



Tractor used for skidding and loading in CB 212



CB 212 before commercial thinning



Rub trees were used along skid trails to protect residual trees

CB 212 after commercial thinning (same view)



Skid trails averaged 2 m in width
Winter logging prevented ground disturbance



Lumber recovery, grades and costs were determined

Challenges

Cut Block 212 had enough volume to justify the cost of thinning but Cut Block 211 proved not to have enough following harvesting of the test area. The remainder of that block was juvenile spaced but not commercially thinned.

Grade 6 logs (trees below the utilization limit of 20 cm at stump height), made up 35% of the sawlogs harvested, and should be off-quota and bear minimum stumpage. In order to upgrade log quality, however, defects were bucked off in the bush. This action removed the falling cuts that indicate to the scaler that those logs came from grade 6 trees and not from the tops of large trees that cost more and count against AAC. Saw nicks on the butt of the logs were then successfully used to indicate Grade 6 trees.



Conclusion

Thinning in these small-diameter stands yielded high quality sawlogs but was economically challenging given our current products and cost structures. Significant benefits to mule deer habitat values, however, will likely result over the medium term. Finding market opportunities for these small but high quality logs, in combination with duty and market conditions at any given time will be the limiting factors that determine the viability of future commercial thinning efforts in such stands.



Dry-belt Dynamics Trail

Commercial Thinning on Mule Deer Winter Range



Steve Walker photo

Uneven-aged management in stands with small average diameter in Dry-belt Douglas-fir forests

Co-operators:

UBC/Alex Fraser Research Forest
BC Ministry of Forests, Research
West Fraser Timber Co. Ltd.
R.W. Gray Consulting Ltd.
FERIC
PAPRICAN

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Why are we doing this research?

Mule deer winter habitat consists of uneven-aged Douglas-fir forests that provide snow interception and forage for deer, thus reducing energy demands and improving winter survival.

"Commercial thinning" or "thinning from below" can restore habitat values in stands with high densities of small stems, as well as allow for commercial entries. As a result of thinning, residual stands should attain the size and structure important to mule deer survival more quickly.

Lack of knowledge about the economics of thinning in small-diameter stands has been a barrier to widespread implementation. Typically, it is expected that the cut volume would be low and harvesting costs high, while the logs produced would be small and predominately of poor quality.

This project investigated the details of operational commercial thinning in mule deer winter range on the Research Forest.

Before Thinning

Silviculture prescriptions were prepared for two stands in the IDFDk3/IDFXm transition.

SP for Cut Block 211 (22.7 ha):

- Pre-harvest basal area (BA) - 34.4 m²/ha (12.5 cm dbh +)
- Target BA after thinning - 26.6 m²/ha
- Thin select stems from 15-25 cm dbh
- Stems >27.5 cm dbh to be reserved from cutting
- High habitat objective, indicating a long-term target basal area of 29 m²/ha

SP for Cut Block 212 (33.3 ha):

- Current BA - 27.4 m²/ha (12.5 cm dbh +)
- Target BA after thinning 20.5 m²/ha
- Thin select stems from 15-35 cm dbh
- Stems >37.5 cm dbh to be reserved from cutting
- Moderate habitat objective, indicating a long-term target basal area of 22 m²/ha

Pre-harvest measurements on treatment and 4-hectare control areas:

- standing volume,
- growth and yield
- stand structure and vegetation (snow interception and forage values)

These will be monitored in 5-year, post-harvest intervals beginning in 2003.

Operational Methodology

Equipment & Resources, Block 211:

- 2 hand fallers/buckers
 - John Deere 440 Line Skidder (2.5 m wide)
- This outfit had no loader so sorting and decking logs at the landing was a problem.

Equipment & Resources, Block 212:

- 1.5 hand fallers/buckers
 - Ford New Holland 30 HP Tractor modified with winch, grapple, loader and roll-over bar with canopy (1.7 m wide)
- This outfit was able to sort and deck wood at the roadside in addition to skidding.

Harvesting contractors determined rates based on the harvesting costs of test areas in each block (3 ha) where leave trees were marked in advance.

Juvenile spacing of layers 2 and 3 followed harvesting on both blocks.

Harvesting Economics

Using Servis recorders and operator records, FERIC estimated logging costs and productivity.

Select Cost Components	Block 211 (3 ha test area only)	Block 212 (11.3 ha)
Falling Cost (\$/m ³)	46.06	31.33
Falling Productivity (m ³ /work hr.)	1.0	1.3
Falling Utilization (%)	84	90
Daily Rate - 8 hour shift (\$)	300.00	300.00
Skidding Cost (\$/m ³)	50.40	32.56
Skidding Productivity (m ³ /work hr.)	1.4	1.8
Skidding Utilization (%)	77	85
Hourly Rate - per machine hour (\$)	55.00	50.00
Total Cost (\$/m³)	96.46	63.89

Lumber Recovery

West Fraser Timber Co. Ltd. in Williams Lake milled the wood and tracked log volume, lumber recovery, lumber grades, and costs.

Almost 100% of the logs were Douglas-fir and milled into 2x4 lumber. Three-quarters of this lumber was grade 2 and better.

Revenues to West Fraser were a function of lumber market conditions and US exchange rates at the time of milling. Future thinning will likely be timed according to when lumber values are high.

Pulp Properties

Pulplogs up to 17.5 cm dbh class were identified by the loggers in the test areas of each block and sorted from sawlogs. Wood, fibre, pulping, and pulp properties were determined by PAPRICAN.

The coarse fibre properties of pulps from interior Douglas-fir thinnings make them suitable for use in making newsprint and brown paper. The smallest diameter trees made the best pulp, but required more processing and yielded less than the larger classes.

Fuel and Fire Behaviour Assessment

Fire behaviour and soil heating models, based on pre-harvest surface and overstory fuel loading, suggest that severe surface fires with the potential to reduce ecological productivity were likely in these stands.

It is expected that while ladder fuels that allow a ground fire to become a crown fire have been greatly reduced by thinning, slash will be a surface fire hazard for many years in these dry forests. Eventually it is expected that fire hazards in these thinned stands will be reduced as the slash decays.