

Report of the Main River Advisory Group
to
Sierra Club of Canada and Corner Brook Pulp and Paper Company

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1 BACKGROUND

Forest management activities in the Main River Watershed in western Newfoundland have been the subject of much discussion and debate, both locally and nationally, in recent years. Among the factors which have made it particularly difficult to design a management approach that is generally acceptable to all parties interested in the fate of the watershed are the following.

- The Main River is known locally and internationally for its pristine character and value as a wilderness area. In June 2001 it was granted Heritage River Status based on these values.
- The watershed supports the Province's second largest population of the Newfoundland variety of the American marten (*Martes americana atrata*), a sub-species officially classified as endangered on the Island.
- According to recent research, a rare old-growth balsam-fir forest, containing some of the oldest balsam-fir trees ever recorded, is situated in the watershed.
- Much of the watershed is under 99-year lease to Corner Brook Pulp and Paper Company, and this forest represents an important source of wood supply to the mill which contributes heavily to the economic and social well-being of the Province.

In March 2001, Corner Brook Pulp and Paper announced a “no clearcut” policy for the watershed and embarked on a number of harvest trials to examine partial-harvest alternatives. Although the decision not to employ clearcut harvesting was generally viewed as a positive development, questions remain concerning the ability of partial harvesting to protect adequately the wilderness, habitat, and old-growth values of the forest in the watershed area.

In light of this concern, and in the interest of cooperatively formulating a mutually acceptable management strategy for the forest, the Sierra Club of Canada and the Corner Brook Pulp and Paper Company signed a Memorandum of Understanding. One outcome of that Memorandum was the formation of the Main River Advisory Group comprising four forestry and environmental scientists who were jointly selected by the two convening parties. This report is the outcome of the deliberations of the Group.

The Advisory Group was charged with a Terms of Reference (Appendix I) which included the tasks of assessing timber harvesting in the Main River Watershed, in particular focussing on the harvesting trials initiated by the Company in 2000 and 2001, and addressing broader landscape considerations, where appropriate.

The Terms of Reference state that the work of the Advisory Group was to be done “in a manner that recognizes and supports the integrity, viability, diversity and extent of all structural components of the old-growth boreal ecosystem”. They further state that the Group should be guided by *adaptive management*, “a means of working towards the dual goals of achieving management objectives and gaining reliable knowledge at the same time”, and by *the precautionary principle*, which “emphasizes the need for care and caution when there are threats of serious or irreversible damage to the natural environment ..(and that)... scientific uncertainty shall not be used to postpone measures to prevent environmental degradation”.

This report presents the Group's recommendations, derived by consensus, deemed consistent with the Terms of Reference, and judged to be appropriate given the Group's knowledge of the Main River Watershed, and the Group's collective experience in forestry, forest conservation, and contemporary forest management.

No attempt is made in this report to provide a comprehensive review of the literature; likewise no attempt is made to provide a quantitative prescription of management options and outcomes. Further, no single position is taken by the Group on what should be the fate of the Main River Watershed as that is for the people of Newfoundland and Labrador to decide.

Rather, the report presents practical suggestions which the Group feels comfortable to put forth given the resources, information and time at its disposal. These recommendations are offered solely with the intent of helping the interested parties strike a satisfactory resolution to the problem.

2 ASSUMPTIONS/PREMISES

The deliberations and resulting recommendations of the Group were founded on the following key assumptions.

- Wilderness value is partly defined by the absence of human interventions and each precludes the other at any one place.
- Old-growth forest is generally associated with extensive areas containing trees at or near maximum age for the species in question and with little influence of human intervention. Carefully designed and implemented intervention cannot maintain old-growth forest in the pristine sense, but may maintain some old-growth characteristics and ecological functions.
- Much of the Main River watershed is characterized by gap-phase renewal dynamics and contains balsam-fir trees at the upper limit of recorded ages. Such dynamics and the resulting stand structures differ from those balsam-fir forests elsewhere on the island which are subject to periodic spruce-budworm and other insect outbreaks of moderate or high severity.
- Opportunities to protect significant area of forest characterized by gap-phase stand breakup are restricted to the Main River Watershed and possibly other undeveloped forest areas on the Northern Peninsula.
- Corner Brook Pulp and Paper has an objective to apply science-based ecosystem management principles which are guided by the general hypothesis that maintaining key ecosystem attributes within their range of natural variability is the best way to conduct forest management to conserve biodiversity.

3 RECOMMENDATIONS

The recommendations put forward by the Group are based on the above assumptions together with other sources of information. These include, in part, a field visit to the Main River watershed (ground and air viewing), two separate face-to-face discussions with representatives of Corner Brook Pulp and Paper and the Sierra Club of Canada, data from post-harvest surveys of the 2001 harvest trials, the Main River Harvest Trials report (2002), the Environmental Evaluation of the Proposed Five-year Operating Plan for Forest Management District 16 (2001), the Environmental Preview Report for the Main River Watershed (2002), and other relevant papers. (For a partial listing, see the Selected Reference List, section 4.)

Each of the recommendations which follows is accompanied by a brief preamble which sets some of the context and rationale for the recommendation. The recommendations address three areas: management actions, information acquisition, and analysis of management and policy alternatives.

3.1 Management Actions

3.1.1 Roads Implicit in the use of harvest trials is the notion that harvesting will not be conducted at-large in the forest unless the trial outcomes are acceptable. Implicit in the precautionary principle is the ability to back away from a particular strategy, without irreparable harm, if outcomes of the strategy appear unacceptable.

Extension of the access road network beyond the immediate vicinity of the harvest trials and into presently unaccessed reaches of the watershed presupposes that harvest trial outcomes will be acceptable. Road access directly threatens some of the non-timber values of the watershed and, once built, roads are very difficult to unbuild. Further, the cost of road construction will create compelling economic pressure to recover timber in the area.

For these reasons, the Advisory Group recommends that no further road construction occur within the watershed until a more complete picture of harvest trial outcomes is available, and a more complete analysis of outcomes is performed. (Recommendation 1)

3.1.2 *Harvest Prescriptions* As part of its “no clearcut” strategy in the Main River Watershed, Corner Brook Pulp and Paper is considering variations of selection and variable-retention harvesting. Its Environmental Evaluation Report recommends that group selection and individual selection be the systems used within the Main River watershed.

To maintain what appear to be key attributes of the balsam-fir old-growth, single-tree selection would best emulate the natural small-gap dynamics of these stands if done in conjunction with an objective to allow some trees to grow large and die naturally. Such a system would maintain an uneven-aged structure and a relatively closed canopy.

The Environment Preview Report presents two other harvest patterns scheduled to be tested: a strip pattern of cutting using a 20 m corridor every 60 m throughout the block, and group selection cutting of small openings up to 3 ha randomly located through the block. These two methods are unlikely to maintain the old-growth characteristics of the forest; both represent, up to a point, small-clearcut methods. Clearcut environmental conditions are produced when cut dimensions exceed two mature tree heights. Since average stand height would seem to be around 11 m, both the proposed strips and openings would reach such a threshold.

For these reasons, the Advisory Group recommends that only single-tree selection or narrow, irregular-strip harvesting be tested in harvest trials and given further consideration for the Main River forest undergoing gap-driven dynamics.

(Recommendation 2)

3.2 Information Acquisition

3.2.1 Stand-Level Response to Harvesting Some quantitative results from the selection harvest trials are available. These suggest that, in the short term, selection harvesting did maintain some old-growth structural characteristics. The reverse-J, irregular size distribution of the trees was maintained, albeit skewed with under-representation of both small and large trees. Tree selection did maintain a significant proportion of large trees, but the rare very large trees with a DBH >40 cm were eliminated by harvesting. By maintaining a live-tree basal area in excess of 13 m²/ha, a more or less closed forest canopy was maintained. However, the use of straight-line strips does create long linear openings that are distinctly visible in the field. Their width being less than one tree height, though, would seem to be within the size range of natural gaps.

In the longer term, the degree to which these old-growth characteristics are maintained through natural stand dynamics will be largely determined by the rate of regeneration, the rate of residual tree growth, and the occurrence of catastrophic windthrow. A fourth determinant is the harvest re-entry cycle (discussed in a later recommendation).

To date, the status of regeneration in the harvest corridors has not been established, although field-visit observations suggest that regeneration success might be spotty owing to variable ground conditions. Also, no estimates of residual tree growth have been made for the area, although the shallow soils and severe climate suggest growth will not be rapid. Finally, there has been little time to assess windthrow, but in eastern Canada, windthrow has always plagued partial-cutting attempts in mature balsam-fir stands.

Poor regeneration, slow residual tree growth, and high incidence of windthrow can, individually or in combination, reduce some of the old-growth characteristics that selection harvesting is supposed to maintain. Given the extant stand and site types in the Main River Watershed, the risk of all three is high.

For these reasons, the Advisory Group recommends that post-harvest measurements be taken specifically to quantify regeneration success, to estimate residual tree diameter and height increment, and to assess windthrow losses. Such information should be acquired and analysed prior to any decision of broad-scale implementation of selection harvesting in the watershed. (Recommendation 3)

3.2.2 *Extent of Area with Suitable Basal Area* One of the commitments of Corner Brook Pulp and Paper is to manage stands in accordance with the Newfoundland Marten Guidelines. These require maintenance of 18 m²/ha in the post-harvest stand, which, in turn, will require a pre-harvest basal area of at least 24 m²/ha to support an economic harvest operation.

It is not clear what proportion of productive forest land base in the watershed is amenable to selection cutting, given this relatively stringent pre-harvest basal area requirement. If the presence of 24 m²/ha stands is relatively low, the whole strategy of removing the target of 25,000 m³/yr from the watershed and, at the same time, maintaining marten habitat will be jeopardized.

For these reasons, the Advisory Group recommends that a survey of the watershed be conducted to quantify the distribution of productive forest by basal area and thereby define how much area is suitable for selection harvesting in accordance with Marten Guidelines and the economics of harvesting. (Recommendation 4)

3.2.3 *Area Undergoing Gap vs Stand Replacing Dynamics* The research of John McCarthy has revealed the existence of gap disturbance dynamics and old-growth forest structure in parts of the Main River Watershed. However, it has not been determined that such dynamics are in operation in the entire forest area of the watershed. Recent and ongoing severe defoliation by hemlock looper at lower elevations on the eastern side of the watershed area suggests that stand-replacing natural dynamics are currently operating in part of the watershed and may have done so in the past.

Under the ecosystem management concept, choosing an appropriate harvest method requires first knowing the nature and severity of the predominant natural disturbance for an area. The Group fully recognizes that stand- and gap-replacing dynamics represent extremes of the continuum of disturbance severity which exists in nature, and that more than one disturbance severity can occur at different times at the same place on the landscape. However, where stand-replacing disturbance generally prevails, it would be inappropriate to conduct selection harvesting of the same type that may be appropriate in a gap-replacing forest.

For this reason, the Advisory Group recommends that a survey of the watershed be conducted to identify and delineate which, if any, portions of the watershed appear dominated by stand-replacing dynamics. (Recommendation 5)

3.2.4 *Wildlife Monitoring:* Studies in both Newfoundland and Quebec have shown that old-growth balsam-fir stands support distinctive biological communities ranging from birds to mosses and fungi. For example, the Black-backed Woodpecker (*Picoides articus*), a resident cavity nester, is considered an indicator of old-growth balsam-fir in Newfoundland. The presence of this species is related to large living, dead and fallen trees.

As for the Newfoundland marten, late successional conifer forests with more than 30-50% canopy cover are considered the key habitat in this region.

Providing sufficient snags, coarse woody debris and canopy cover are the critical factors for old-growth-dependent species. However, the necessary thresholds for these structural components of the ecosystem are mostly unknown for old-growth balsam-fir. Only the monitoring of sensitive species in treated stands will provide adequate answers. For example, it will be critical to evaluate if the partial cutting methods tested in the Main River Watershed provide adequate cover for marten, as well as good habitat for the marten's prey base.

Corner Brook Pulp and Paper and Gros Morne National Park have formed a Connectivity Working Group to assess the effectiveness of selection cutting on the ability of animals, such as marten, to move across the landscape. However, the monitoring program they have undertaken does not explicitly aim to determine if this type of cutting maintains old-growth-dependent wildlife and vegetation.

For these reasons, the Advisory Group recommends that the wildlife monitoring by the Connectivity Working Group include the study of both animal and vegetation old-growth-dependent species, and of the key structural components associated with biological diversity in old-growth balsam-fir forests. (Recommendation 6)

3.3 Analysis of Alternatives

3.3.1 *Stand-Level Prescriptions* In a selection harvesting system, the main risk to significantly altering the old-growth characteristics of the stand comes at the time of the second and subsequent harvest entries. The crucial questions are whether: (a) the re-entry interval

will be sufficiently long for stands to replenish themselves with large trees and snags, (b) sufficient volume will exist to support an economically feasible second entry, and (c) the residual stand conditions after the second harvest entry will, in the short-term and long-term, adequately retain the important old-growth characteristics (including a representation of large, old trees which will be left to die naturally, snags, coarse woody debris, and relatively intact canopy).

To the Group's knowledge, re-entry intervals and second-entry removal rates have not been explicitly defined, nor quantitatively examined. Further, there appears to exist no solid connection between the proposed 25,000 m³/yr harvest rate from the watershed and the selection-harvest re-entry interval and removal rate necessary to sustain that harvest. The three crucial questions posed above are currently unanswered and the long-term consequences of selection harvesting at the proposed rate are currently unaddressed.

In the Group's view, commencing large-scale harvesting (even selection harvesting) without first addressing these questions and quantitatively connecting the proposed harvest rate and harvest prescription is unduly and unnecessarily risky. While it cannot be known with absolute certainty that a particular harvest prescription will prove suitable in all respects, much insight can be gained into the sustainability of alternative harvest rates and alternative harvest prescriptions through quantitative stand- and forest-development forecasting. In the context of the management objectives for the watershed, such forecasting work can help all parties screen out unsuitable strategies, identify promising strategies, and focus more directly on key areas of uncertainty.

For these reasons, the Advisory Group recommends that (a) a thorough analysis be conducted of alternative stand-level prescriptions (examining re-entry intervals and removal rates) using credible stand-development forecasting models, and (b) a

thorough analysis be conducted of alternative forest-level harvest rates using the most promising harvest prescriptions defined in (a). (Recommendation 7)

3.3.2 *Forest Level* Corner Brook Pulp and Paper's proposed partial harvest strategy was formulated largely in reaction to concern about clearcutting in the watershed. All indications are that (a) it will be expensive to implement operationally, (b) it will require costly research and monitoring, (c) the environmental impacts will be highly uncertain, and (d) the knowledge gained may have limited geographic applicability on the island, if the Company's plan is to employ it only in the Main River watershed. High cost, high uncertainty, and limited applicability make for an undesirable mix, and suggest that alternative management approaches be considered.

One such alternative could be to maximize the area in the watershed unaffected by roads and harvesting, while meeting the annual supply level of 25,000 m³. This would require concentrating the harvest on the smallest possible area, and situating it geographically so as to minimize road construction, minimize intrusion on wilderness space, and minimize the area of gap-phase dynamics which is affected by harvesting. This could be achieved by (a) implementing clearcutting with variable retention on carefully selected portions of the watershed where stand-replacing natural dynamics dominate, and (b) expanding the area legally protected from harvest and road construction activities where wilderness values are highest and natural forest characteristics most unique.

As previously stated, recent studies reveal gap-phase dynamics to be operating in some portions of the watershed, but it is not clear that the whole watershed is characterized by such dynamics. As discussed above (section 3.2.3), it appears that stand replacing disturbances are occurring and have occurred in easterly and lower elevation sections of the watershed due to severe insect damage. The combined ecological and economic

consequences of clearcut harvesting with variable retention in such areas may be far superior to those of the proposed strategy.

For these reasons, the Advisory Group recommends that a thorough analysis be conducted of an alternative timber-harvest strategy with limited area, variable-retention clearcutting. Such analysis should incorporate the results of some of the above recommendations, including improved information on the location of gap-phase and stand-replacing natural dynamics in the watershed, improved stand-growth forecasting, and comprehensive forest-level modelling. (Recommendation 8)

Should a comprehensive analysis of this alternative reveal it to produce superior and mutually acceptable environmental, economic, and social outcomes, joint and public endorsement by both the Sierra Club and Corner Brook Pulp and Paper would be necessary since the strategy is a reversal of the Company's publicly stated commitment not to clearcut in the Main River Watershed.

3.3.3 *Harvest Sustainability by District* The current provincial forest management policy requires timber sustainability to be ensured within each Forest District. This presents a constraint which reduces wood supply relative to what may be possible if sustainability is ensured over a combination of Districts.

If the harvest sustainability requirement is shifted from the District level to a combined District level, it *may* be possible to remove area from harvesting in the Main River Watershed, without reducing the harvest level which can be sustained from Corner Brook

Pulp and Paper's overall forest base. There are other implications of changing the geographic scale at which harvest sustainability is ensured and these should be fully

considered. However, this policy change does represent a potential option to protect simultaneously both the non-timber Main River Watershed values and the Company's wood supply. Indeed, in combination with a provincial protected areas policy (section 3.3.4), this strategy might lead to the permanent protection of a significant portion of the Main River Watershed as a whole, in a manner consistent with both economic and environmental concerns.

For this reason, the Advisory Group recommends that analyses be conducted on the effect of changing the geographic unit of harvest sustainability on wood supply. Such analyses should examine the possibility of maximizing the area of the Main River Watershed removed from any harvest, while minimizing the resulting loss of wood supply from Corner Brook Pulp and Paper's overall holdings on the Island.
(Recommendation 9)

- 3.3.4 *Protected Area Policy* Management decision-making for the Main River Watershed appears to take place in isolation of management decisions for the rest of the forest on the Island. Attempts to strike a reasonable balance between economic and non-economic values are partly hampered by the lack of a broad-scale provincial plan for protection of natural areas.

Existence of such a plan will not completely defuse the controversy or eliminate differences in perspective, opinion, and values of interested parties. However, a well-conceived comprehensive plan should result in an improved overall approach which better balances the protection of environmental, social, and economic values across the forest. Moreover, it should reduce the amount of energy expended on conflict and should help avoid sub-optimal choices which may result from a case-by-case decision-making and dispute resolution.

For this reason, the Advisory Group recommends that both the Sierra Club and Corner Brook Pulp and Paper, actively and cooperatively, lobby the Provincial government to complete and implement a Provincial protected areas strategy.

(Recommendation 10)

4 SELECTED REFERENCE LIST

Environmental Preview Report: Five-Year Operating Plan (2002-2006) Main River Watershed. May 2002. Prepared by AMEC for Corner Brook Pulp and Paper Limited. 47 pp plus appendices.

Fuller, RD; Harrison, RB. 2000. Partial harvesting guidelines for Maintenance of Marten and their primary prey in north central Maine. Final Contract Report to Maine Forest Service, Dec 1999.

Krawchuk, MA; McPherson, M. 2001 (DRAFT) A literature review on landscape conductivity, and for a selected group of animals, habitat and connectivity needs to maintain viable populations. Prepared for The Connectivity Working Group of the Greater Gros Morne Ecosystem. 47pp.

Main River Harvest Trials. 2002. Prepared by Corner Brook Pulp and Paper Limited. 9 pp plus appendices.

McCarthy, J. 2001. Gap dynamics of forest trees: A review with particular attention to boreal forests. *Environ. Rev.* 9: 1-59.

Thompson, ID; Hogan, HA; Montevecchi, WA. 1999. Avian communities of mature balsam-fir forests in Newfoundland: Age-dependence and implications for timber harvesting. *The Condor* 101: 311-323.

APPENDIX 1

Main River Advisory Group Terms of Reference

Main River Advisory Group

Terms of Reference

The Main River Advisory Group is jointly convened by Corner Brook Pulp and Paper Limited and the Sierra Club of Canada.

Purpose

The Main River Advisory Group will assess and report on what conclusions can be drawn regarding how and to what extent, if at all, logging might be carried out in the Main River watershed in a manner that recognizes and supports the integrity, viability, diversity and extent of all structural components of the old-growth boreal ecosystem.

Activities

The Advisory Group will:

Assess and evaluate the information obtained as a result of modified logging trials carried out in 2000 and 2001.

Advise Corner Brook Pulp and Paper Limited on further studies needed and on an appropriate ongoing monitoring regime to evaluate the impacts of modified logging trials on the old-growth ecosystem components of the Main River watershed.

Offer recommendations or advice on the appropriate intensity, spatial distribution, and return interval of harvesting in the watershed.

The Advisory Group may, as appropriate, consider and offer recommendations pertaining to landscape-level implications of logging in the Main River watershed and the potential impacts of modified logging (as well as the road infrastructure to support it) on ecosystem health, landscape connectivity, forest biodiversity, aquatic habitats, wildlife and wilderness values.

Operating Principles

The Advisory Group recognizes and agrees to be guided by the following principles:

Adaptive management is a means of working towards the dual goals of achieving management objectives and gaining reliable knowledge at the same time. The principle of adaptive management is important in devising, implementing, monitoring, and assessing new logging methods in the Main River watershed.

The **precautionary principle** will guide the final conclusions and recommendations of the Advisory Group. This principle emphasizes the need for care and caution when there are threats of serious or irreversible damage to the natural environment, and scientific uncertainty shall not be used to postpone measures to prevent environmental degradation.

Deliverables

The Advisory Group will prepare a report to be completed by March 31, 2002. In formulating its conclusions and recommendations, the Advisory Group will strive to reach consensus. Where consensus is not possible, the full range of views held by

Advisory Group members will be adequately and fairly reflected in the report.

The report will be a public document.

Membership

Members:

Louis Belanger, Université Laval

Peter Duinker, Dalhousie University

Thom Erdle, University of New Brunswick

Faye Murrin, Memorial University

Advisor:

John McCarthy, University of British Columbia

Co-Conveners:

George VanDusen, Corner Brook Pulp and Paper Limited

Martin von Mirbach, Sierra Club of Canada

Members serve in a voluntary capacity but will be fully reimbursed for legitimate expenses.

Other people may be invited to participate as observers in meetings of the Advisory Group to give their advice and share their expertise.

Expenses

The direct costs associated with meetings and conference calls of the Main River Advisory Group will be shared by Corner Brook Pulp and Paper Limited and Sierra Club of Canada. Costs associated with logging and monitoring will remain the responsibility of Corner Brook Pulp and Paper Limited.