Pacific Madrone Provenance Trial

2015 Assessment of **WSU Puyallup Valley** site

(Trial assessed Jan 30, 2015)

Draft Report 2/6/2015

Photos: M. Elliott

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 2013 (see some details at http://puyallup.wsu.edu/ppo/madrone/research/common_garden/index.html)
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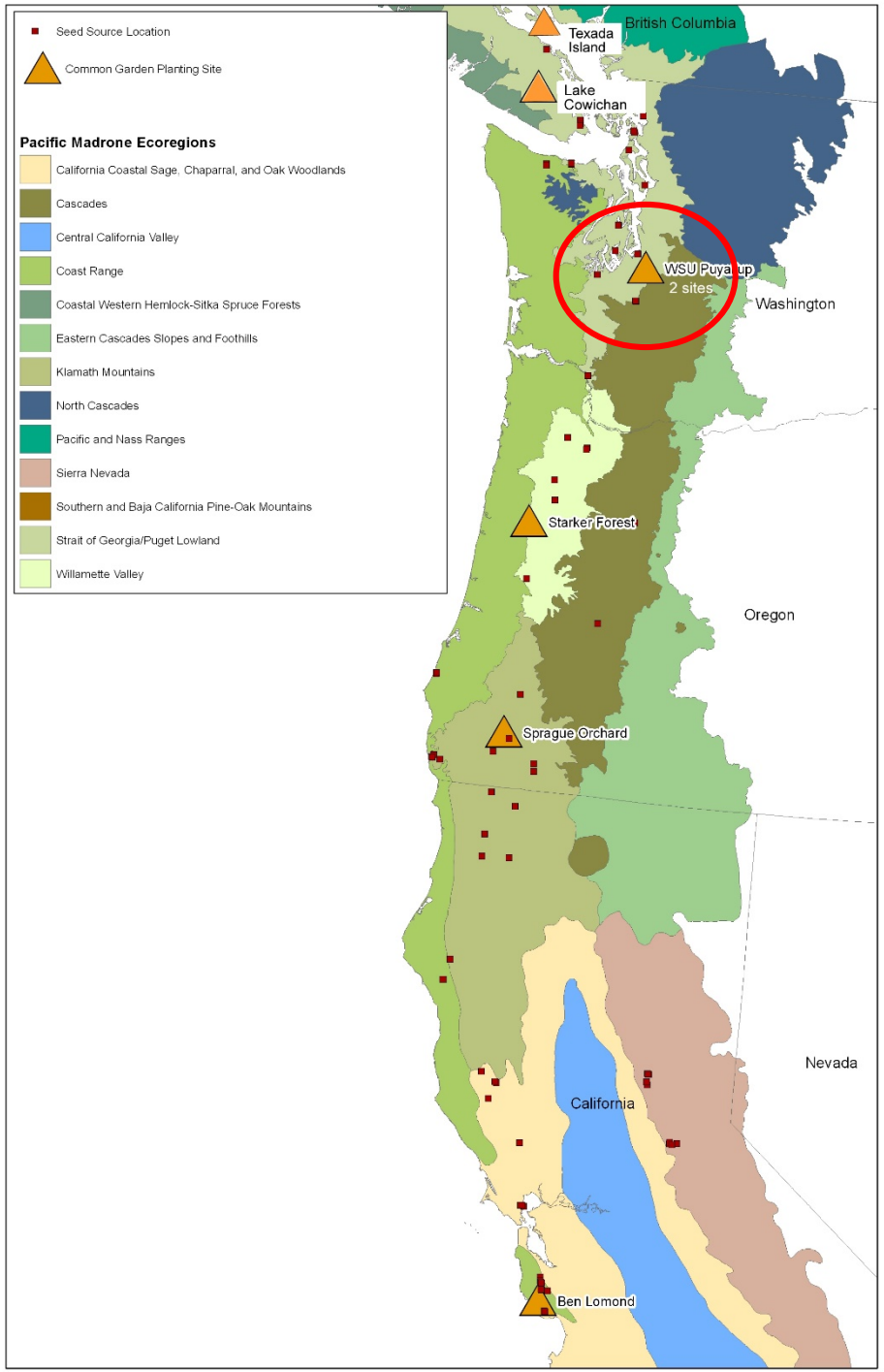


Washington Pacific Madrone: Sources for Seed

- **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 winter 2013, 2014, and Jan 2015
- 2 British Columbia trials recently established – one has high drought related mortality (CLRS)
- Considering replanting BL (California) and CLRS (Lake Cowichan, BC) in 2015/2016

					Assessments		
	Site	seed sown	Nursery data	planted	1 yr	2 yr	3 yr
PV	WSU Puyallup (valley site)	Feb. 2011	Nov. 2011	Nov. 2011	Jan. 2013	Oct. 2013, Jan. 2014	Jan. 2015
PH	WSU Puyallup (hill site)	Feb. 2011	Nov. 2011	Nov. 2011	Jan. 2013	Dec. 2013	Jan. 2015
SF	Starker Forests	Feb. 2011	Nov. 2011	Feb. 2012	Oct. 2012	Sept. 2013	Oct. 2014
SO	BLM Sprague Seed Orchard	Feb. 2011	Nov. 2011	Nov. 2011	Nov. 2012	Sept. 2013	Oct. 2014
BL	Cal Fire Ben Lomond Conservation Camp	Feb. 2011	Nov. 2011	Feb. 2012			
TI	Texada Island	Feb. 2013	Jun. 2013		Sept. 2014		
CLRS	Cowichan Lake Research Site	Feb. 2013	Jun. 2013		Sept. 2014		

2015 Assessment (Washington sites)

- **Assessment Team 2015**: Andy McReynolds, Marianne Elliott, David McLoughlin, Carly Thompson, Gary Maguire, Travis Bonnette, Nathan Stacey, others??

- Teams for
  - Height measurements
  - Frost & blight ratings
  - All other objective measurements

2015 Washington Pacific Madrone Site Assessments (WA sites, Jan 2015)

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

 # leaders: Number of leaders present (tallest dominant shoots)

new growth: Active new growth on terminals
0 = none (default)
1 = bud swell
2 = new leaves

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=multiple flushes on leader(s)
9=flowering

Frost:
0 = none
1=related to immature flushes
2=shoot dieback, affecting less than half the tree
3=shoot dieback, affecting more than half the tree
4=whole tree, may be dead

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)

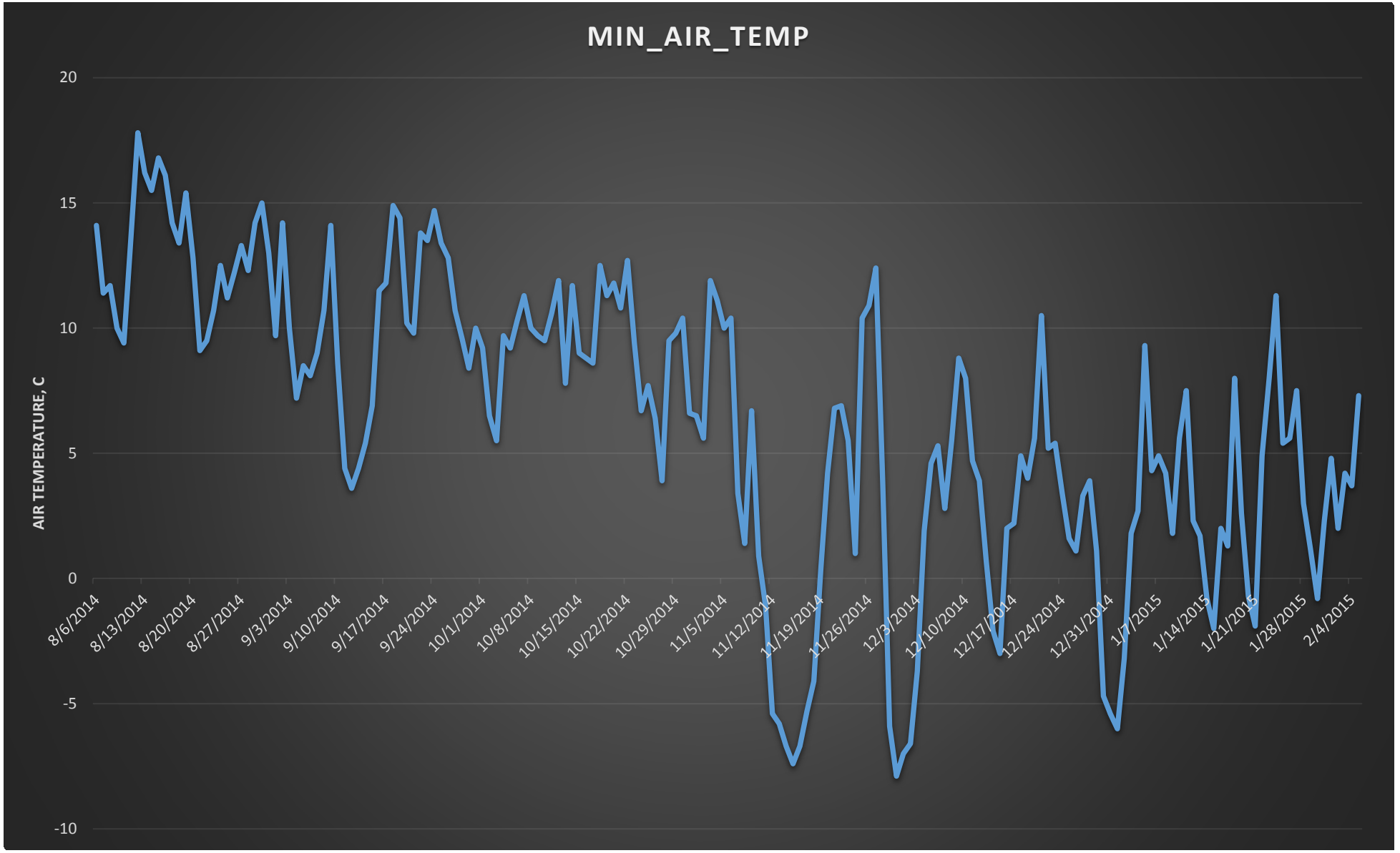
blight inc: whole tree
1 = <25 of leaves with severity rating
2 = 25-50% of leaves
3 = 51-75% of leaves
4 = >75% of leaves

Total ht (cm): total height of seedling

WSU Puyallup Valley site

- Significant height growth, especially at N end of plot
- Variable amounts of leaf blight
- Mortality in areas of the plot, will test for *Phytophthora*
- Multiple flushes common on dominant shoots
- Some trees were flowering
- Freeze damage on new foliage and swelled buds, also wilting of entire tree
- Trees that had shoot dieback in previous years had multiple leaders and “bushy” growth habit
- Some trees with ‘reddish’ foliage
- No madrone in area surrounding site
- Sandy loam soil
- Trial assessed 1/30/2015

Below freezing temperatures occurred in November and December at Puyallup.
Weather station located near PV planting.



Puyallup Valley site
1.30.2015

Vigorous shoot growth

Multiple leaders resulting from shoot dieback in the previous year.

Poor growth on some plants and
vigorous growth on adjacent plants

Tree with red foliage

Low blight damage

Fruit stalks killed by frost, with fruit still attached

Wilting from cold damage on entire tree

Cold damage

All the Texas madrones planted in the border row died.

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

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Cooperators

- BLM (Sprague) and Starker Forests provide sites for the two Oregon trials
- CalFire provided site for CA trial
- 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)