

Starting With the Best Seed: Genetic Testing and Seed Production To Improve Dry Side Disease Resistance and Value

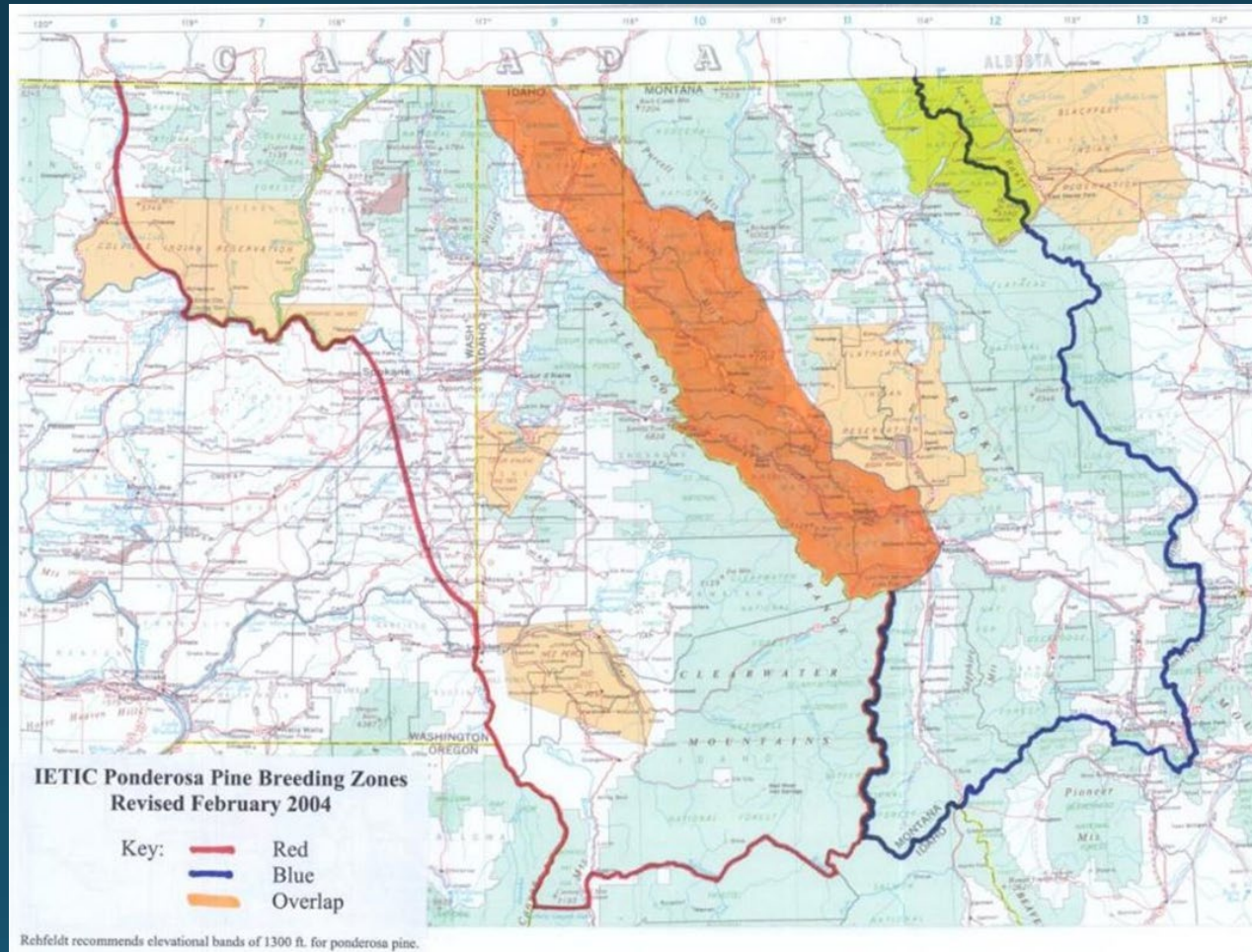


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Washington DNR
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- Selecting & testing parent trees
- Establishing & managing seed orchards
- Seed orchards for the Inland Empire

Decide on boundaries and elevational breaks for breeding zones



Search the woods for promising trees

- only from natural stands
- uniform stands



Collect seed from selected trees and grow seedlings for testing



Plant seedlings in progeny tests and measure performance over time

- height & diameter
- stem form & defects
- incidence of disease
- wood properties
- adaptive traits



Graft the best trees from tests into a breeding orchard to start a new round of testing



Seed Orchard Establishment

- Collect scion and graft selected trees
or
- Collect seed from selected trees and grow seedlings



Seed Orchard Establishment

- plant trees in the orchard;
- collect cones when they begin producing



If the orchard was established prior to having testing results, rogue the orchard after the results are available



Seed Orchard Management



- Cone induction by girdling, often together with fertilization or injection of gibberellins
- Aerial spraying to control insects is common where the surroundings allow it
- Stem injected insecticides are used by some orchard managers
- Some orchards work on enhanced pollination

Cooperative Seed Orchards for the Inland Empire

Bingham White Pine Orchard



Bingham Expansion



White pine blister rust: screening for resistance



Resistant vs. non-resistant white pine



Seedlings from
selected parents

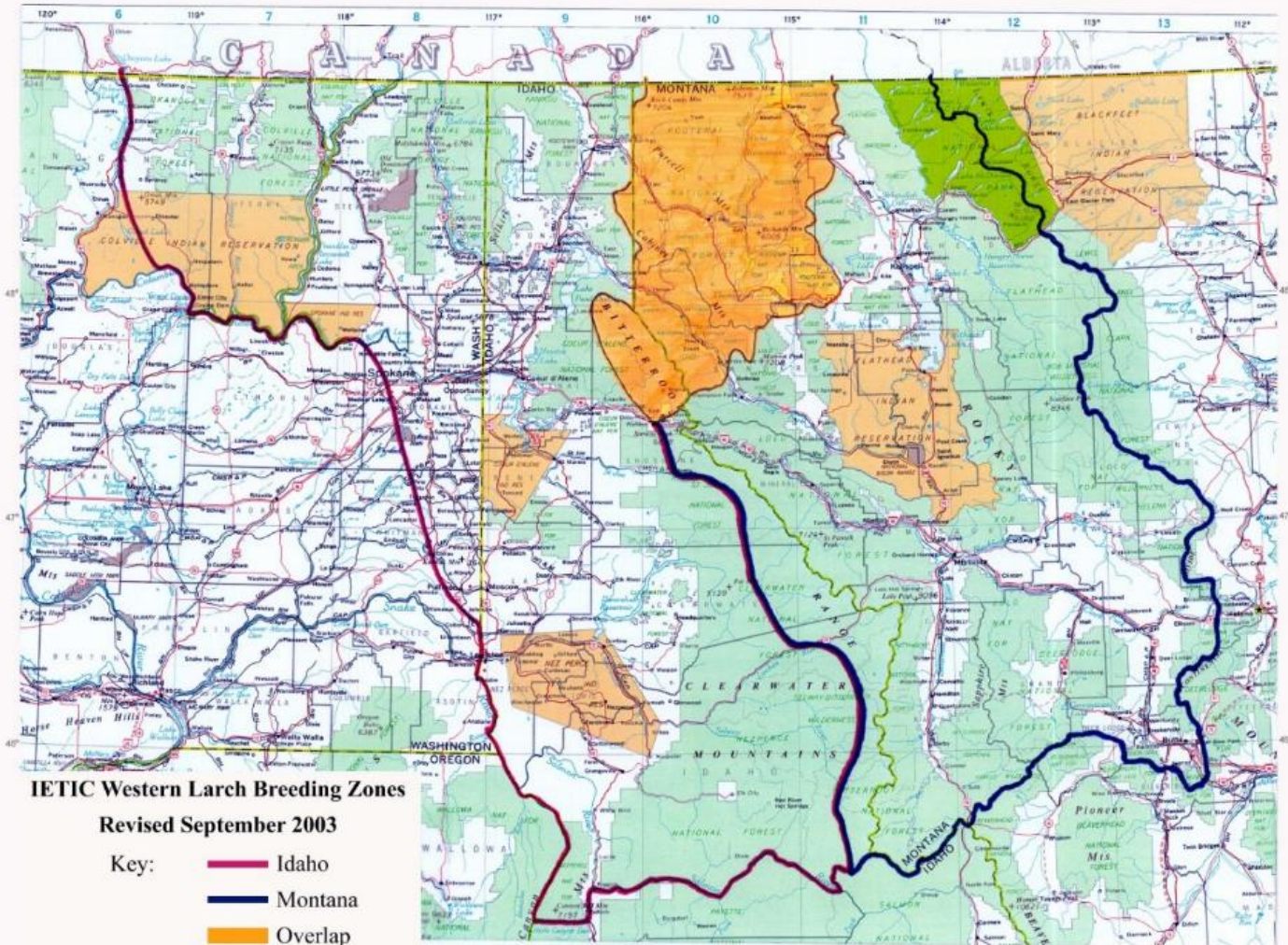
Seedlings from
unselected parents

Bingham white pine orchard



- 12 members
- in full production
- about 60% resistance to WPBR

Western Larch

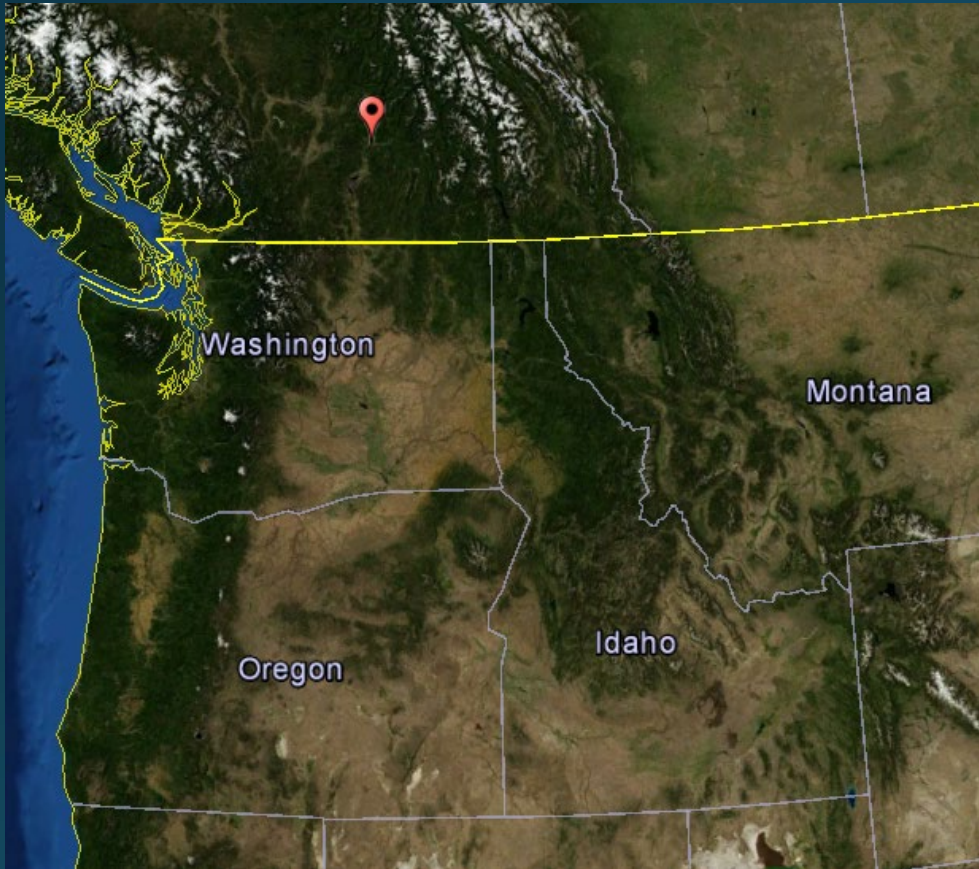


Rehfeldt recommends elevational bands of 1400 ft. for western larch.

Kalamalka Larch Orchard

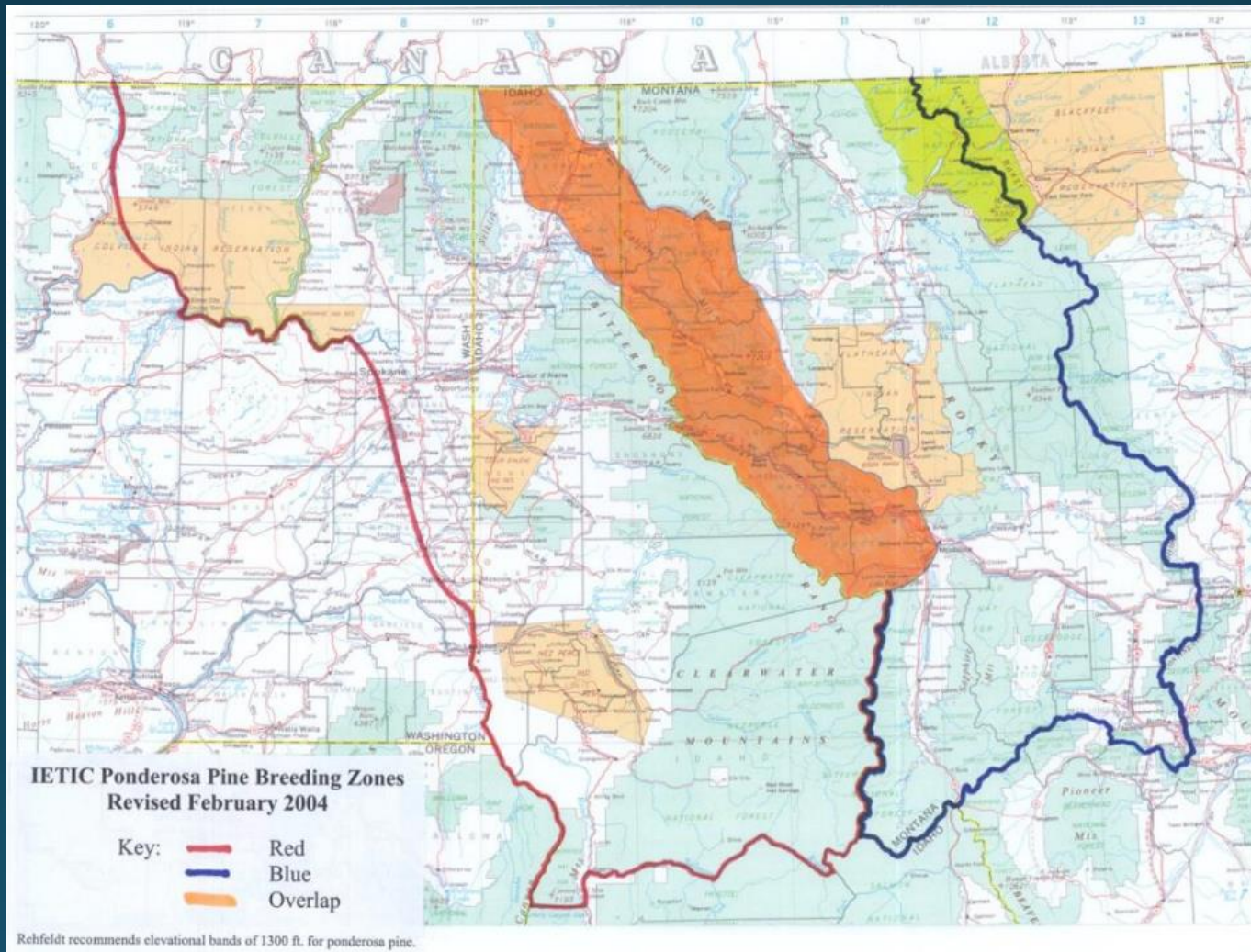


Kalamalka larch orchard



- 12 members
- increasing production
- high gains for volume growth
- ID/WA 2800-4200 feet

Ponderosa Pine



Pullman Ponderosa Pine Orchard



Pullman ponderosa pine orchard



- 9 members
- just starting to produce
- moderate gains for volume growth

Missoula Ponderosa Pine Orchard

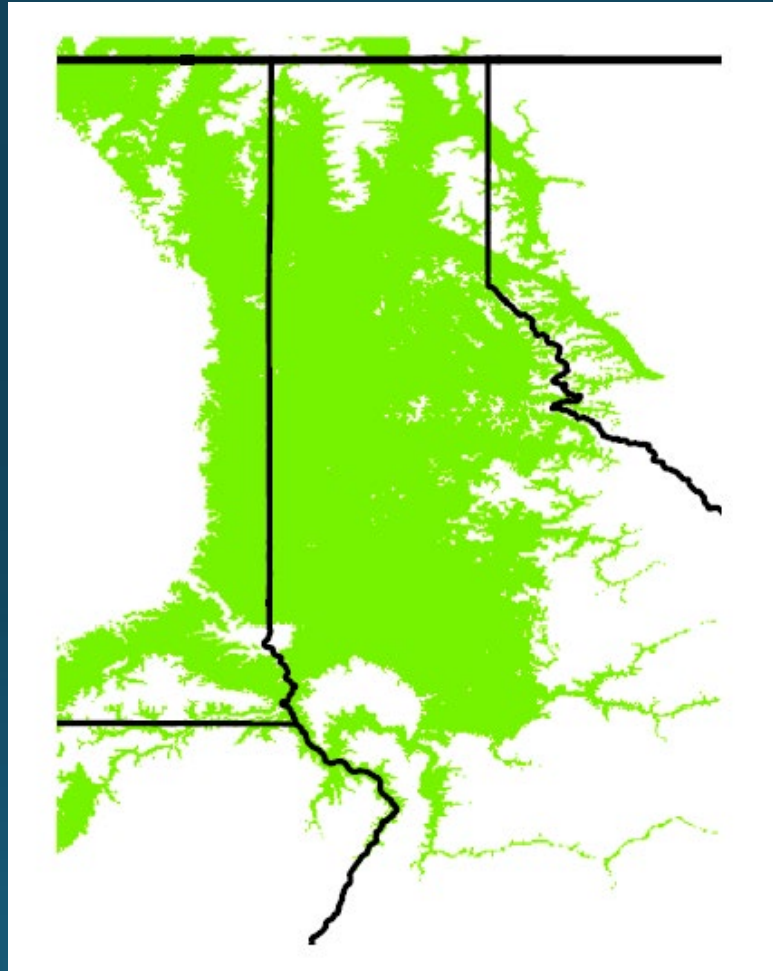


Missoula ponderosa pine orchard



- 3 members
- in full production
- low gains for volume growth

Douglas-fir

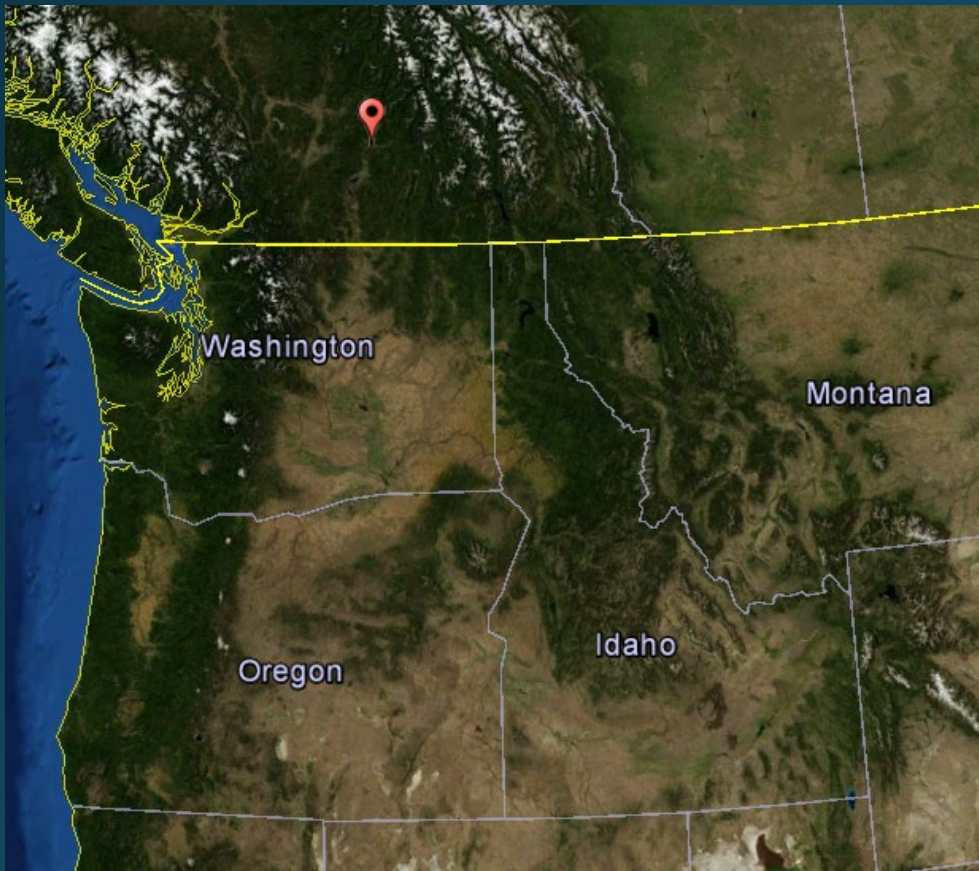


Kalamalka Douglas-fir Orchard



Photo courtesy of BC Ministry of Forests

Kalamalka Douglas-fir orchard



- 8 members
- recently established
- high gains for volume growth
- ID/WA 3000-4000 feet

Western Red Cedar Orchards



Paradise western redcedar orchard



- 7 members
- recently established
- untested
- ID/WA
2500-4500
feet



Questions?