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AN EXAMINATION OF CUTTING PATTERNS PROPOSED IN THE "GUIDELINES FOR THE PROTECTION OF TOURISM VALUES"

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Introduction

When the Timber Management Guidelines for the Protection of Tourism Values were implemented, a new level of complexity was added to the responsibilities of the forest manager. The guidelines present options to reduce the deterioration of natural values, particularly aesthetics, resulting from timber operations near remote lakes, highways, and recreational waterways (Ontario 1987). This is important in areas where the tourism values are based on a perception of wilderness.

Tourism values include access (remoteness), fisheries, and wildlife and may be maintained in several ways. Aesthetic values are very subjective, and therefore, the objective of modified cuts to maintain aesthetic values is often not clearly identified.

The practicality of applying the cutting patterns proposed in the guidelines has been questioned by timber, wildlife, and tourism managers alike. Criticisms range from being too expensive to being ineffective or even counter-productive. Part of the problem is the lack of documented examples or analytical follow-up needed to critically evaluate the practicality of these procedures.

This note takes a critical look at several modified cutting patterns and relates the harvest and site features to the practicality of using these patterns for the protection of aesthetic values. In addition, this note lists many examples of modified cutting patterns in Northwestern Ontario which will encourage managers to become familiar with various cutting patterns and their effectiveness.

Inventory of Modified Cuts

In the summer of 1988, an inventory of modified cuts for the protection of tourism values in Northwestern Ontario was compiled (Table 1). The majority were block cuts, chevron cuts, or strip cuts along highways. Few examples of these modified cuts exist along waterways or lakes, probably because shoreline reserves for the protection of fish habitat or water quality are being broadly applied. A well-documented example at Rita Lake, in Red Lake District, has been examined here because it illustrates many of the special considerations which must be evaluated before making a commitment to modified cuts for the protection of aesthetic values.

Rita Lake Demonstration

Canadian Pacific Forest Products Limited (formerly Great Lakes Forest Products) of Dryden demonstrated many of the cut patterns proposed in the Guidelines for the Protection of Tourism values in the fall of 1984 at Rita Lake. Rita Lake is a 140 ha lake located approximately 55 km north of Red Lake, Ontario. The lake is

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surrounded by mixed jack pine and black spruce stands on a deep, sandy, till soil. The stands were similar to Northwestern Ontario Forest Ecosystem Classification (NWO FEC) vegetation types V32, V33, and V34, and the soils were primarily S8 with a moisture regime of 6 (Ontario Institute of Pedology 1985); although some S7, S1, and S2 soil types were also present (Sims et al. 1989). Coarse fragment content was high (>50%) at several locations in the demonstration area.

TABLE 1: Modified cuts for the preservation of tourism values in Northwestern Ontario

District	Type of Cut	Details
Red Lake	strip cut	Highway 105, cut in late 70's
	chevron, strip, basal area reduction, and clearcut with fringe	Rita Lake, demonstration of shoreline cuts, cut in 1984
Ignace	strip cuts	Arethusa Lake - south end 1980
	sawtooth cuts	English River and Smock Lake 1983
	strip cuts blowdown salvage 1986	Highway 17, Canadian Pacific camp 418
	strip cuts	Highway 17, Mameigwess Lake and Highway 642, Pike Lake 1986
	strip cuts	Highway 599, Valora and Wonga flats 1988
Kenora	block and chevron cuts	Highway 71 north of Sioux Lookout
Fort Frances	block cuts	Standard operations in portions of district
Geraldton	angled strips	Caramat highway
Terrace Bay	block cuts	Highway 625 north of Caramat
block cuts	Highway 614 south of Manitouwadge	
	block cuts	Pic River, 50% removal system
Thunder Bay	chevron cuts	Highway 17, near English River on Dog River - Matawin FMA, cut 1982
Atikokan	strip cuts	Highway 11, Sapawe CMU near the Quetico Information Pavilion (public information brochure is available); Highway 11, Flanders CMU
	block cuts	Highway 807; to reduce visual impact of logging
Nipigon	block cuts	Highway 17 east of Nipigon, 120 m alternating blocks; effectiveness questionable due to slopes

Nine cutting patterns were tested and the company evaluated the increased cost of operations and documented problems which developed. The nine options were as follows:

1. Pine-only cut	Cut only merchantable jack pine leaving all other merchantable softwoods standing and unmarred. No topping of the pine was allowed in the cutting area.
2. Clearcut, leaving smaller wood	Clearcut close to the shoreline leaving only the smaller wood adjacent to the shoreline as a no-cut reserve.
3. Small chevron cuts	Standard chevron cut pattern with the width of remaining timber and cut width maintained at 30 m. The cut went right to the shoreline.
4. Selective cut	Removal of all large diameter (>15 cm dia.) spruce and pine leaving all hardwoods, alders, and unmerchantable softwoods. A small fringe of wood was left along the shoreline.
5. Clearcut to shoreline	Removal of all merchantable softwoods down to the shoreline. No topping of felled wood was done close to the shoreline or in high visibility areas.
6. Large chevron cut	A 64 m chevron cut with 132 m width of remaining timber. No topping was allowed from the edge of the shoreline to the corner of the strip.
7. Basal area reduction cut	Removal of 75% of the total volume in this stand leaving the remaining volume standing, unmarred, and evenly spread. Cutters were instructed to leave one in every four trees standing and evenly spaced.
8. Block cut	Removal of all merchantable wood surrounding the no-cut blocks. The width of the skid trails were minimized at the corners of the block.
9. Diameter reduction cut	Removal of all merchantable softwoods greater than 15 cm on the butt. A small, no-cut fringe was left along the shoreline.

The results of the Rita Lake demonstration show that many of the cut patterns, particularly those that involve increased skidding distances, add significantly to the cost of timber harvest (Table 2). Neither the large nor small chevron cuts added to the cost of harvest. The most expensive operations were those that involved great care in selecting trees to cut such as the pine only, the basal area reduction cut, and the diameter limitation cut. The layout costs were not included in these calculations. These additional costs will be proportional to the degree of complexity and the length of edge to be surveyed.

Two major problems can be identified from the Rita Lake demonstration; blowdown and lack of screening provided by the residual trees.

Blowdown is always a concern when trees are left exposed after nearby trees have been removed, particularly in cut patterns with abundant edge such as sawtooth patterns (Buckland and O'Brien 1988). The degree of windfirmness will depend upon soil depth, drainage, moisture regime, tree species, stand age, degree of exposure, coarse fragment content and the location of the exposed trees in relation to topography, and the direction of the prevailing winds (Fosberg 1986). The pine-only cut and both chevron cuts suffered heavy blowdown damage. This damage was salvageable in the pine-only cut but not in the chevron cut. Between 20 and 30% of the timber adjacent to the chevron cuts had blown down, as well as a substantial amount of timber in the basal area reduction cut and on the edges of the block cuts, 4 years after harvest. This problem may have been unavoidable given the stand composition, stand age, soil type, and topography.

TABLE 2: Costs **($/m³st)**[1] for direct skidding to roadside over and above normal costs, total area cut, and total volume harvested for the Rita Lake demonstration

Cut Pattern	Additional Costs[2]	Total Area cut (ha)	Total Volume Harvested (m^3st)
Pine only	8 -10	6.5	1,198
Clearcut leaving smaller wood	1 - 3	10.5	10,963
Small chevron cut	0	1.0	ND[3]
Selective cut	1 - 3	0.8	382
Clearcut to shore	1 - 3	1.0	ND
Large chevron cut	0	2.4	437
Basal area reduction cut (75% removal)	5 - 6	2.9	ND
Block cut	1	2.8	510
Diameter limitation cut	2 - 3	1.5	295

[1] Dollars per cubic metre stacked
[2] Layout costs not included
[3] ND: No data available.

Two factors contributed to the unpleasant appearance of the modified cut patterns: stand composition and regeneration method selected. The stands were fairly even-aged with a poorly developed shrub layer. Therefore, it was easy to see through the chevron cuts and the thin shoreline reserves. The residual trees created the perception of a feeble attempt to hide timber management activities. In our opinion, having no reserves or full reserves would have created a better impression. The blowdown of trees further reduced the degree of screening provided by the residual trees and residual stands.

Four years after harvest, the area still failed to present an image of vigorous growth and active regeneration, even though the regeneration objectives had been met. The aerial and natural seeding of jack pine had produced good stocking, and some natural seeding by both black spruce and jack pine had filled in many shoreline areas. The combination of a relatively shrub-poor site and very small seedlings created an image of poor recovery from the cutover. In reality, the seedlings were performing well and the absence of competing vegetation meant that tending would probably not be necessary.

Therefore, these modified cuts failed, if their objectives involved creating a perception of wilderness, or screening timber management activities from view. They also increased the cost of timber operations but successfully met the silvicultural objectives of the plan.

What Can be Learned from Rita Lake?

Stands and sites similar to those surrounding Rita Lake should not be the subject of modified cuts, particularly chevron or strip cuts. Other chevron cuts in similar stands along highways have also failed to provide adequate screening. Chevron cuts should be effective in mixed wood stands that are rich in tall shrubs, and exhibit good vertical distribution of cover as do stands of an uneven age structure or species composition (Figure 1). These stand conditions are similar to those found in NWO FEC vegetation types V6, V7, V8, V9, V10, V12, V13, V14, V15, V16, V17, V21, and V24 (Sims et al. 1989). The paradox is that the value of the timber in these stand conditions is often low enough that the allocation of a continuous, no-cut reserve is not an issue. In the more uniform upland black spruce or jack pine types where the value of timber per hectare is greater, chevron cuts may be negotiated but they may not achieve their aesthetic objectives. We are once again faced with the situation where either timber volumes are diminished by leaving a no-cut reserve or the perception of wilderness is diminished by creating reserves or modified cuts which have minimal screening value.

Figure 1. Stands of an uneven age structure or variable species composition on well-drained, productive soils provide good screening and tend to be more resistant to blowdown than other stands.

Soil conditions, particularly those shallow or bouldery soils, or those with a high moisture regime value such as NWO FEC soils types S7, S8, S9, and S10 (Sims et al. 1989), should not be subject to chevron cuts because of the high probability of large scale blowdown occurring (Figure 2).

Figure 2. Tall, even-aged jack pine on shallow or moist soils, or black spruce stands on moist-wet, bouldery and organic sites are particularly susceptible to blowdown, especially when exposed to strong winds. Blowdown risk can be lower in protected valleys or if the leave blocks are oriented parallel to prevailing wind direction.

The only way to forecast the effectiveness of modified cutting plans is to do a pre-harvest assessment of blowdown risk factors and stand structure. Then, depending on the expected results of harvest, three options are available: 1) do not perform modified cuts because of expected poor results, 2) proceed with modified cuts and be aware of the consequences, 3) re-evaluate resource management objectives for the site.

Atikokan Example

A series of chevron and strip cuts for the protection of tourism values was created beside Highway 11, near the entrance to Quetico Provincial Park. These cuts provided a good, all-season visibility barrier (Figures 3 and 4) because of a near-continuous vertical distribution of vegetation. These cuts occurred in V-types 10, 11, 17, and 29. Major blowdown problems are not expected because of fine-textured, well-drained soils and diverse vegetation. In addition to screening timber management activities, the opportunity for viewing moose and deer has been greatly enhanced by increasing the interspersion of food and shelter along this well-travelled tourist route. In this example, the cuts not only represent a good forest management tool, but a good public relations tools as well.

Figure 3. Chevron and strip cuts have been used effectively in Atikokan District along Highway 11. These cuts provide good screening and an aesthetically pleasing cutover pattern. Their susceptibility to blowdown will be monitored.

Figure 4. The vertical distribution of vegetation in mixed stands can provide screening as well as excellent opportunities for wildlife habitat.

Recommendations

1. A detailed pre-harvest assessment should be completed prior to the approval of modified cuts for the protection of tourism values. Soils and vegetation should be examined to determine if silvicultural and other management objectives can be met. The Northwestern Ontario Forest Ecosystem Classification is a good method for evaluating ecological conditions and monitoring results.

2. Planting stock or advanced regeneration should be used whenever possible to minimize the time between harvest and free-to-grow status.

3. The objectives of the tourism industry, and the specific values which need to be protected, should be clearly specified for each plan. Follow-up monitoring on how well the modified cut satisfied these objectives should be completed several years after harvest.

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