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PARTIAL CUTTING TO IMPROVE WINTER MULE DEER HABITAT: A SHORT-TERM OBSERVATION OF SKIDDING

Introduction. During the last decade, more and more forest land has been set aside for non-forestry values ranging from wildlife reserves to public parks. In the Cariboo Forest Region, Riverside Forest Products Limited and the Fish and Wildlife Branch of the Ministry of Environment agreed to test forest and wildlife management strategies that would allow harvesting of timber in the Enterprise mule deer winter range while improving the stand to better support wintering mule deer. A partial cutting prescription for the area was planned, approved and implemented in the fall of 1996. Small patches of less than 1 ha and partially cut areas were prescribed to retain a high to medium crown closure rating during low-moderate snowfall winters (Figure 1). This has been found to meet the habitat requirement of wintering mule deer (DWB Forestry Services Ltd. 1996). The harvesting prescription on the small patch units was to remove 15% of the Douglas-fir volume and all of the lodgepole pine and white spruce. In the partially cut areas, only the pine and spruce were to be removed. In the fall of 1996, the Forest Engineering Research Institute of Canada (FERIC) participated in this study to determine the costs and productivities of small scale skidding of the small patch and partial cutting treatments. This Field Note summarizes the findings.

Site Description. The study area was located at the Enterprise mule deer winter range, 20 km south of Williams Lake in British Columbia's Cariboo Forest Region. Four large blocks ranging in size from 42.5 ha to 75.7 ha were identified as part of the timber licence. FERIC studied harvesting productivities in one of the four blocks. The area had an average slope of less than 10% and was even in ground roughness. The stand was predominately immature and mature Douglas-fir, with some mature white spruce and lodgepole pine. Average net merchantable volume was 307 m³/ha. Trees averaged 32 cm in diameter at breast height and 0.79 m³ in gross merchantable volume.

Treatments were identified as: no harvest, clearcut with regeneration and pole layer protection (small patches), and thin with a residual high-moderate crown closure. Areas designated for clearcut contained primarily spruce and pine, while areas designated for thinning contained primarily

mature and immature Douglas-fir with vets dispersed throughout the block. In the thinned units, pine and spruce were removed to create predominantly Douglas-fir regeneration, which is more suitable as deer habitat (DWB Forestry Ltd. 1996). Small openings resulting from past beetle killed pine were distributed throughout the block. Many of the existing skid trails left from the beetle kill salvage were utilized in this trial.

Study Method. The study block was divided into 19 polygons, of which 17 were small patches (less than 1 ha in size) and 2 were thinned (up to 3.5 ha in size). Time constraints limited FERIC's timing studies to 5 of the 17 clearcut polygons but both of the thinned areas were studied. Both shift-level and detailed-timing data were collected. Final harvested volumes were obtained from Riverside's weigh-scale receipts while daily scaling of skidded turns provided detailed volume data. Time spent for each activity was recorded by the contractor in a daily journal (to the nearest half hour) for the duration of the study. Manual felling and landing activities were not included in the timing.

Production costs were derived using the standard FERIC costing method, which is based on interior B.C. IWA rates for the workers and on current purchase prices for new or comparable equipment.

Harvesting. Riverside and its consultant, DWB Forestry Services Ltd., planned the study block to meet prescriptions and requirements of the BCMOF and the Fish and Wildlife Branch. Polygons were defined by timber type and were evenly distributed throughout the study area. The prescription called for a harvest of 15% of the total volume of Douglas-fir. If 15% of the volume of Douglas-fir was harvested before all the polygons were completed, harvesting was to stop. Larger Douglas-fir vets were not harvested unless they were a safety concern for the faller.

The contractor, who was self-employed and had thinning experience, carried out all phases of harvesting with one helper.

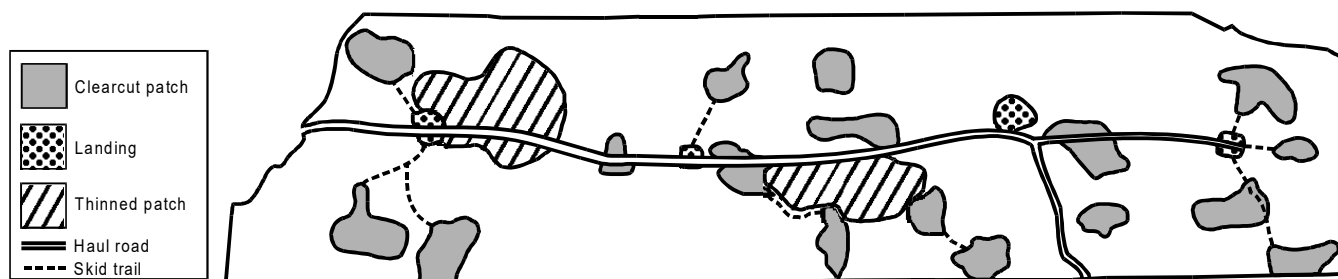


Figure 1. Study block showing layout of treatments.

The contractor used a modified John Deere 440C grapple skidder (Figure 2), a John Deere 440 wheeled line skidder, a modified Dresser TD8 crawler with a shear head, and a John Deere 540G wheeled loader. A second TD8 crawler was used as a line skidder when ground conditions or wood size warranted.

Felling was intended to be mostly mechanical, but because many of the trees were too large for the efficient use of the TD8 shear head, manual felling was used for about 95% of the area studied. Occasionally, when the production was high, a third person was hired to assist with landing activities such as bucking, decking and loading. The patch cuts were skidded primarily with the JD440C grapple skidder while thinning units were skidded with either the JD440 line skidder or the TD8 crawler. When the faller was able to place logs into bunches, the JD440C grapple skidder was used in place of the slower line machines. Four chokers were used on each line skidder, but the number of pieces per turn varied depending upon the size and location of the stems. In many cases, only one log was skidded in a turn to prevent overloading the machine. The small size of all the machines had the advantage of added maneuverability, low cost and low ground disturbance compared with larger machines. The John Deere 440 series of skidders are no longer manufactured because of low demand due to their small size and small payload. Although the area is wet in summer, logging in the winter created minimal ground disturbance. The summer harvest portion was left until very dry so disturbance could be kept to a minimum.

Results. Productivity was generally low for all treatments compared with typical harvesting operations because the contractor utilized small equipment and a two-person crew to carry out all phases of logging. All machines sat idle for extended periods each day depending on the harvesting activities of the day. Blowdown in some polygons also inhibited movement of the TD8 with the shearhead, but the same production and better directional control could be achieved by manual felling. The faller tried to bunch stems whenever the natural stand conditions permitted. Overall, the productivities of the line and grapple skidders in the patch cuts were 23 m³/PMH (productive machine hour) and 18 m³/PMH, respectively.

Although the cycle time for the line skidder was greater than that of the grapple skidder, the line skidder averaged twice the volume per turn.



Figure 2. Modified John Deere 440C grapple skidder.

In the thinned units, the line skidder also had better productivity, averaging 19 m³/PMH compared to 11 m³/PMH for the grapple skidder. All trails in the thinned units were chosen by the operator since no previous trails were present. The trees were usually felled in a herring-bone pattern when the location of the skid trail was known. Since manual felling was used, the grapple skidder could not optimize its turn volumes. Skidding distances were similar for both machines in both treatments. The TD8 crawler worked two shifts in the thinned units with an average productivity of 10 m³/PMH.

The following costs are for comparison between treatments and are not the actual costs incurred by the contractor. The cost of grapple skidding in the patch cuts averaged \$3.29/m³ compared with \$3.62/m³ in the thinned units. The line skidder incurred costs of \$2.60/m³ and \$3.63/m³ for the patch and thinned units, respectively. Cost for the TD8 crawler in the thinned units was \$6.21/m³.

Conclusions. In 1997, Riverside Forest Products Limited and the Fish and Wildlife Branch of the Ministry of Environment agreed to test forest and wildlife management strategies that would allow harvesting of timber in the Enterprise mule deer winter range while improving the stand to support wintering mule deer. FERIC assisted in determining skidding costs and productivities for the area. Overall productivities for the patch cut polygons were 23 and 18 m³/PMH for the line skidder and grapple skidder, respectively. In the thinned polygons, productivities were 19 and 11 m³/PMH, respectively. Costs associated with harvesting the patch cuts averaged \$3.29/m³ for the grapple skidder and \$2.60/m³ for the line skidder. In the thinned units, costs were \$3.62/m³ and 3.63/m³, respectively.

References

DWB Forestry Services Ltd. 1996. CP 460, Blocks 3,4 (development proposal). Lac La Hache, B.C.

Information. The information contained in this report is based on limited field observations and is published solely to disseminate information to FERIC members. It is not intended as an endorsement or approval by FERIC of any products or service to the exclusion of others that may be suitable. More information on the trial may be obtained from:

Carl Hennig
Riverside Forest Products Limited
Williams Lake Division
110 Hodgson Road
Williams Lake B.C. V2G 3P6
Tel.: (250) 392-4121

Craig Evans, Research Technician,
Silvicultural Operations

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