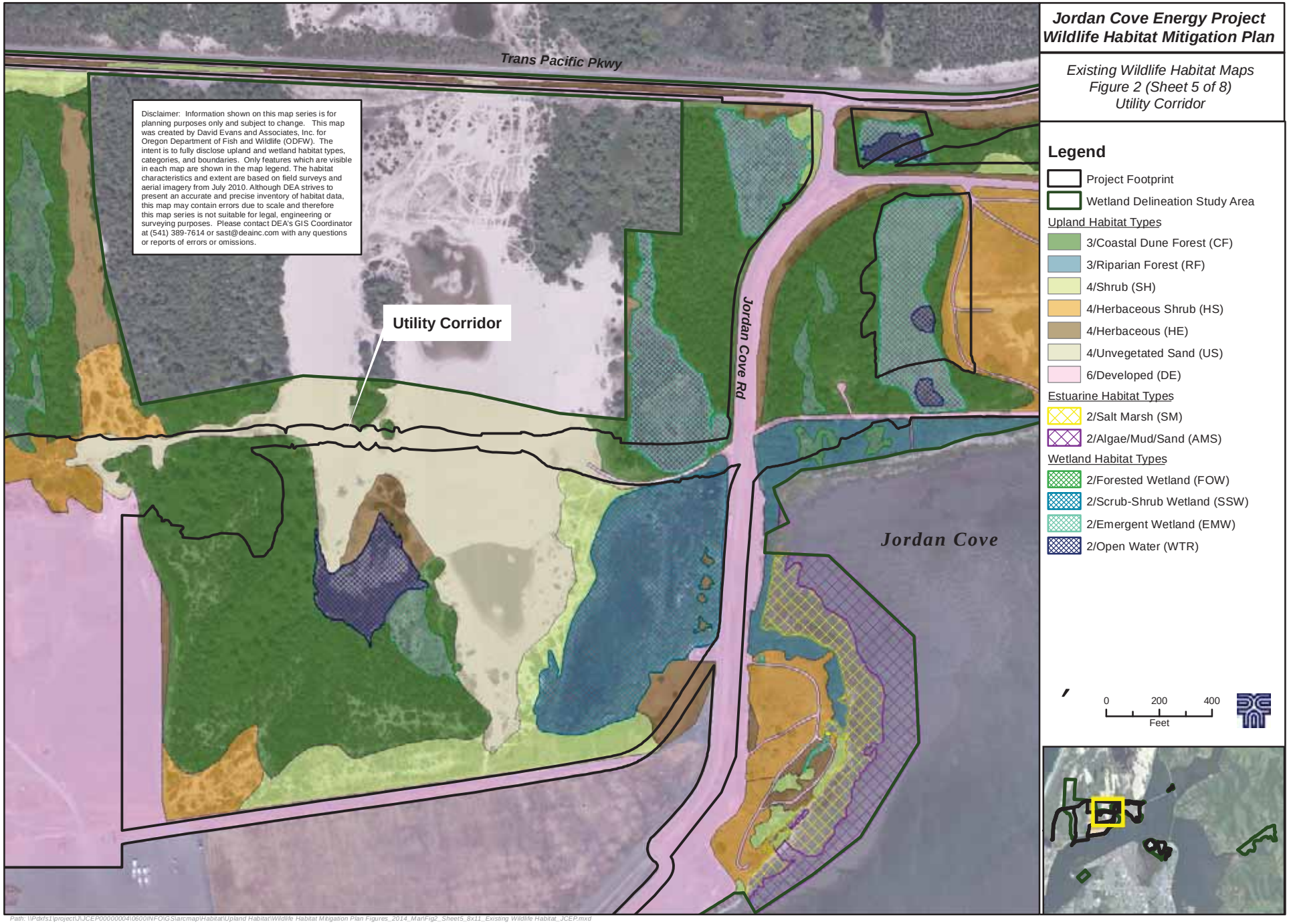
Wetland Habitat Types
- 2/Scrub-Shrub Wetland (SSW)
- 2/Emergent Wetland (EMW)

0 200 400
Feet



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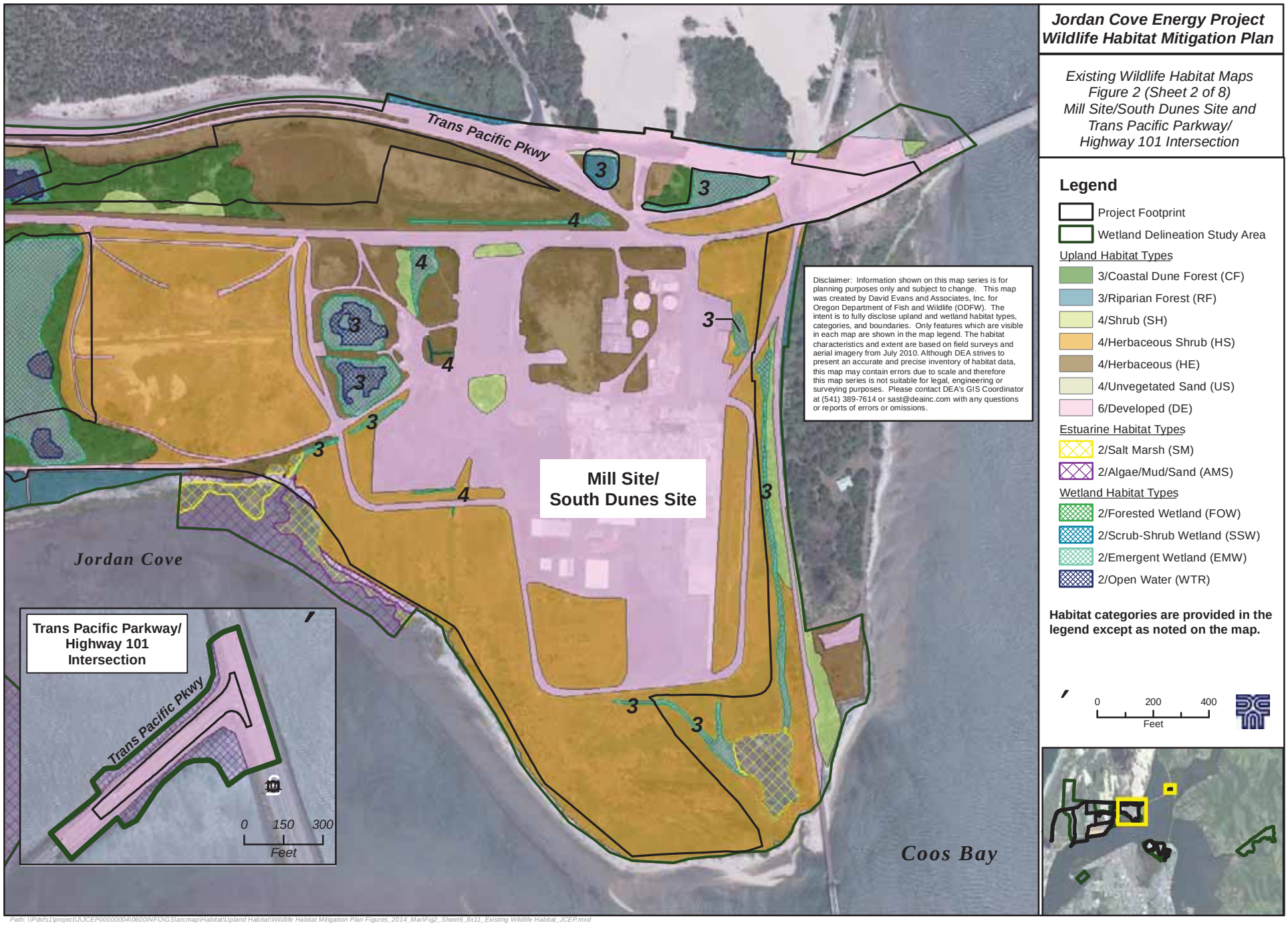
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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Existing Wildlife Habitat Maps
Figure 2 (Sheet 5 of 8)
Utility Corridor

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Existing Wildlife Habitat Maps
Figure 2 (Sheet 2 of 8)
Mill Site/South Dunes Site and
Trans Pacific Parkway/
Highway 101 Intersection

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Existing Wildlife Habitat Maps
Figure 2 (Sheet 7 of 8)
North Point Workforce Housing Project

Legend

- Project Footprint
- Wetland Delineation Study Area
- Existing Rail

Upland Habitat Types
- 3/Coastal Dune Forest (CF)
- 4/Shrub (SH)
- 4/Herbaceous Shrub (HS)
- 4/Herbaceous (HE)
- 4/Unvegetated Sand (US)
- 6/Developed (DE)

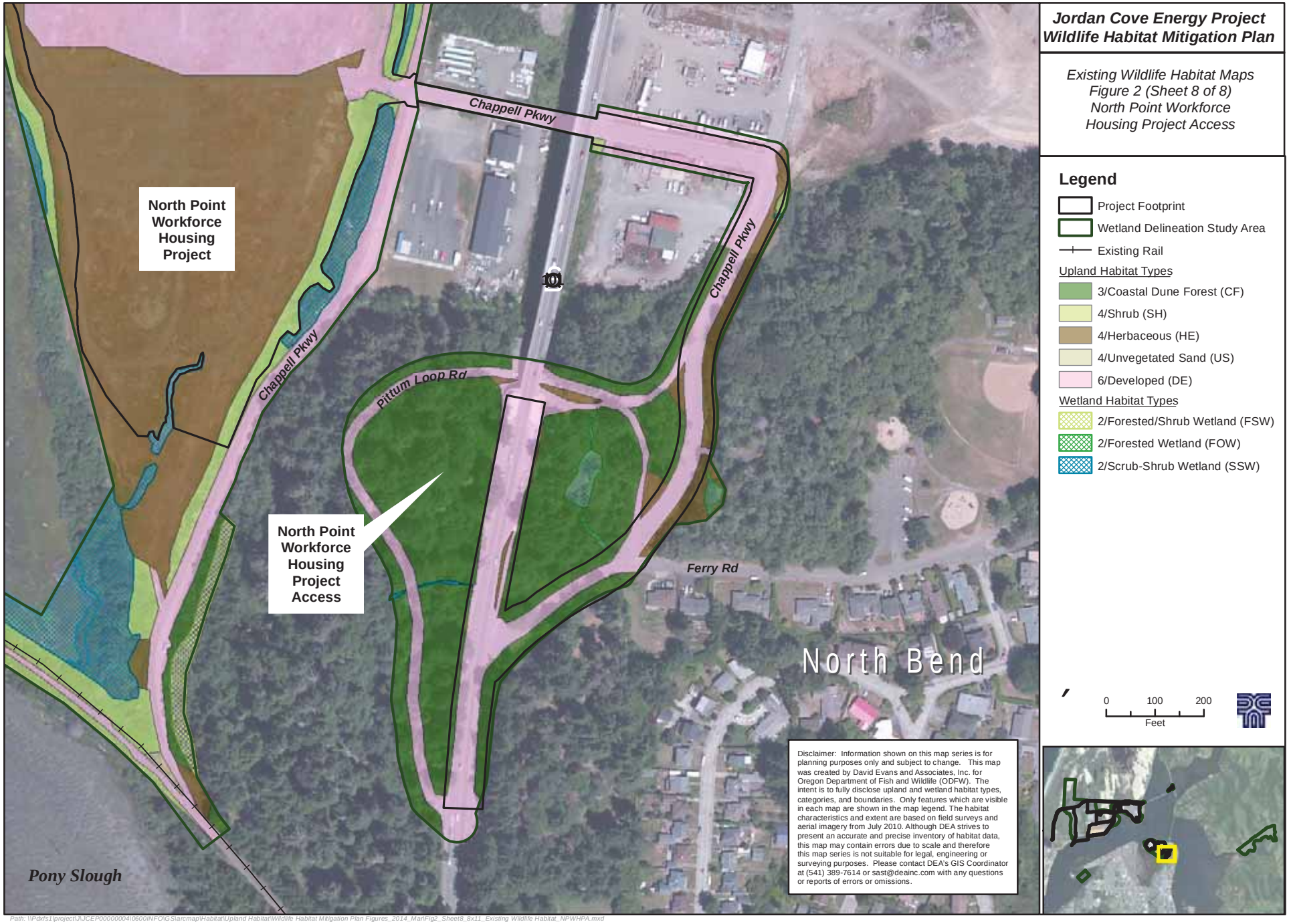
Estuarine Habitat Types
- 2/Salt Marsh (SM)
- 2/Algae/Mud/Sand (AMS)

Wetland Habitat Types
- 2/Forested/Shrub Wetland (FSW)
- 2/Forested Wetland (FOW)
- 2/Scrub-Shrub Wetland (SSW)
- 2/Emergent Wetland (EMW)

0 175 350
Feet

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Existing Wildlife Habitat Maps
Figure 2 (Sheet 8 of 8)
North Point Workforce Housing Project Access

Legend

- Project Footprint
- Wetland Delineation Study Area
- Existing Rail

Upland Habitat Types

- 3/Coastal Dune Forest (CF)
- 4/Shrub (SH)
- 4/Herbaceous (HE)
- 4/Unvegetated Sand (US)
- 6/Developed (DE)

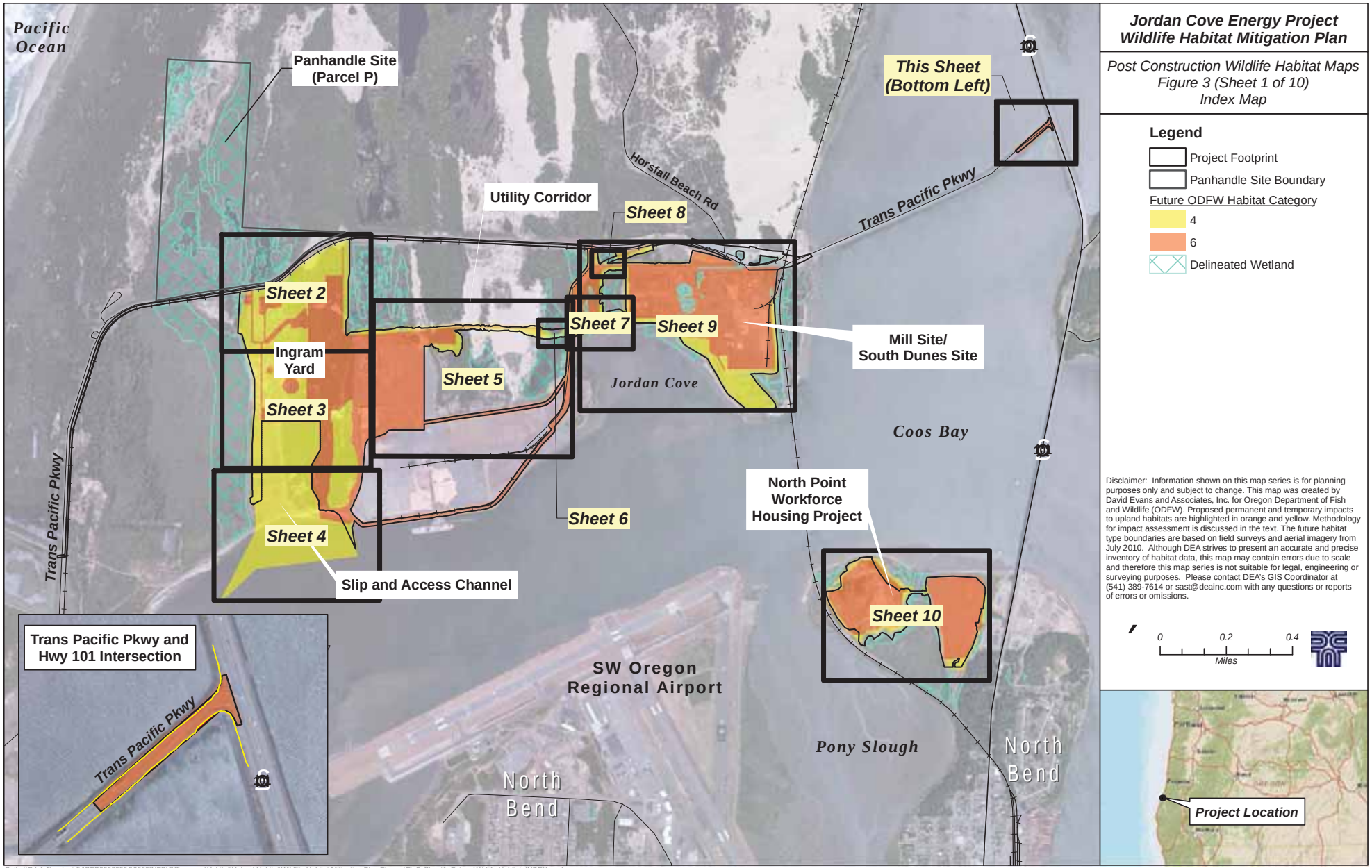
Wetland Habitat Types

- 2/Forested/Shrub Wetland (FSW)
- 2/Forested Wetland (FOW)
- 2/Scrub-Shrub Wetland (SSW)

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Feet

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 1 of 10)
Index Map

Legend

- Project Footprint
- Panhandle Site Boundary

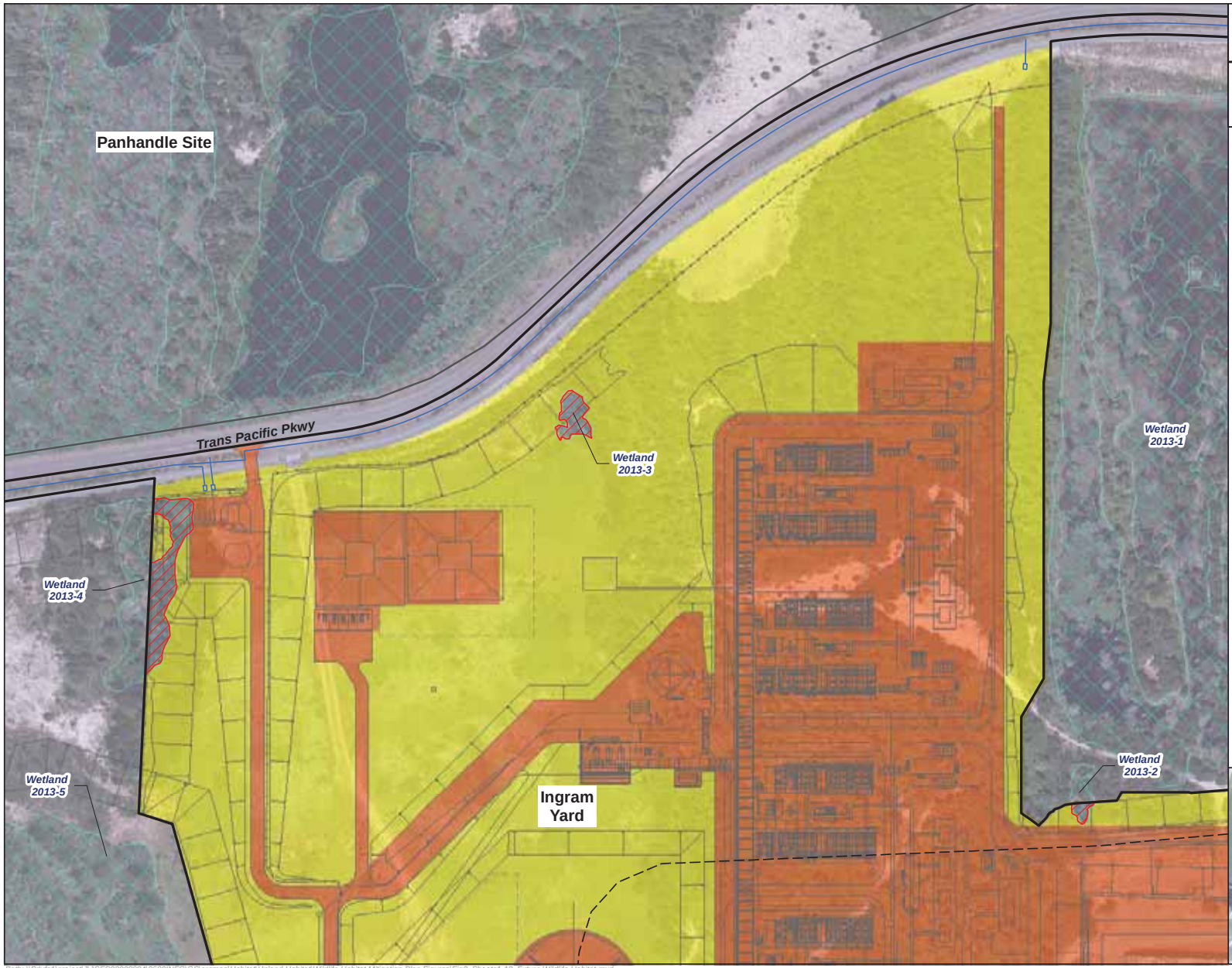
Future ODFW Habitat Category

- 4
- 6
- Delineated Wetland

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0 0.2 0.4
Miles

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 2 of 10)
Ingram Yard

- Project Footprint
- Panhandle Site Boundary

Future ODFW Habitat Category

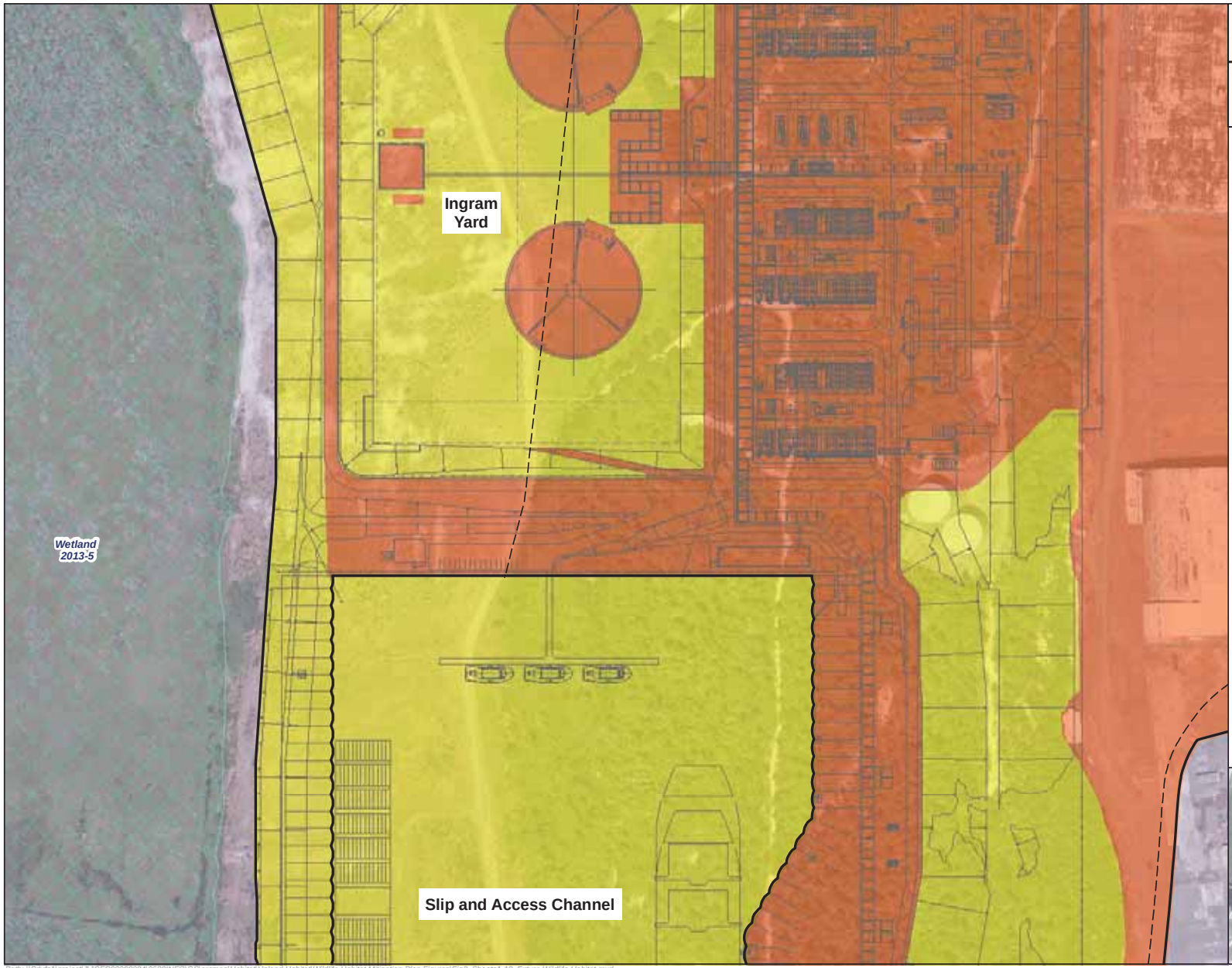
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Water Line
- Haul Road
- Temporary Facility

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 3 of 10)
South Ingram Yard/Slip

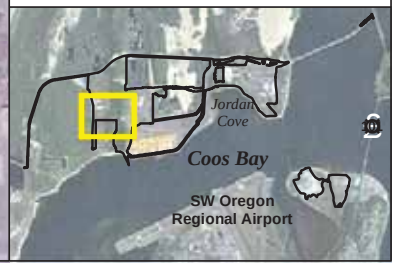
- Project Footprint

Future ODFW Habitat Category

- 4
- 6
- Delineated Wetland
- Haul Road
- Temporary Facility

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 4 of 10)
Slip and Access Channel

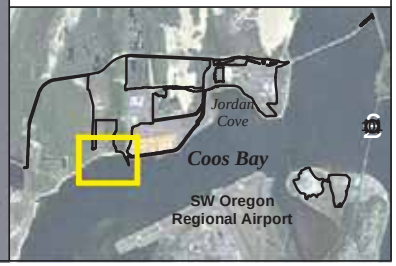
- Project Footprint

Future ODFW Habitat Category

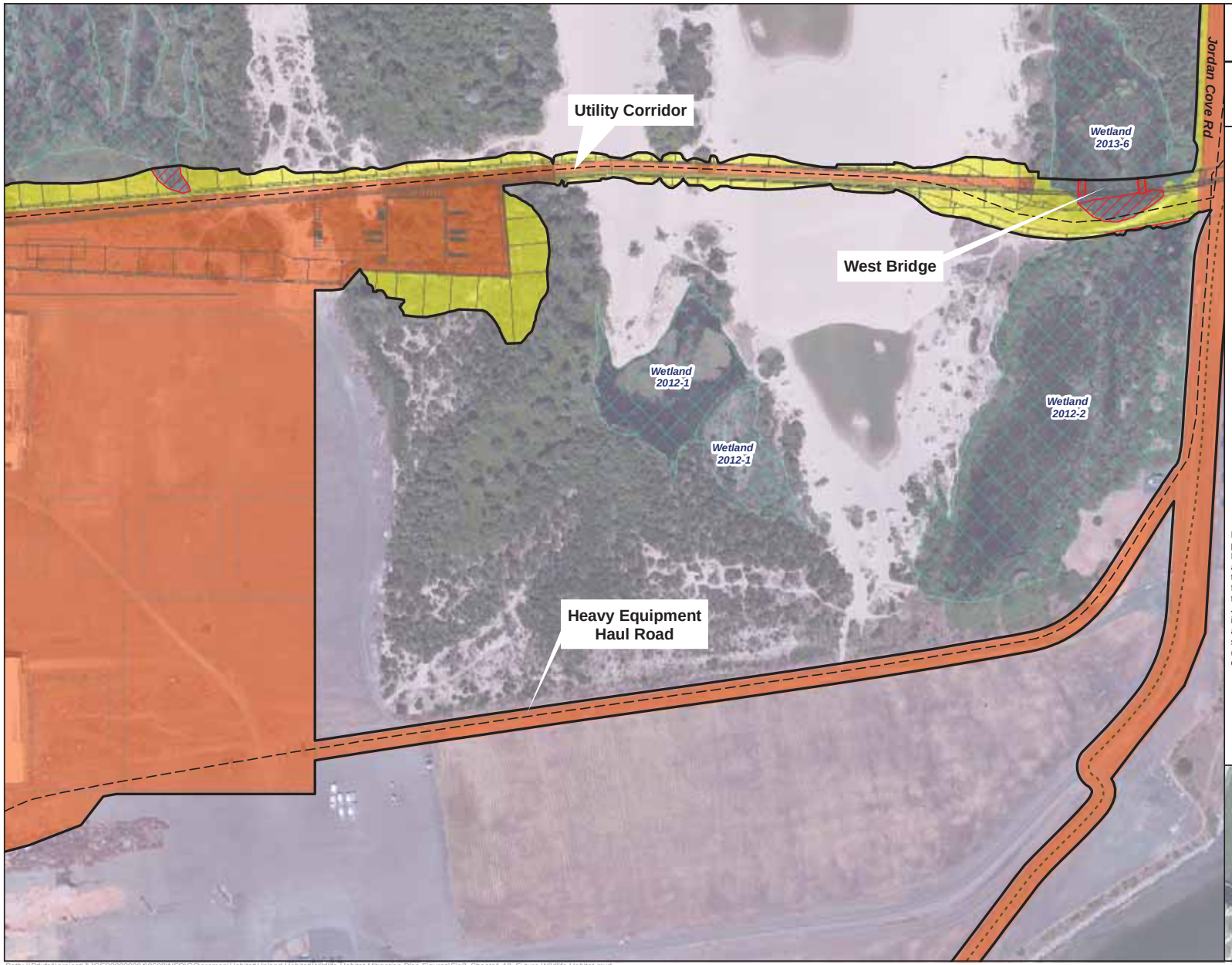
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact
- Pipeline
- Haul Road

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 5 of 10)
Utility Corridor

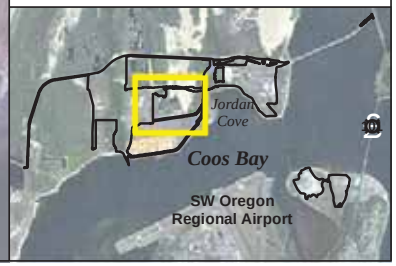
- Project Footprint

Future ODFW Habitat Category

- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact
- Pipeline
- Haul Road
- Temporary Facility

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 6 of 10)
West Bridge

- Project Footprint

Future ODFW Habitat Category

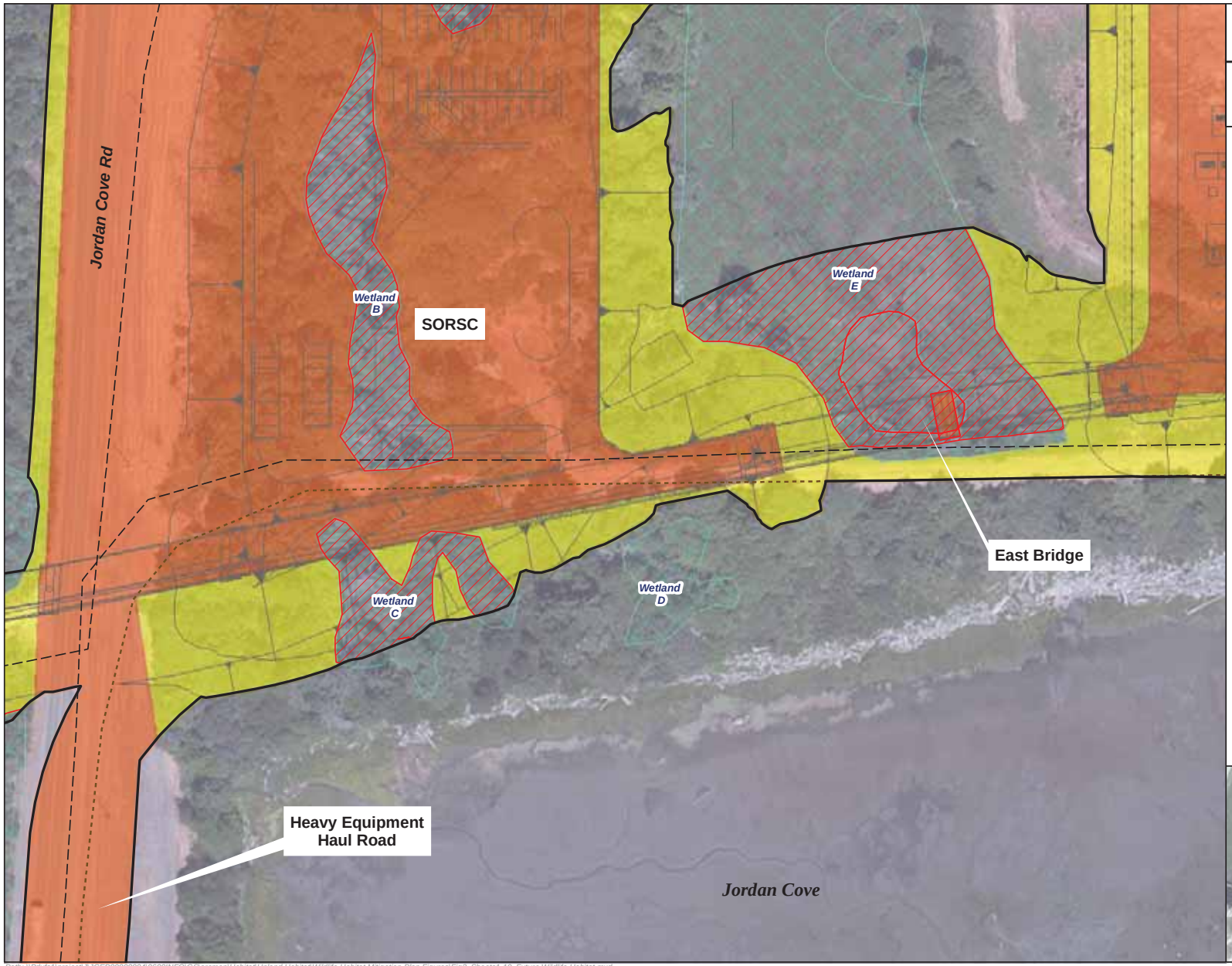
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact
- Pipeline
- Haul Road

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 7 of 10)
East Bridge

- Project Footprint

Future ODFW Habitat Category

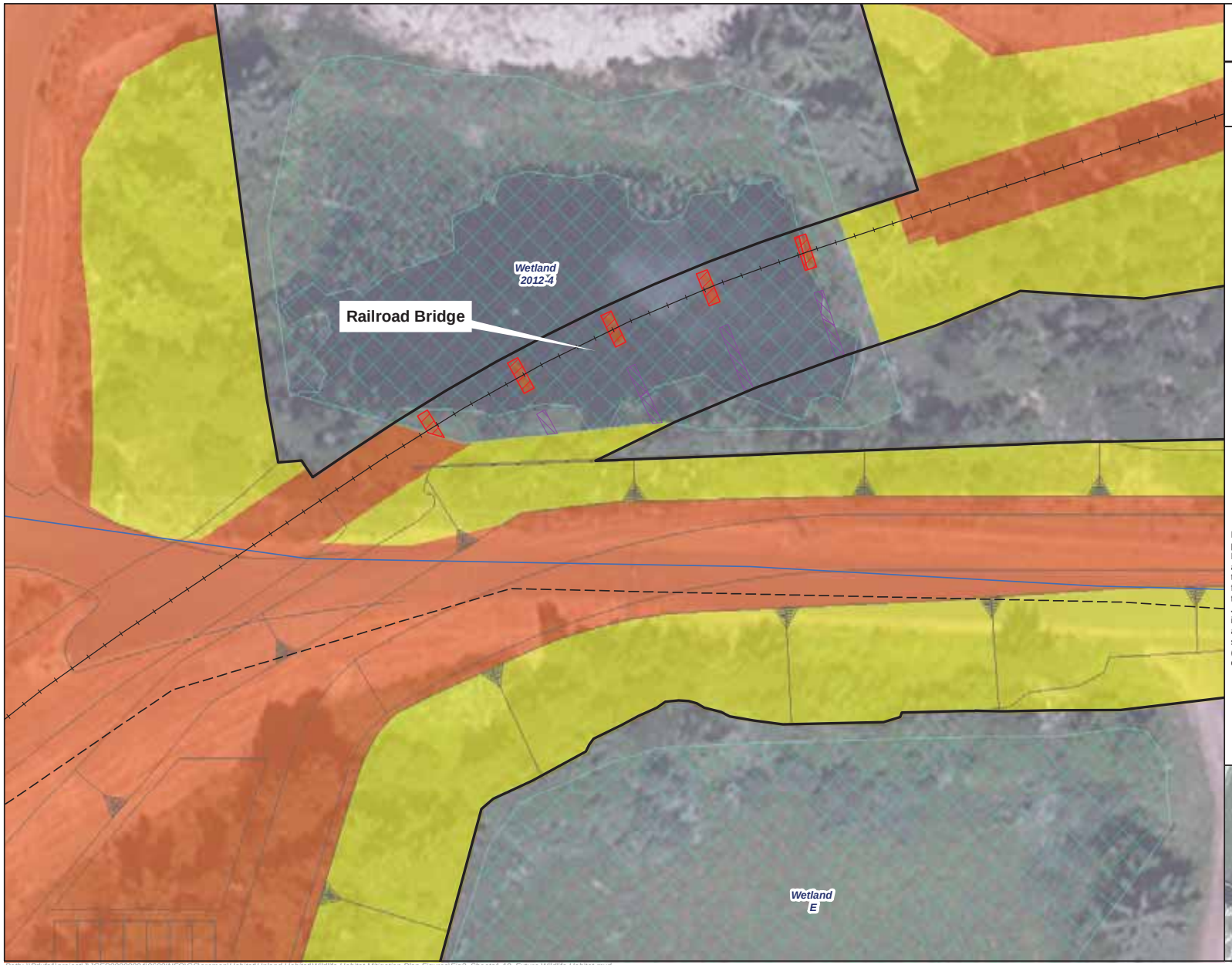
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Pipeline
- Haul Road
- Temporary Facility

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 8 of 10)
Railroad Bridge

- Project Footprint

Future ODFW Habitat Category

- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact
- Haul Road
- Proposed Rail

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 9 of 10)
South Dunes Power Plant

- Project Footprint

Future ODFW Habitat Category

- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact
- Water Line
- Pipeline
- Haul Road
- Temporary Facility
- Proposed Rail

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 10 of 10)
North Point Workforce Housing Project

- Project Footprint

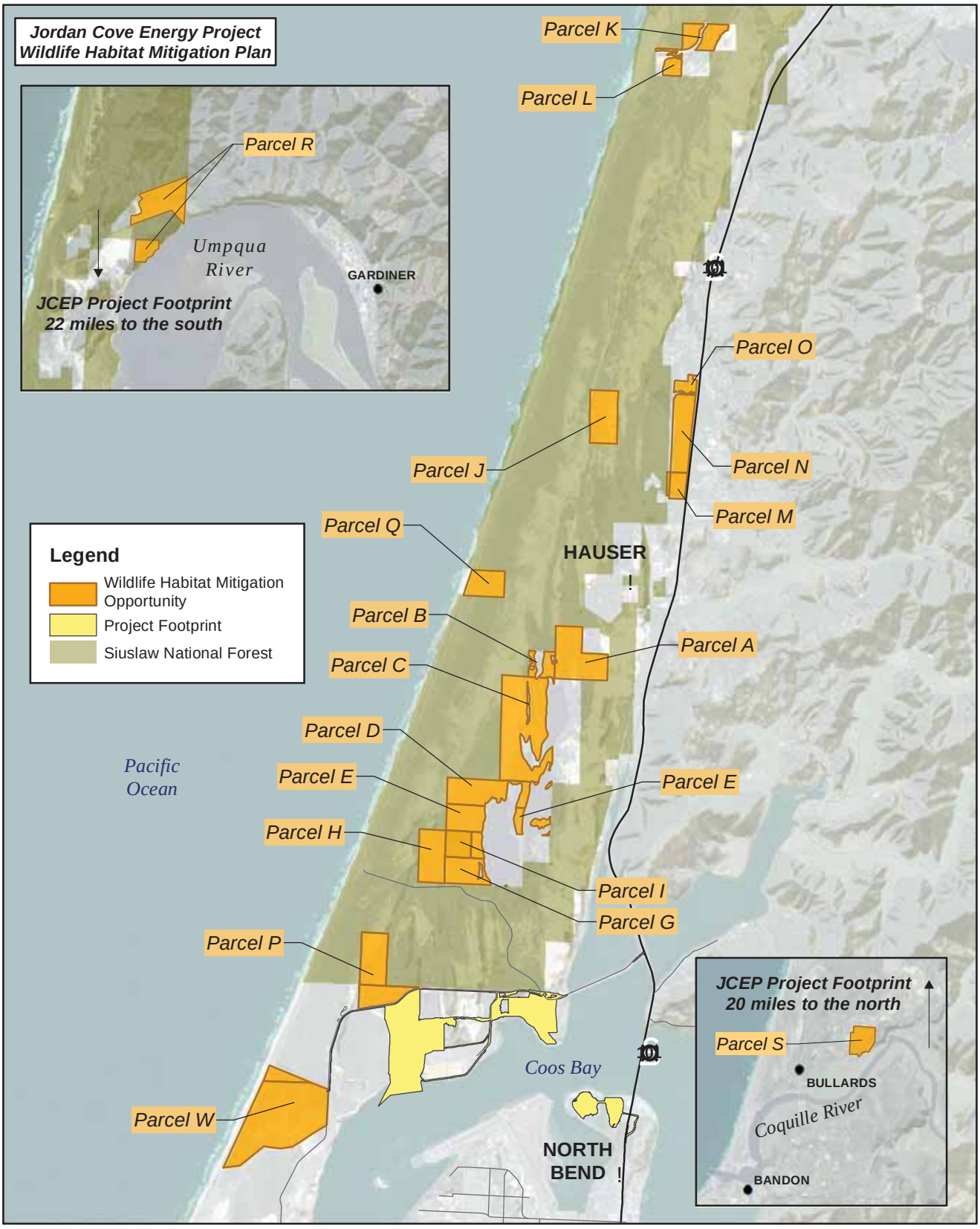
Future ODFW Habitat Category

- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact

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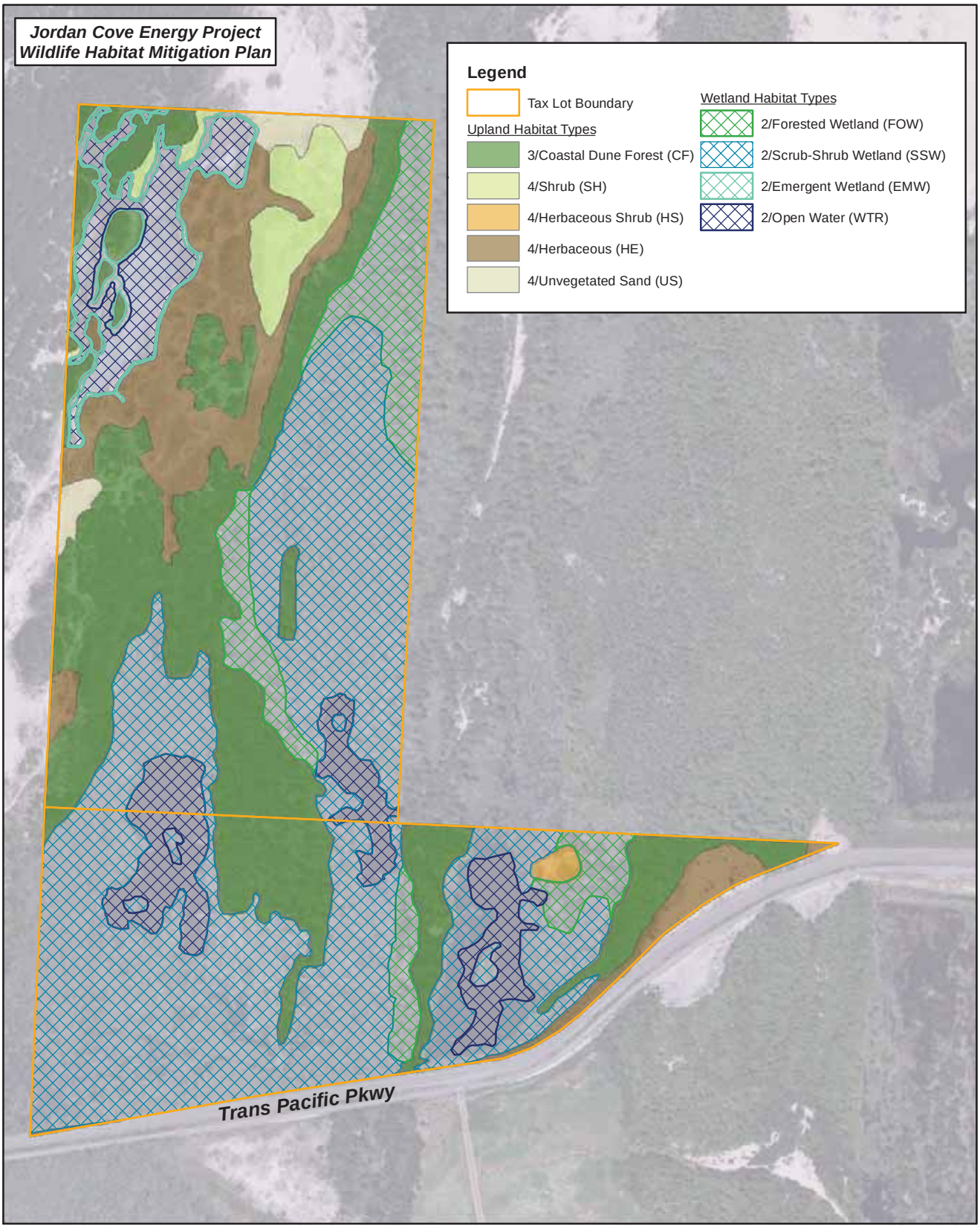
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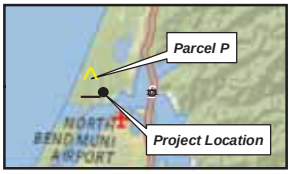


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Wildlife Habitat Mitigation Site Maps
Figure 4
Wildlife Habitat Parcels Investigated

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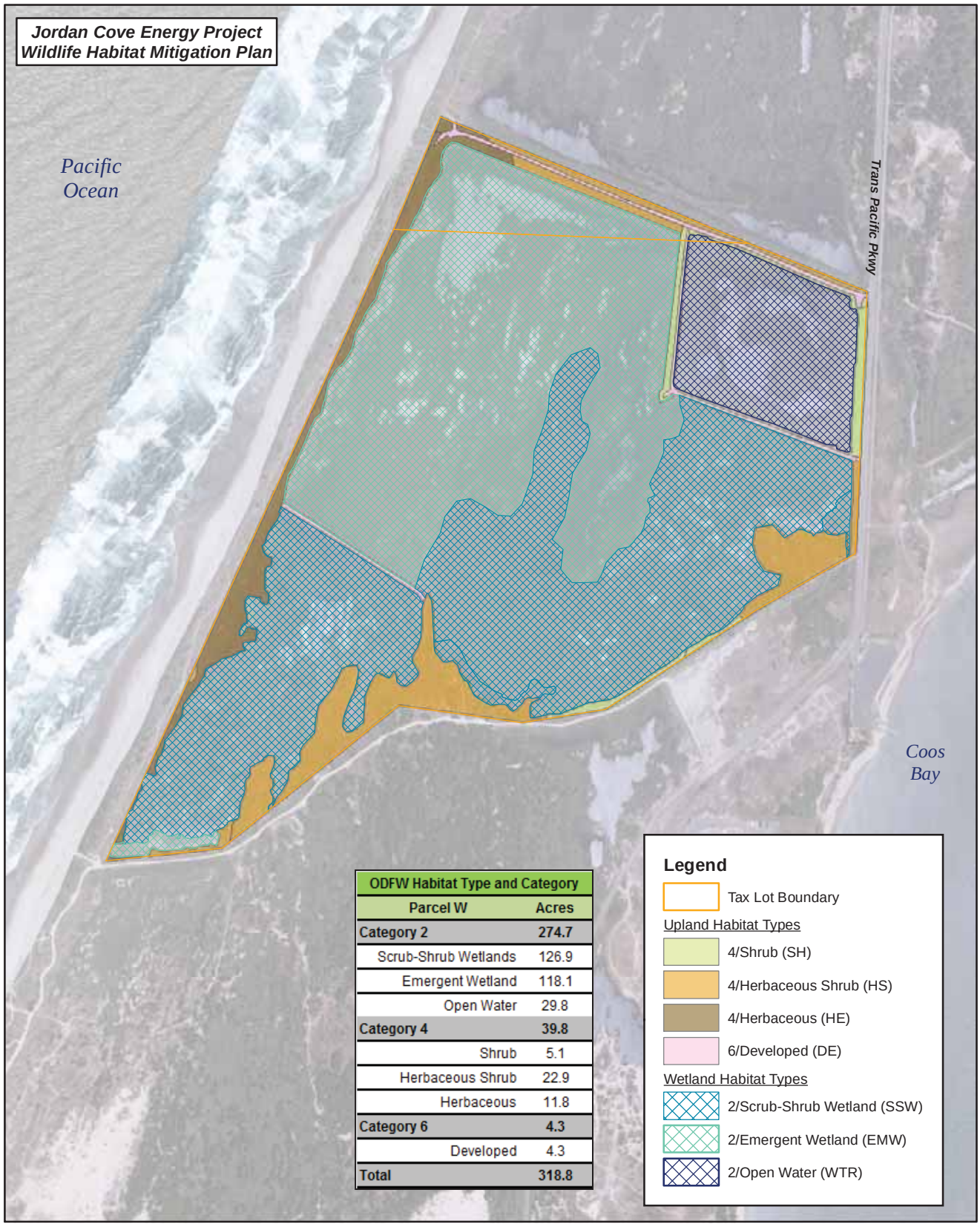
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Wildlife Habitat Mitigation Site Maps
Figure 5 (Sheet 1 of 3)
Panhandle (Parcel P)

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Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan



ODFW Habitat Type and Category	
Parcel W	**Acres**
Category 2	**274.7**
Scrub-Shrub Wetlands	126.9
Emergent Wetland	118.1
Open Water	29.8
Category 4	**39.8**
Shrub	5.1
Herbaceous Shrub	22.9
Herbaceous	11.8
Category 6	**4.3**
Developed	4.3
Total	**318.8**

Legend

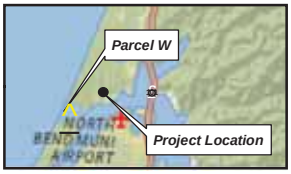
- Tax Lot Boundary

Upland Habitat Types

- 4/Shrub (SH)
- 4/Herbaceous Shrub (HS)
- 4/Herbaceous (HE)
- 6/Developed (DE)

Wetland Habitat Types

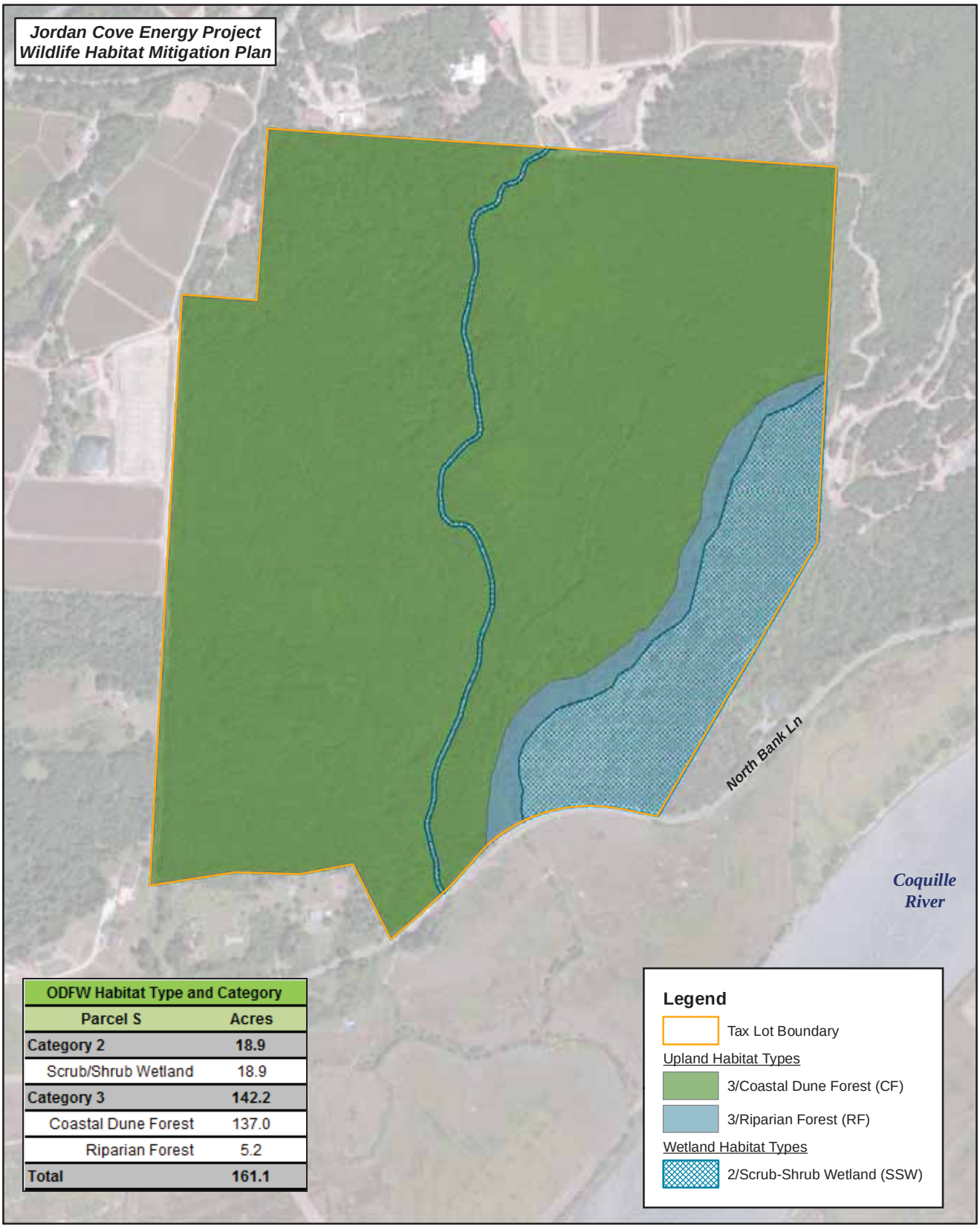
- 2/Scrub-Shrub Wetland (SSW)
- 2/Emergent Wetland (EMW)
- 2/Open Water (WTR)



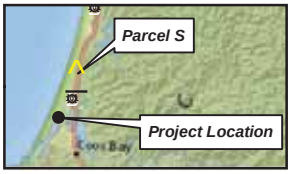
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Wildlife Habitat Mitigation Site Maps
Figure 5 (Sheet 2 of 3)
Lagoon Site (Parcel W)

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ODFW Habitat Type and Category	
Parcel S	Acres
Category 2	18.9
Scrub/Shrub Wetland	18.9
Category 3	142.2
Coastal Dune Forest	137.0
Riparian Forest	5.2
Total	161.1



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Wildlife Habitat Mitigation Site Maps
Figure 5 (Sheet 3 of 3)
North Bank Site (Parcel S)

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APPENDIX C: Draft Jordan Cove Energy Project Wildlife Salvage Plan

DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE:	January 29, 2014
TO:	Stuart Love, Wildlife Biologist; Chris Claire, Fish Biologist; Art Martin, Energy and NRDA Coordinator, Wildlife Division
FIRM:	Oregon Department of Fish and Wildlife (ODFW)
FROM:	Phil Rickus
SUBJECT:	**DRAFT Jordan Cove Energy Project Wildlife Salvage Plan**
PROJECT:	JCEP0000-0004 – Jordan Cove Energy Project
COPIES:	Bob Braddock, Jordan Cove Energy, LP Sean Sullivan, David Evans and Associates, Inc. (DEA) Steve Donovan, SHN Consulting Engineers & Geologists

The following Draft memorandum is intended to provide initial guidance for salvage of species present in freshwater wetlands that may be impacted by the Jordan Cove Energy Project (JCEP). Oregon Department of Fish and Wildlife (ODFW) provided input for this plan, and they and other agencies are invited to comment and provide additional on-site guidance as the project nears initiation. David Evans and Associated, Inc. (DEA) assembled this plan using best available information regarding salvage of a variety of species, and welcomes additional input.

The species that would benefit most from salvage are amphibians and aquatic species within wetlands to be fully or partially filled by the project. Other species (including most upland species) would be expected to move to adjacent habitats as construction commences, or are impractical to salvage based on difficulty in locating them. Every effort should be made prior to construction to identify species that may be present. However, depending on the time of year, nesting or denning wildlife could be discovered during construction, and in need of salvage.

Vegetation clearing is planned to occur outside of the breeding season for birds, but may occur during the denning season. If terrestrial species are encountered, they should be delivered to a predetermined licensed rehabilitator, and arrangements with this rehabilitator need to be made before construction begins. The following applies primarily to aquatic species with considerations for terrestrial species where appropriate.

The general plan for salvage is as follows:

1. Water areas are blocked off with silt fence to prevent movement of species into the construction areas. This fencing will remain in place during construction to prevent migration of species back into construction areas. Screen or fence mesh size will need to restrict movements of the smallest life stage present that will be captured.
2. Seine nets and/or dip nets are utilized first (where possible) to capture/remove species within the construction reach. Hand-removal of species is the preferred method of capture, but may not be effective in wetlands with woody debris or dense vegetation.
3. Once as many species are caught by hand as possible, an electro-shocker is utilized to capture remaining species, using the most current National Marine Fisheries Service (NMFS) and United States Fish and Wildlife Service (USFWS) protocols for anadromous fish.

4. Often fish and amphibians are very difficult to capture through any seining, dipnetting, or electroshocking effort, especially in water deeper than 3.5 feet. Moving fish and amphibians to a shallower area where they can then be captured can be effective. Although stress can occur as a result, often a much higher proportion of the population is able to be salvaged.
5. Filling of the wetland or stream from a consistent direction with relatively clean fill material (sand, etc.) can help maintain livable habitat; the species of concern can then migrate ahead of the fill material and thereby be salvaged.
6. Species transport is conducted using 6-wheeled, Off-Highway Vehicles (OHVs) with integrated utility beds for secured storage of trapping containers. Specific detail regarding transport is provided below, and has been adapted from Appendix F of the 2006 USFWS DRAFT Chiricahua Leopard Frog Recovery Plan (USFWS 2006), which is available online.
7. Species are transported in large, aerated coolers secured in OHV utility beds. Species hold times are minimized by making multiple transport trips. Water temperatures are monitored as work progresses to avoid thermal stress.
8. All encountered fish, amphibians, and reptiles are salvaged and relocated to pre-determined wetland and waters areas that have been surveyed for similar condition compared to impact site, and absence of bullfrogs (predators). Species are relocated to several different pre-designated areas to avoid concentrating individuals at release sites. Distance from capture site, and release site connectivity and perennial water supply should be among the many factors considered during release site selection.
9. Relocation sites would be pre-determined by coordination with ODFW, as well as with National Marine Fisheries Service (NMFS) and United States Fish and Wildlife Service (USFWS) if applicable for federally listed species. Relocation sites for terrestrial wildlife will be determined based on requirements under which licensed rehabilitators operate at the time of construction.

General Considerations:

- Qualified biologists will conduct the work under a Scientific Research and Take permit issued by ODFW.
- Release sites should contain similar habitat conditions to collection sites (pH, temperature, etc.).
- Identification of release sites will be coordinated with ODFW to ensure impacts to release sites are minimal, and access to sites is clear (including land ownership). Release sites would likely include private properties only. If release sites include public lands, additional permits or coordination may be required.
- Relocated organisms are especially susceptible to predation, and areas with predators (e.g. largemouth bass or bullfrogs) should be avoided if possible.
- Active searches (including electroshocking) are generally most effective, and are recommended for this project. Pitfall and funnel traps could also be used, but are usually less effective and more time-consuming, and have not been included in this plan to date. However, hoop and funnel traps are often a good method for initial determination of general composition and abundance, and could be useful if implemented sufficiently prior to construction.

- Surface activity of amphibians is needed for salvage. A minimum of 45 degree Fahrenheit water temperature is preferred for red-legged frog capture.
- ODFW uses specific settings for sampling lamprey larvae. Lamprey electroshocking settings have been utilized effectively for salamander surveys and may be useful for stimulating amphibians to emerge for capture.
- Breeding adults generally congregate in the littoral zone during egg-laying season. Egg mass relocation can be effective, but also requires fencing to prevent egg drift without restricting larval movement.

Transport Considerations (adapted from USFWS 2006):

- General Container Information
  - Use only plastic containers, no metal or glass.
  - Containers should be water tight when tipped upside down.
  - Do not use bags more than once. Use only new, rinsed bags.
  - Carry 1 or 2 extra containers filled with water in case of an emergency (i.e., leak).

- Type of Containers per animal size
  - Larvae at any stage, ship well in one gallon self-closing bags (e.g. Ziplocs®). Double bagging should be considered for trips longer than 4 hours or when driving on rough roads. Larvae may also be transported in hard plastic buckets or containers that have tight fitting lids.
  - GladWare® is highly recommended for transportation of metamorphs, juveniles, and adults. Keep them from being crushed and they are reusable. For longer trips multiple individuals can be placed in a container with holes, and then placed in a cooler with a bubbler such as this one (www.google.com/#q=marine+metal+products+quiet+bubbles+air+pump).
  - For transportation and temporary containment of terrestrial wildlife (should they be encountered), pet carriers work well for many species like large birds and large mammals. Smaller cages need to be used for smaller animals. For many species plastic carriers can be chewed through, and steel cages may be better. JCEP should work with the licensed rehabilitator to develop specific strategies for capture and transport.

- Preparing Containers
  - Thoroughly rinse all shipping containers with water. Do not use any type of detergent or soap to clean the containers.
  - The GladWare® needs holes drilled in the top, approximately 16 holes. A standard hole punch works well. Drill from the inside out so that no sharp edges protrude into the animal holding space.
  - If desired, mark each bag with identification of eventual destination and the number of animals in the container.

- Container densities (per gallon bag for short shipments-avoid overcrowding):
  - Eggs: 1 mass per bag, minimize disturbance and division of mass
  - Larvae under ½": 25 per bag
  - Larvae 1" - 1 ½": 15 per bag
  - Larvae over 1 ½": 10 per bag
  - Recently metamorphosed frogs: 5 per container

- Water
  - Water put in the bags must be chlorine and chloramine free. Dechlorinating chemicals can be used to immediately remove chlorine. ODFW recommends using onsite water unless it is too hot or turbid due to active construction.
  - Stream or pond water from which the animals originated can be used. Avoid capturing aquatic invertebrates or organic debris.
  - Other alternatives are bottled drinking water or tap water left uncovered for 24 or more hours.
  - For larvae, fill bags by approximately 75 percent or greater volume water to avoid excessive sloshing.

Sincerely,
David Evans and Associates, Inc.



Philip Rickus
DEA Ecologist

APPENDIX T

List of Preparers and Reviewers

APPENDIX T
LIST OF PREPARERS AND REVIEWERS

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APPENDIX U

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