

Station 6: Pruning

Producing high quality, knot-free lumber increases its commercial value, and as a result forest managers have tried several methods to achieve this. This stand was planted in 1970 and then pruned in 1992 to eliminate the lower limbs, thus reducing the number and size of knots. Although this technique yielded good results, it is labor intensive and is therefore seldom used.



Station 7: Silviculture and Agroforestry

One silvicultural (forest vegetation management) practice is agroforestry, which combines agriculture and forestry by growing crops or grasses beneath the trees, as well as grazing livestock. This practice creates a diverse, productive, healthy forest, sustainable for multiple resources. Douglas-firs were planted in 1979 in clusters of three, spaced at 25 ft to observe the effect of planting in clusters vs. grids on forage production and tree growth. This spacing allowed the growth of grasses and vegetation to be used as forage. Between 1983 and 1988, sheep were grazed on one side of the trail and not the other, and you can still see the effects today! Trees on the south side of each group were later thinned to increase tree growth. In 1988, red alder (*Alnus rubra*) was planted between the clusters because alder produces a usable form of soil nitrogen. Cluster planting of conifers along with the alder planting may also benefit wildlife by providing better diversity of food and shelter.

Station 8: Disastrous Competition

Planted in 1964, this is the oldest stand of Douglas-fir along this trail, intended to show what occurs in dense and unmanaged forests. Trees were planted with irregular spacing averaging 4 ft. by 4 ft., and were never thinned. The increased density caused intense competition for resources, resulting in slow growth, a loss of vigor, and increased mortality. The stand tried to naturally thin itself, a process that foresters call competitive exclusion. Competitive exclusion can cause an accumulation of dead fuels, and if ignited, can cause very hot and destructive forest fires. When bugs or diseases enter the stand, the entire stand can be killed. This is why thinning is an important step in maintaining a healthy managed stand.

Station 9: End of the Trail

This completes your self-guided tour of the Intensive Management trail. The stand you are now in was a study of about 175 different seed sources from different elevations throughout the northwest. We hope you have enjoyed learning about some of the many techniques tried here, as well as some of the issues surrounding forest management.

Thank you for visiting and come back soon!

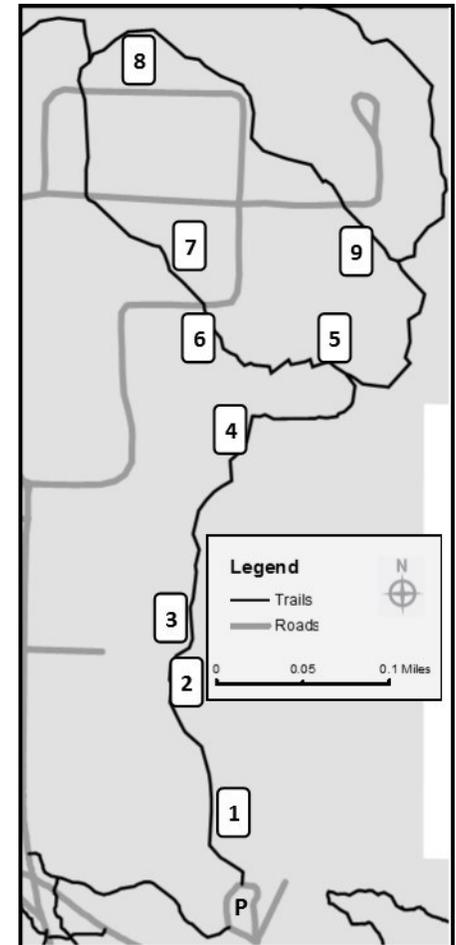
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<http://cf.forestry.oregonstate.edu/intensive-management-trail>

Intensive Management Trail Exploration Tour



A Hike Through the History of a Managed Forest



This 1.2 mile trail was built to allow forest visitors an opportunity to observe some of the many forest practices that have been developed by OSU College of Forestry researchers to improve forest health, provide sustainable harvests, and increase biodiversity. This brochure accompanies the interpretive signs that you will encounter along the trail. You will pass through 13 different managed plots and encounter examples of pruning, thinning, tree spacing, and the practice of agroforestry.

*These forest stands were planted in the 1960s and 1970s with seedlings of Douglas-fir (*Pseudotsuga menziesii*) from around the Pacific Northwest with the intent of watching how each strain would grow in this area under common conditions. In 1988, this long-term study was further developed to observe the effects of different forest practices on the growth and health of the stands. Use this brochure to learn about forest management at each station along the trail!*

Station 1: Valley Ponderosa

This stand of Valley ponderosa pine was planted in 1994 in the memory of Doug Tinstadt, who identified this strain of ponderosa pine as one that historically covered the Willamette Valley. Unlike the ponderosa pine native to eastern Oregon, this strain can thrive in the Valley's wet winters and dry summers. The conservation and reestablishment of this specie in the Willamette Valley is supported by the non-profit Willamette Valley Willamette Valley Ponderosa Pine Conservation Association.

Station 2: Close Spacing for Quality

To observe the relationship between spacing and wood quality, this stand of Douglas-fir was planted in 1972 with 8 ft. by 8 ft. spacing, then was randomly thinned in the early 1990s. Douglas-fir requires abundant sunlight to grow well, so the close spacing restricted the sunlight reaching the trunks. As a result, the lower limbs died and fell off. Having fewer limbs on

Station 2 (Continued)

the 'boles,' or trunks, of the trees produces higher quality lumber with fewer knots, a feature that is important in construction situations where the grain of the wood is exposed.

Station 3: Wide Spacing for Growth

These trees were planted in 1969 with 12 ft. by 12 ft. spacing. Due to reduced competition from other trees, these trees grew faster than the previous stand. The increased light coming through the canopy also allowed the limbs to remain viable and grow lower on the trunks. Although this wider spacing leads to faster tree growth, it produces lower quality lumber than the previous stand, with more and bigger knots.



Station 4: Hybrid Pines

This stand contains KMX hybrid pine trees, a cross between knobcone pine (*Pinus attenuata*) and Monterey pine (*Pinus radiata*). The cross was created to take advantage of the tall, straight, and clear growth habit of the Monterey pine, which is not cold hardy, as well as the cold hardiness of the knobcone pine, which is a native to eastern Oregon. Although the cross was fairly successful, KMX is highly prone to diseases and very seldom grows to its full potential here in Oregon. This is a good example of the advantage of planting native species, like Douglas-fir or ponderosa pine, which are acclimated to Oregon climates and environments. Non-native species plantings can be risky for forest managers due to their higher risk of failure.

Station 5: Thinning vs. No Thinning

This area demonstrates the difference between thinning and not thinning. Although this may look like two different stands, they were actually planted at the same time in 1972. The trees on the left were thinned in 1990 to promote faster tree growth, while the trees on the right were not thinned. Increased sunlight in the thinned area allowed the ground vegetation to grow, whereas in the un-thinned area, the lack of sunlight and competition for nutrients and water resulted in restricted understory growth.