HARDWOOD PRE-COMMERCIAL THIN #2

NORTHWEST NATURAL RESOURCE GROUP

Site Summary

Stand type	20 year old red alder, naturally regenerated
Location	Elma, WA
Soils	Centralia Loam Site Class II Site Index 135 (DF)
Aspect	Flat to easterly
Elevation	550’

Treatment Variables

Design	Two 1.0 - acre treatment sites. Four 1/20th-acre plots per site.
Type of labor	Two chainsaw operators.
Other species	Bigleaf maple, cascara, Douglas-fir, western red cedar, western hemlock.

Funding for this project was provided by the USDA’s Western Sustainable Agriculture and Research Education (SARE) program.

SARE Sustainable Agriculture Research & Education

STAND DESCRIPTION (PRE-TREATMENT, 2020)

This stand encompasses an area of the forest where naturally regenerated hardwoods have overgrown the original Douglas-fir plantation. Red alder is the dominant species. As is common with naturally regenerating hardwoods, stocking densities vary considerably, and this stand ranges from 300 TPA to 1,300 TPA. Live crowns across most of the dominant and co-dominant trees still exceed 40%, but are quickly diminishing. Timber quality across this unit varies considerably, with a high level of storm damage in dominant and codominant alder and an increasing rate of suppression mortality amongst the least dominant trees. Despite this high defect, there is ample stocking of high quality trees that can be released through thinning. Douglas-fir persists as individuals or in small groups, although it is struggling beneath the canopy of the more vigorous alder. Western hemlock is also naturally regenerating sparsely throughout the understory.

Species per Acre						
Site	**RA**	**DF**	**RC**	**BM**	**CA**	**Total**
1	255	50	0	0	0	305
2	275	20	0	15	0	310

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TREATMENT OBJECTIVE

The primary objective of the thinning treatments was to improve the growth of the most dominant and highest timber quality trees of each species. A secondary objective was to conserve biodiversity by retaining trees of all species present in the stand, including understory conifers and non-timber trees such as cascara and maple.

TREATMENT CONSIDERATIONS

The decision to thin these stands was based on the following considerations:

1. The alternative to thinning was to clear the site and start over, which would incur a cost and lose 20 years of growth.

2. Dominant and co-dominant trees averaged over 7” DBH and retained >40% live crowns. At current growth rates, 8-10 years of additional growth should yield merchantable trees averaging 10” - 12” DBH.

3. Dominant trees have clear boles to at least 26’, which is sufficient to produce a merchantable log.

4. Although continued height growth may be marginal, releasing the crowns of the dominant and co-dominant trees should maintain or improve diameter growth.

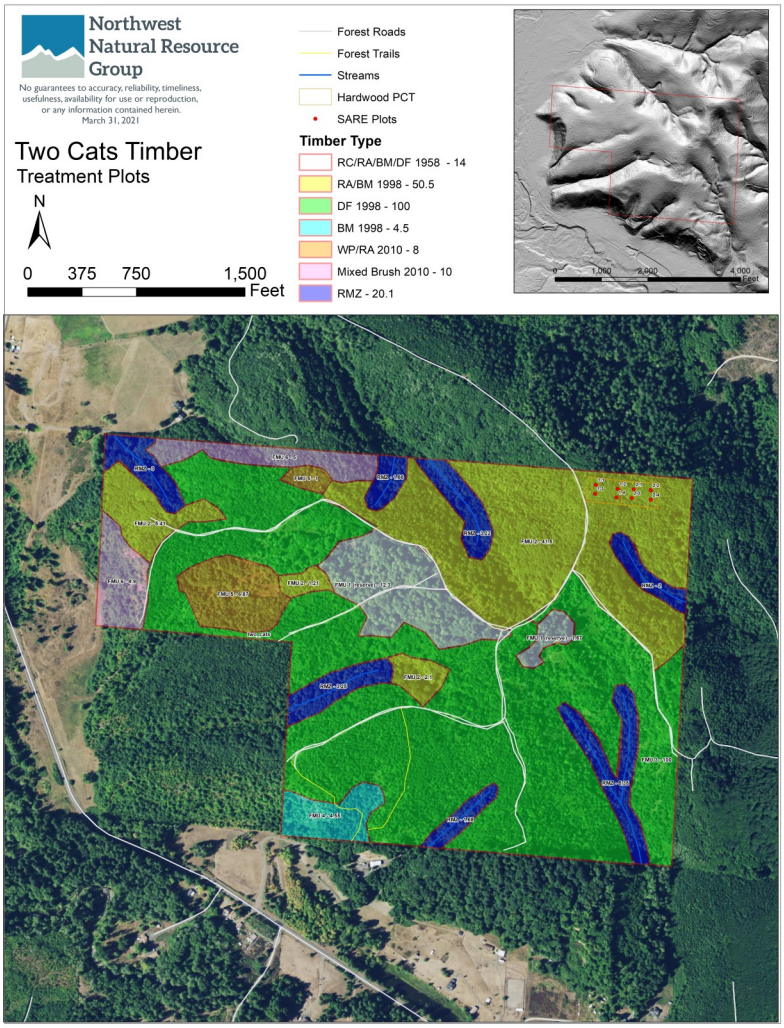
5. Cost-share assistance was available through the USDA’s Environmental Quality Incentives Program (EQIP), thereby reducing the financial disincentive to conduct the thinning.

TREATMENT PRESCRIPTIONS

In order to study growth rates of trees at varying densities, the stands were prescribed to be thinned to the following densities. Thinning occurred primarily from below, releasing the most dominant trees with the highest timber quality of each species. Storm damaged trees that were not expected to yield merchantable timber were also removed.

1. 240-280 TPA (12’-14’)

2. 300-400 TPA (11’-12’)



PCT Treatment Sites in NE corner of property.

LABOR & OTHER COSTS

Thinning was conducted by two chainsaw operators. Thinning occurred during the dormant season in order to avoid damage to the bark of residual trees, facilitate movement of the operator through understory brush, and to avoid the wasp season.

	Treatment 1 (240—280 TPA)	Treatment 2 (300—400TPA)
Labor	2 workers, 6 hours combined	2 worker2, 4 hours combined
Cost	Flat rate $588/acre	Flat rate $588/acre
Fuel	2.0 gallons+	1.3 gallons+
CO2 Emissions	39 lb CO_2++	25.5 lb CO_2++

+(assumption: 0.25 gallons of gas/45 minutes/worker)

++(assumption: 19.64 lbs CO_2/gallon)

PRE-TREATMENT PLOT DATA

(Trees >40')

Treatment	Acres	Avg TPA	Avg DBH	Avg Ht	Avg LCR	Avg % Defect
Treatment 1	1	285	7.4	49	55.5%	5.0%
Treatment 2	1	310	7.9	51	50.0%	0%

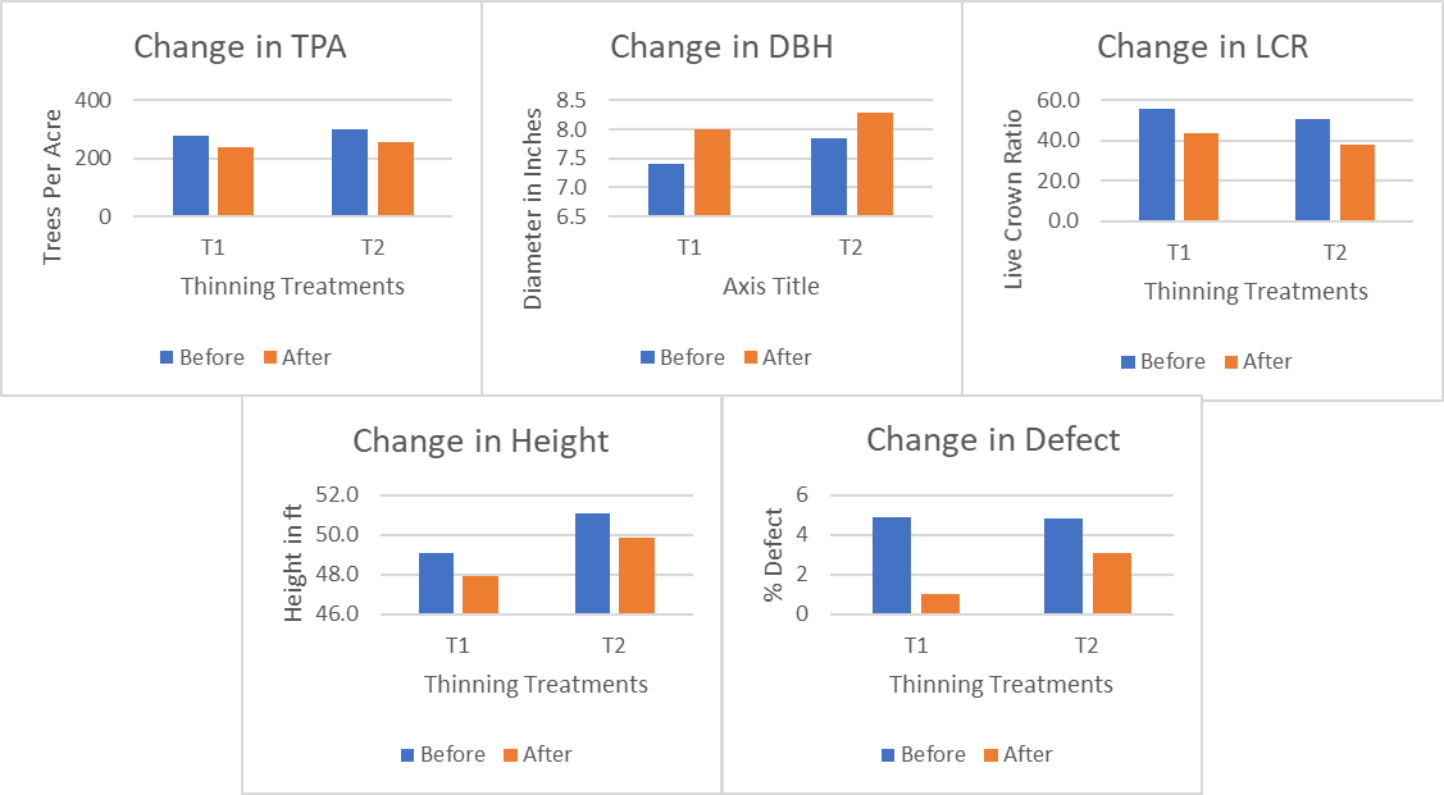
POST-TREATMENT PLOT DATA

(Trees >40')

Treatment	Acres	Avg TPA	Avg DBH	Avg Ht	Avg LCR	Avg % Defect
Treatment 1	1	240	8.0	48	43.6%	1.0%
Treatment 2	1	255	8.3	50	37.0%	0%

ANALYSIS

Although all trees were inventoried within each plot, only dominant trees >40' tall were included in the analysis in order to focus on competition within the canopy.



KEY LESSONS LEARNED

- At 20 years of age, the stand still retained sufficient trees (>180 TPA) with >40% live crowns to justify releasing.
- Given the high percent of storm damage and other defect in the stands, and the heterogeneous distribution of the damage, it was difficult to balance then twin objectives of thinning to a target density with thinning to remove defect. As a consequence of prioritizing the removal of damaged trees with low timber value, Treatment Site 2 was thinned to a lower density than desired for this study.
- Although not reflected in the data above, there is a also high stocking of trees less than 40' tall within both stands (an additional 265 TPA in Treatment Site 1 and 385 TPA in Treatment Site 2). These represent seedlings, saplings, and low trees of varying species, though mostly hardwood. A large percent (>40%) of these trees include newly regenerating cascara, a shade tolerant low tree that is not competitive with dominant canopy trees and therefore can be retained for its wildlife and non-timber forest product values.
- Although both average height and LCR decreased slightly after thinning this was likely due to the removal of tall trees with defective, broad crowns, and does not indicate a reduction in growth.
- USDA funding covered more than 50% of the cost of thinning, making the project an affordable investment for the landowner.