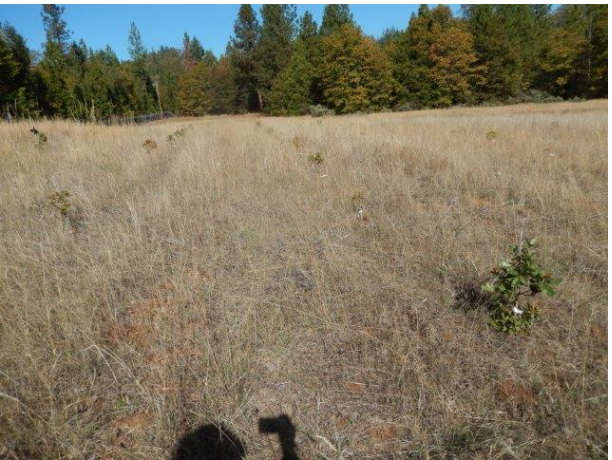
Pacific Madrone Provenance Trial

2014 Assessment of **BLM Sprague** site
(Trial assessed Oct 16, 2014)
Draft Report 10/26/2014
Photos: R.Sniezko



Objective

- **Provide the first baseline data on range-wide genetic variation in adaptive traits (e.g. growth) and resistance to pathogens for this wide-ranging species**.
  - 105 families collected from 7 ecoregions were planted in five locations in California (1), Oregon (2), and Washington in fall 2011/winter 2012; and a slightly different subset in BrCol (2) in 2014 (see some details at http://puyallup.wsu.edu/ppo/madrone/research/common_garden/index.html)
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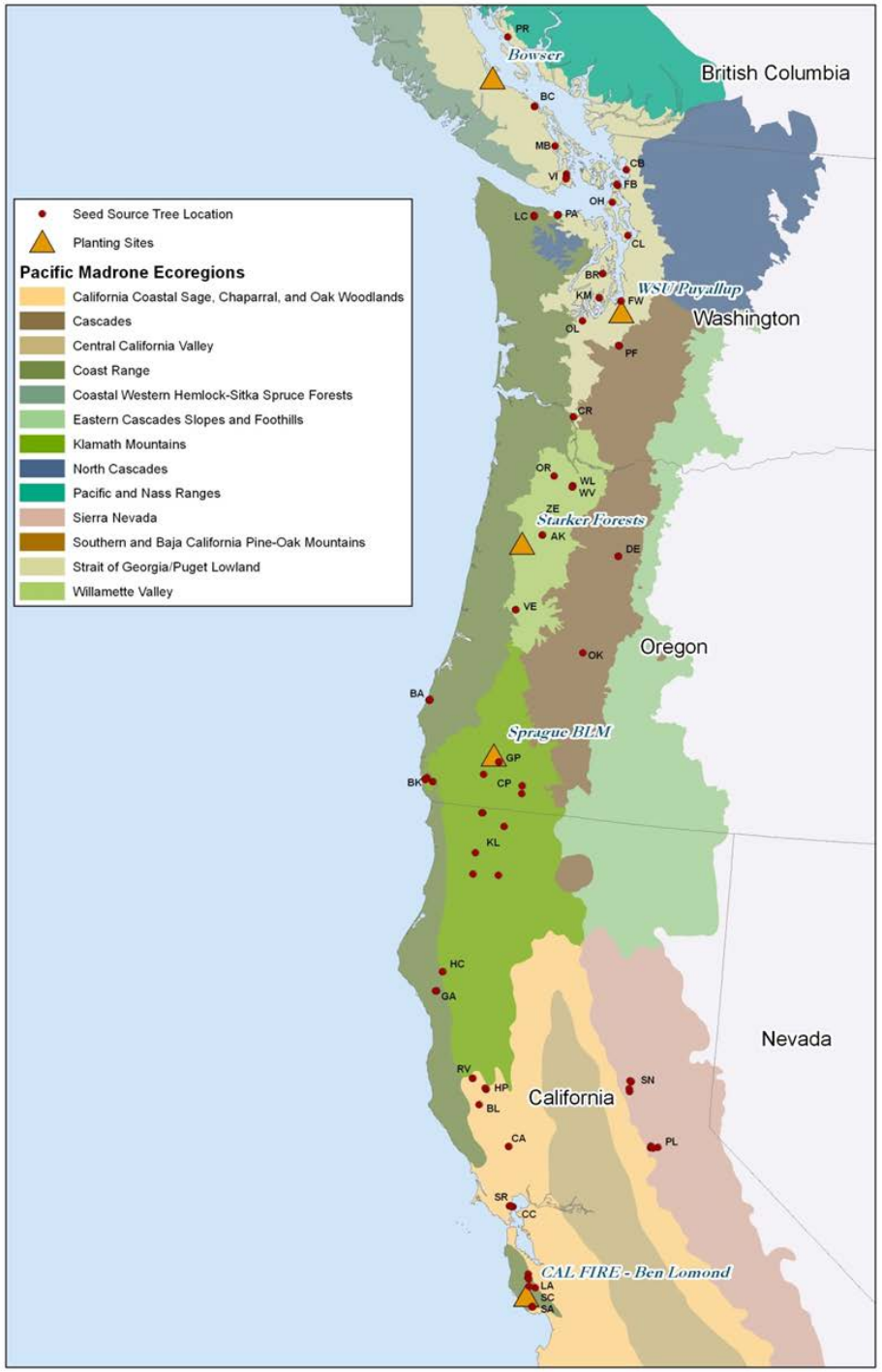
Oregon Pacific Madrone: Sources for Seed



- **105 families represented**
- **7 Ecoregions represented**

http://puyallup.wsu.edu/ppo/madrone/research/common_garden/

Map: from Marianne Elliott?)

Assessments

- OR trials assessed in fall 2012, 2013, and 2014
- CA trial with extreme mortality (drought) in 2012 (no further assessments to date?)
- WA trials assessed in 2012 and 2013?
- 2 British Columbia trials recently established – one has high drought related mortality

2014 Assessment (Oregon sites)

- **Assessment Team 2014**: Bob Danchok, Brian Luis, Sally Long, Richard Sniezko (all 3 days); Juli Sticha, Rachel Zitomer, Lisa Foster (Oct 15 & 16); Angelia Kegley (Oct 20) – all USFS Dorena GRC.
- Samples of dead trees (mainly roots) collected from both sites to send to Gary Chastagner (to test for *Phytophthora*) – 11 samples from SF site, 13 samples from BLM Sprague site.
- See 2013 & 2012 Sniezko powerpoint reports for comments & photos from previous assessments

2014 Oregon Pacific Madrone Site Assessments (OR sites, Oct 2014)

Plant Condition
1 = alive
2 = dieback**
3 = wilting
4 = dead
5 = missing

Total ht (cm): total height of seedling

 # leaders: 1 is default, 2=forked, 3= >2 leaders

~~**Leader branching:** 0 = no (default)~~
~~1 = branching~~

new growth*: Active new growth on terminals
0 = none (default)
1 = buds swollen to a large degree
2 = flushing buds

blight sev: severity of symptoms on most severely impacted current season leaf
0 = none
1 = slight (<25% of leaf area affected)
2 = moderate (25 to 50% of leaf area affected)
3 = severe (>50% of leaf area affected)

blight inc: whole tree
1 = <25 of leaves with severity rating
2 = 25-50% of leaves
3 = 51-75% of leaves
4 = >75% of leaves

Blight total: %of total leaf area affected

Comments
1 = leaf rust present
2 = chewing insect damage present
3 = variegated foliage present
4 = browse damage evident
5 = Burrowing varmint activity around tree
6 = Reddish-green fully expanded foliage
7=basal sprouts
8=2nd flushing

*very little in 2014,
but 2nd flushing was common at Starker site
**2.1, 2.2, and 2.3 used to denote increasing levels of dieback from minor to whole main stem

BLM Sprague Orchard site

- Relatively little growth on most seedlings – tallest ~80cm - many of taller trees near the road, especially Block 3; but a # of trees are very small - in the 6 to 15 cm height range (many with dieback and basal sprouts)
- Very little leaf blight (even less than Starker Forests)
- Some insect damage (more than at Starker Forest site)
- A few trees with a few leaves showing variegation (less than at Starker site)
- '2nd flushing' uncommon (unlike Starker Forest site)
- Many trees with dieback and sprouting at/near the base – trees will show shorter height in 2014
- Many dead trees showed little or no 2014 growth
- More trees with 'reddish' foliage here than at Starker stie
- Native madrone in area
- *Phytophthora* noted in area for decades (in adjacent sugar pine seed orchards)- dead madrone seedlings collected for testing – sent to G.C. at WSU
- Trial assessed 10/16/2014

Sprague site

- Drought year in 2013 (driest on record?)
- Extreme cold event in Dec 2013.
- Mortality often clumped at this site – high and notable in Block 4 and to lesser extent in Block 3.
- **Contact Jim Hamlin or Richard Sniezko (Forest Service) or Gary Chastagner/Marianne Elliott (WSU) for more info on this and the other linked trials; John Russell for information on the British Columbia trials**
- See website http://puyallup.wsu.edu/ppo/madrone/ for some background on trial

Madrone among the grass at Sprague site


4099.jpg

Seedlings with green, and with reddish foliage


GP2
4


LA
5


GA2
4

Dieback (on left) and dead (on right) seedlings


BK1 2

Top dieback with basal sprouting on CC3-2 seedling (4105, 4106.jpg)


CB1
2


CP9
3

Insect chewing

dieback

Insect chewing on leaves

Relatively small new growth typical of many trees at this site (4133.jpg)

dieback


KM1 2

Dieback (with sprouts, on left)


BC6 4

dieback


dieback
CC3
3


Some dieback
RV8

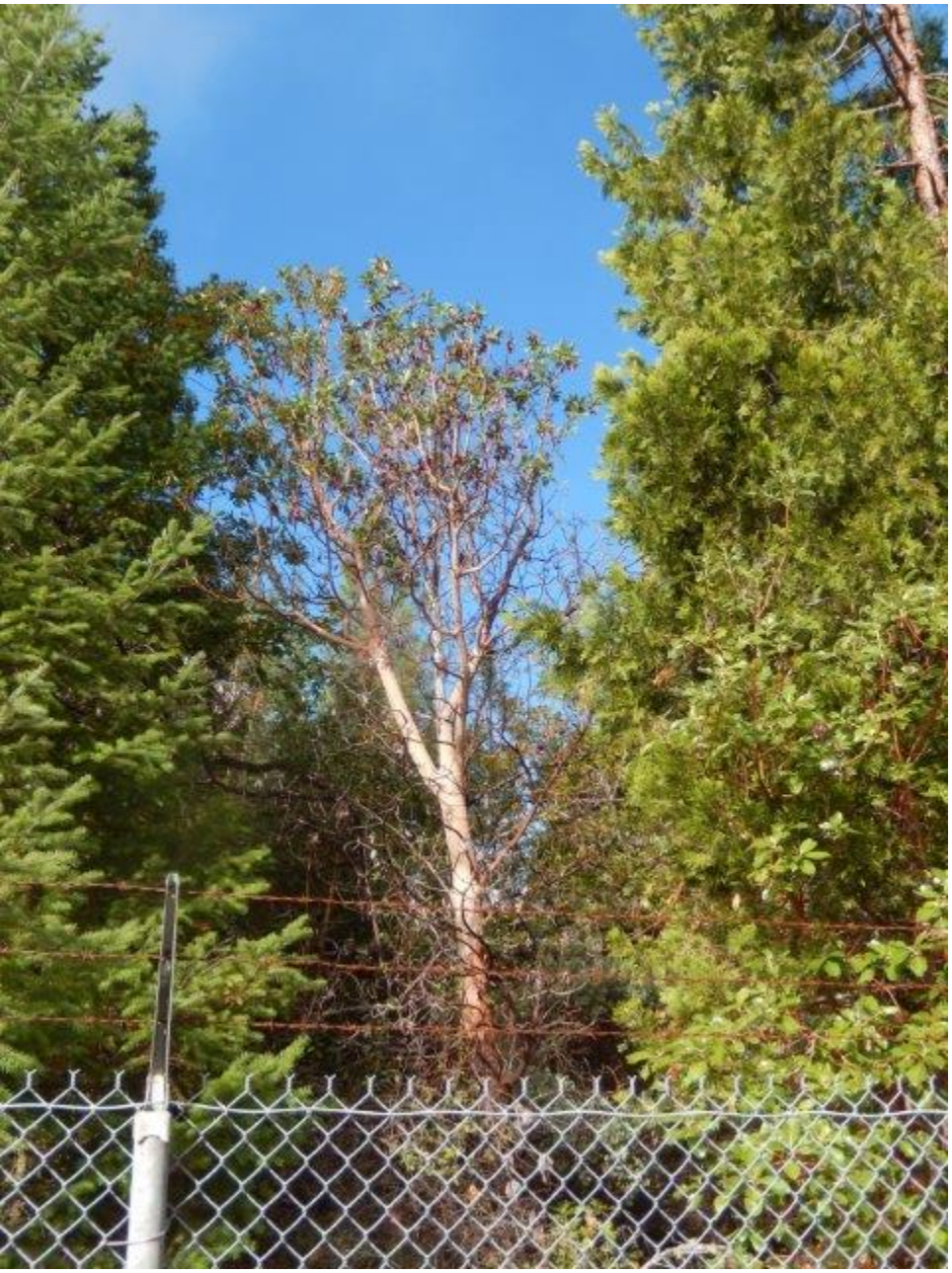

WV6
5

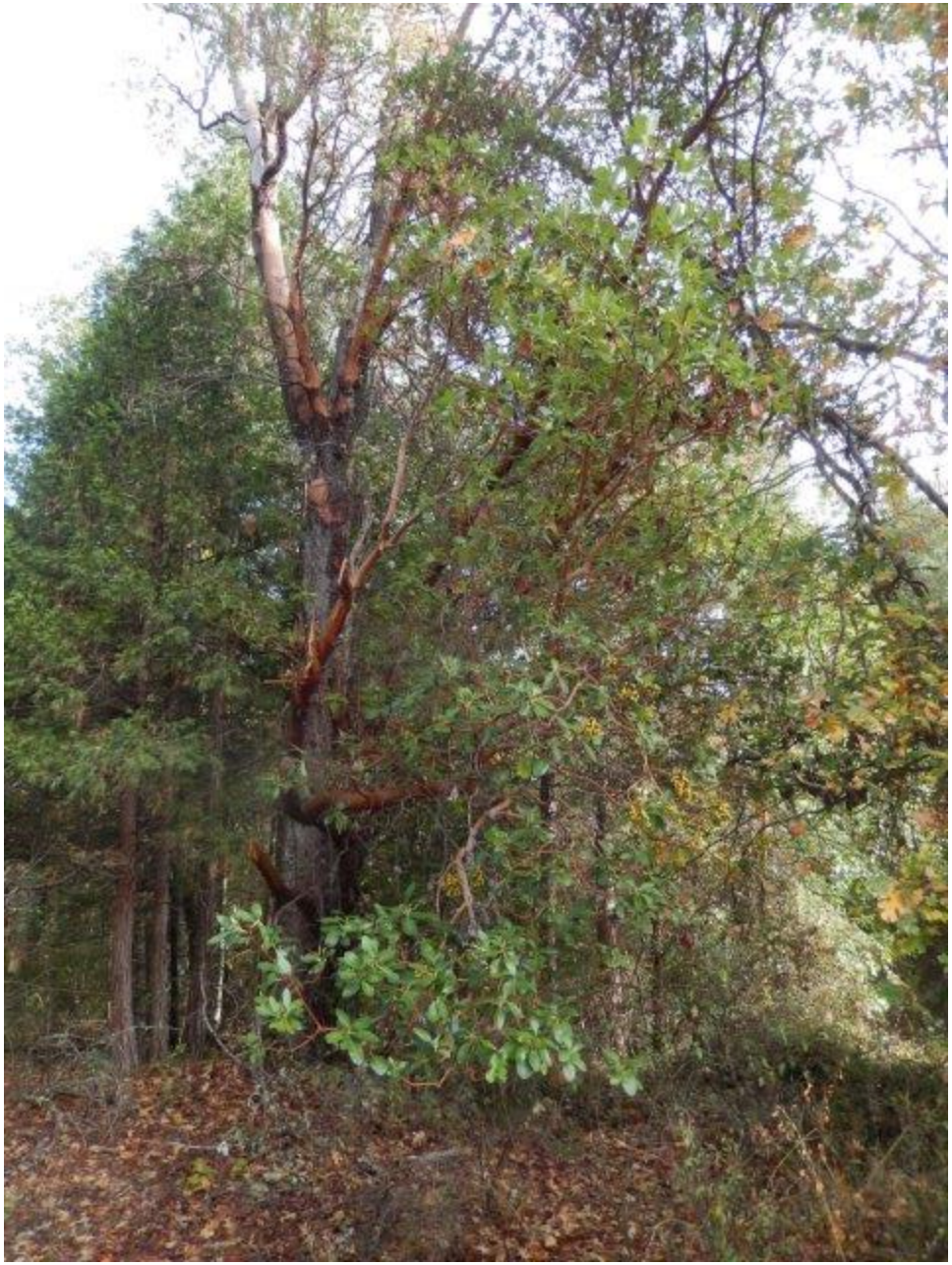

4102.jpg


4157.jpg


View from adjacent sugar pine orchard
(which has 1 madrone tree)

Madrone in area surrounding the field trial





To Do

- Data validation
- Compile unified dataset over assessment dates and sites
- Update Row-Col (X-Y) ‘maps’ showing mortality (different color per year)
- Basic summary info (e.g. mean height by family & source)

Recommendations

- The leaf blight was generally low at both Oregon sites, and there was little or no rust (most/all 2013 leaves were fallen) – a Spring assessment would likely be needed to pick up more in genetic variation trends for these two traits.

- Cooperators: BLM (Sprague) and Starker Forests provide sites for the two Oregon trials
- Thanks to the many people contributing seedlots to the project
- Pacific madrone Provenance Trial Team Contacts:
  - WSU (Gary Chastagner/Marianne Elliott);
  - USFS, **NFS**: (Jim Hamlin, Richard Sniezko), **PNWRS**: Connie Harrington
  - ODF (Alan Kanaskie)
  - British Columbia Ministry of Forests (John Russell)

Pacific madrone publications

- A First Look at Genetic Variation in Resistance to the Root Pathogen *Phytophthora cinnamomi* using a Range-wide Collection of Pacific Madrone (*Arbutus menziesii*)
  Marianne Elliott, Gary Chastagner, Annie DeBauw, Gil Dermott, and Richard A. Sniezko
- Range-wide Genetic Variability in Pacific Madrone (*Arbutus menziesii*): Examining Disease Resistance, Growth, and Survival in a Common Garden Study
  Marianne Elliott, Gary A. Chastagner, Gil Dermott, Alan Kanaskie, Richard A. Sniezko, and Jim Hamlin