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## MECHANIZED THINNING OF DENSE POST-FIRE JACK PINE REGENERATION

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On May 1, 1959, a wild fire burned about 14,000 acres in the central pine region of northern Minnesota. The fire, commonly referred to as the "Badoura Burn" occurred during a two-day period of extremely hazardous fire weather with winds exceeding 25 m.p.h. and relative humidities of 20-29 percent. Included in the burn were 1600 acres of well-stocked merchantable timber land which contained about 24,000 cords of jack pine (Pinus banksiana Lamb.), red pine (Pinus resinosa Ait.) and aspen (Populus sp.) plus about 400,000 board feet of pine saw timber.

Jack pine is a fire species which will often reproduce prolifically when post-fire conditions are favorable. The Badoura fire resulted in near optimum conditions for the establishment of an extremely dense stand. There was an adequate seed supply, good seed bed preparation and more than adequate precipitation for the remainder of the 1959 growing season.

In 1967, The Northwest Paper Company of Cloquet, Minnesota made the decision to thin approximately 1500 acres of the dense reproduction. The objectives were to avoid stagnation of growth and to shorten the rotation for pulpwood. To achieve the objectives at a low cost, a mechanized thinning process was chosen.

The machine used was a John Deere Gyramor rotary cutter (Figure 1). This machine was designed primarily for cutting light brush and agricultural crops and not for the material encountered in the thinning operation. Debris on the ground such as old stumps and pole size material put considerable strain on the cutting blade and caused numerous breakdowns.

The rotary cutter weighs about 1300 lbs. and was gear-driven from the power take-off of an International TD-6. It has a seven-foot wide cutting width and a variable cutting height of 2 to 12 inches. The actual operating time<sup>2/</sup> for the machine was 4.6 hours based on a 7-hour day or a machine availability of 66 percent. This resulted in a productive rate of 1.9 acres per hour. The total cost including supervision, operator and equipment was \$7.25 per acre.

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<sup>2/</sup> Operating time is defined as time during which the machine was performing the function for which it was scheduled.

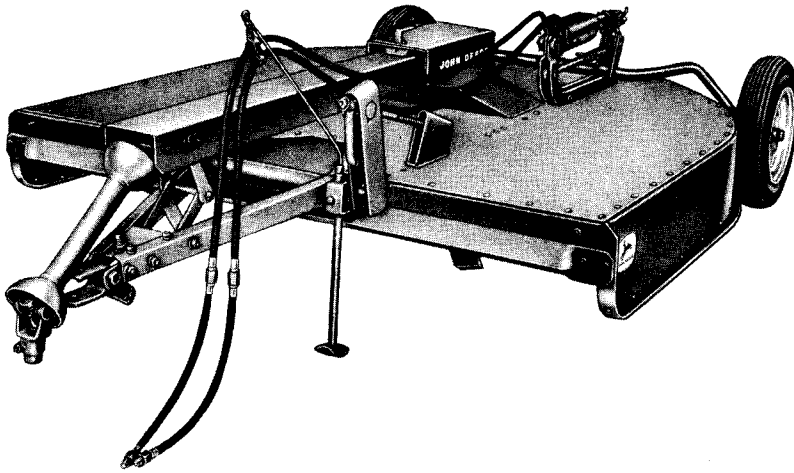


Figure 1. The rotary cutter used in the thinning operation.

The operator was instructed to leave a row of trees not more than 12 inches wide between the seven-foot wide cut strips (Figure 2). The thinning strips were cut in one direction. Thinning in two directions was attempted in the beginning, but it was determined that this often resulted in too low a stocking density.



Figure 2. Seven-foot wide strips after thinning, unthinned area on left of photo.

Most motorized travelers came from the local area (defined as Minnesota's Eighth Congressional District in this study) and less than 40% of these preferred paddling a canoe. While local residents are more likely to visit the area for fishing, other campers view the area as a site for solitude and naturalness. These perceptions are also revealed in their travel method preference. Of those visiting the area for its solitude and wilderness environment, 77.1% preferred paddle canoeing; only 16.5% preferred to travel by motor. Sixty percent of the fishermen preferred motors contrasted to 34.5% who preferred a paddle canoe.

It has often been argued that older visitors are not able to withstand the requirements of a rigorous paddle canoe trip, and therefore, motors should not be restricted in the BWCA. Data collected in this study indicate only slight support for this argument. Although older campers did express more frequently a preference for motorized travel, the differences between age groups were relatively small and not statistically significant at the  $\alpha = .05$  level.

The effects of socio-cultural influences of occupation and education on the camper's preferences were also investigated. Preference for paddle canoeing was most frequently elicited by students, professionals, and managers. Least preference for paddle canoeing was shown by sales workers, craftsmen and operatives.

#### Summary and Management Implications

Paddle canoeists are apparently most satisfied with their present means of travel. A substantial proportion of those using motors, however, would prefer paddle canoe over motors, given "ideal" conditions (sufficient time and money). With increasing mobility, affluence, and length of vacation periods, groups using paddle canoe would be expected to increase at a faster rate than groups using motors. Over the five year period 1961-1966, a slight trend in this direction has been noted (5).

Age of the respondent and preference for a specific means of travel appeared to be only weakly related. While recognizing that only BWCA users were studied, regardless of age or previous experience, most respondents preferred paddle canoe. This was especially true of group spokesmen perceiving the area as a place for solitude and wildness. Apparently, fishermen took little note of these opportunities for a majority of them preferred some means of motorized travel. With more communication about wilderness opportunities of the BWCA use may tend more toward paddle canoe.

In terms of management implications, the data reveal that visitor conflicts -- between paddlers and motorized groups -- may increase as use accelerates. A previous work by Lucas (4) has also noted that paddlers object to meeting motor boats more than motor boaters object to meeting paddlers. As paddler-motor boater encounters increase, satisfaction of the paddler's (who accounted for 61% of the total BWCA visitor days use in 1968) anticipated wilderness experience will probably decrease.

Undoubtedly, motorized groups have more impact on water quality than paddlers. With increasing use, managers may have to encourage more use of paddle canoe and discourage motor boaters to reduce this impact. Also, use of paddle canoe seems to be more congruent with the purposes of wilderness as established by the Wilderness Act of 1964. Finally, utilization of travel method preference data (especially in wilderness where conflicts are more serious) can aid managers in preserving sensitive and unique resources from inappropriate activity by visitors.

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