CUMULATIVE ENVIRONMENTAL EFFECTS AND SCREENING UNDER THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT

WORKSHOP PROCEEDINGS

ENVIRONMENT CANADA/DEPARTMENT OF FISHERIES AND OCEANS

January 25-26, 1993

Vancouver, British Columbia

Prepared For:

The Federal Environmental Assessment Review Office and

The Environmental Assessment Branch, Environment Canada

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1. INTRODUCTION

The Canadian Environmental Assessment Act received Royal Assent on June 23, **1992,** and will be proclaimed in 1993. Amongst other things, the Act requires that:

> *"Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:*
>
> > *(a) the environmental effects of the project...and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;*
> >
> > *(b) the significance of the effects refered to in paragraph (a); "*
> >
> > (section 16(1)).

The Federal Environmental Assessment Review Office (FEARO) is currently preparing a Procedural Manual which provides guidance on how to conduct environmental assessments under the Act, including the assessment of cumulative environmental effects. As well, a more detailed Reference Guide on addressing cumulative environmental effects has been drafted as a supporting document to the Manual. However, FEAR0 recognises that approaches and methods for assessing cumulative environmental effects are evolving rapidly and that any guidance offered should reflect best current practice. FEAR0 will be updating and revising the Procedural Manual and the Reference Guide as new information becomes available.

To complement its work to date and to provide the best practical advice possible, FEAR0 in cooperation with other federal departments and agencies is examining how cumulative environmental effects can be considered in screenings of projects during federal environmental assessments. The departments and agencies that are participating in this initiative are:

- Environment Canada;

- Transport Canada;
- The National Capital Commission (NCC);
- The Canadian International Development Agency (CIDA);
- The Department of Indian Affairs and Northern Development;
- The Department of Fisheries and Oceans;
- Energy, Mines and Resources; and
- Agriculture Canada.

The workshops focus on the assessment of cumulative environmental effects at the screening level of the environmental assessment process. Screening is the most routine of the four tracks of the environmental assessment process (the others are comprehensive study, mediation and panel review) and is required for most smaller projects or projects that are thought to be less likely to cause any significant adverse environmental effects. Class screening, in which the environmental effects of a class of projects is assessed, is part of the screening track. The vast majority of federal environmental assessments (more than 95%) are conducted at a screening level. Also, smaller projects that are subject to screening can be important contributors to cumulative environmental effects. In addition, there are special issues associated with addressing the cumulative environmental effects of small projects as opposed to larger ones.

Each participating department or agency selected several case studies of projects that have been subjected to screening under the Environmental Assessment and Review (EARP) Guidelines Order (1984). For each case study, brief written background materials are prepared (see Chapter 2). The case studies are then presented at a series of l-2 day workshops with staff from the department or agency involved. The case studies are used as a basis for discussing how the cumulative environmental effects of projects could be addressed in screening.

There is at least one workshop being held by each participating department or agency. Two departments (i.e., Environment Canada and the Department of Fisheries and Oceans) are holding several workshops in different regions of the country. Three of these (Dartmouth, Vancouver and Burlington) are being held jointly by the two departments. The Schedule of Workshops is shown in Appendix A.

This report summarises the results of the Environment Canada/Department of Fisheries and Oceans workshop, held in Vancouver on January 25-26, 1993. It is intended to summarise the discussions, rather than to provide detailed minutes. The agenda and list of participants for this workshop are shown in Appendix B. As well as this report, a set of 'consolidated proceedings' will be prepared.

The final 'consolidated proceedings' will be distributed to all participants from all workshops in March 1993. As well, a final interdepartmental workshop will be organised to discuss common themes in assessing cumulative environmental effects in screenings, as well as inter-departmental collaboration and co-operation on this subject. This will probably be in April or May 1993. Subsequently, FEARO's Procedural Manual and Reference Guide will be revised to take account of the outcome of this initiative.

2. CASE STUDIES

Each department or agency participating in this initiative was asked to select several recent examples of projects subjected to screening under the EARP Guidelines Order (1984). In most cases, these case studies represented the range of different types of projects screened by the department or agency, as well as different-sized projects and projects in different types of ecosystems.

For each case study, brief written background materials were prepared summarising:

- The project;

- The project's environmental effects;
- The screening decision reached; and
- How, and to what extent could any cumulative environmental effects be addressed.

The following case studies were presented at the joint Department of Fisheries and Oceans/Environment Canada Vancouver workshop:

- Expansion of Comox Harbour (BC);
- Coal development in the Fording River watershed (BC);
- Construction of the Battle Creek Dam (Saskatchewan);
- Pulpwood Agreement #13 (BC);
- Iskut Road project (BC);
- The proposed Three Sisters resort (Alberta); and
- The Slave Lake pulp mill (Alberta).

The background materials prepared by the two departments are shown in Appendix C. Some of the main issues presented and discussed for each case study are outlined below.

Expansion of Comox Harbour

The Small Craft Harbours Branch proposes to expand their facilities at Comox Fishing Harbour on the east coast of Vancouver Island initially to accommodate berthing spaces for 45 boats. The development area is utilised by all species of Pacific salmon, as well as steelhead and cutthroat trout. The estuary is an important herring spawning area, although the area proposed for harbour expansion is not commonly spawned. The area also provides feeding and staging habitat for seals and sea lions.

There are already three marinas in the area and two other proposed marinas. It is likely that the proposed facility will be expanded in the future. As well, there are growing pressures for more extensive marina development on the east coast of Vancouver Island.

The environmental effects of this project include:

- Siltation;
- Habitat loss, and in particular 1.2 ha of eelgrass bed;
- Degradation of water quality;
- Changes in currents, flushing, temperature, etc; and
- Effects associated with construction and operation of the facility.

Several points were raised during the discussion of this case study including:

- To meet the 'no net loss' objective of DFO's Habitat Management Policy it is necessary to understand the project's cumulative environmental effects;
- To understand the cumulative environmental effects of this project, it is helpful to look at the effects of the existing marinas on the environment, as well as the likely environmental effects of the other proposed marinas;
- How should the significance of the identified cumulative environmental effects be determined? Can a responsible authority decide that the cumulative environmental effects of a project are significant, if the individual effects are determined not to be significant? and
- The effectiveness of compensatory measures (e.g., habitat creation) should be monitored as this may influence decisions about allowing future projects to proceed. Could a responsible authority make approval of future projects contingent on the success of compensatory measures for the project being assessed?

Coal Development in the Fording River Watershed

The Fording River is a tributary of the Elk River. It is located in southeastern British Columbia. Coal mine development in the Fording River watershed has been associated with several environmental effects including:

- Diversion of streams;
- The loss or cutting off of many small tributaries;
- Slope failure;
- Effects on water quality (increased nutrient loadings);
- Fugitive dust and particulates; and
- Loss of vegetation and landscape disruption.

The cumulative environmental effects have involved losses of, and alterations to fish and wildlife habitats e.g., overwintering habitat for elk and other mammals.

The presentation of coal development in the Fording River discussed, amongst other matters:

- The difficulties associated with assessing individual coal developments, in situations where the extent of coal deposits in a watershed is not known, or is known to be extensive. This situation occurs when a mining company applies to mine a deposit in a watershed with no existing coal mining;
- The importance of mining leases, reclamation plans, mitigation and compensation plans and monitoring programs as instruments for protecting the environment; and
- The need to consider the environmental effects of other types of development in the watershed, e.g., logging, as well as coal development.

The discussion of this case study focused on the three points outlined above, as well as the need to ensure consistency between federal and provincial environmental assessment

processes and requirements, with regard to assessing, monitoring and requiring remediation/reclamation of cumulative environmental effects. Ideally, there should also be consistency between the environmental assessment processes of different provinces. Another point raised was that controlling the amount of coal mined keeps the price of coal high enough so as to allow the mining companies to afford compensation and reclamation measures for cumulative environmental effects.

Construction of the Battle Creek Dam

Battle Creek flows south from Saskatchewan into Montana. It is considered as an international stream under the Boundary Waters Treaty and the International River Improvements Act. The Prairie Farm Rehabilitation Administration (PFRA) is proposing to build a dam and a reservoir, along with an access road approximately 4 km from the border with Montana. The dam would flood approximately 130 ha of land. It would be located within a PFRA pasture (i.e., on federal lands). The project would be co-funded by the Province of Saskatchewan. The dam and reservoir are thought to be needed to meet Canada's obligation for water apportionment to the U.S. It would also 'free up' water at the upstream Cypress Lake reservoir for irrigation.

PFRA has done an initial screening of the proposal, concluding the construction and operation of the proposed dam and reservoir would have insignificant or mitigable adverse environmental effects. Environment Canada and Saskatchewan have raised objections to this conclusion. PFRA is now preparing a further, in-depth environmental assessment.

Two main cumulative environmental effects were identified and discussed in relation to this case study:

- Hydrological issues, including the need for the dam and reservoir and whether the proposed project is appropriate, given the vagaries of prairie hydrology; and

- Ecological issues associated with the mixed prairie grasslands in which the development is proposed. Human activities over time have resulted in the destruction of much of the mixed prairie grassland ecosystem. The end result is that there are now just a few areas left to provide habitat for smaller numbers of increasingly less diverse wildlife species. Thus the ecological significance of the area in which the dam and reservoir would be located is very high.

This case study highlighted the problem of the combined environmental effects of proposed projects and previous human activities. While the environmental effects of the project itself may not be significant, they may be cumulatively significant if the project would be located in an area that has already been adversely affected by human activities. This raised the issues of equity between past and present projects and activities, and 'first in time, first in right'.

Pulpwood Agreement #13

Pulpwood Agreement (PA) #13 allows Louisiana Pacific to harvest 452,000 cubic metres of aspen a year from an area of approximately 600,000 ha of crown land west of Chetwynd, eastern British Columbia. It also allows Louisiana Pacific to exchange wood between PA #13 and PA #10, a second timber supply area. The area supports a variety of fish species, including arctic grayling, mountain whitefish and bull trout, and wildlife such as white tailed and mule deer, moose and elk, as well as many smaller species.

The Department of Fisheries and Oceans became involved in the evaluation of the pulpwood harvesting agreement following notification that PA #10 and 13 were located on lands covered by Treaty 8 and subsequent to the Old Man River Dam Appeal decision. The EARP screening focussed on understanding how logging was being undertaken, where logging would occur, the silvicultural requirements for forest regeneration and assessing whether the application of existing or new resource management guidelines could mitigate or avoid unacceptable effects. The 'no net loss' principle was applied throughout the screening.

The following cumulative environmental effects were identified:

- Changes in the generation of water yield (peak flows, low flows, snow interception);
- Changes in slope stability and surface soil erosion;
- Changes in stream channel stability (integration of the effects of all forest land use practices);
- Changes in biodiversity (changes in forest composition, wildlife species composition/abundance); and
- Enhanced forest access by non-traditional users and further development.

The most important factor influencing these effects was identified as the rate-of-cut.

Mitigation measures that were recommended and accepted included the construction of streamside buffers, changes in the rate-of-cut, and varying the cut block sizes.

The discussion of this case study highlighted two issues:

- The EARP screening examined aspen (i.e., deciduous) harvesting only, coniferous harvesting in the area was not considered; and
- Mapping forest areas for the age of the trees present, ecological succession and any other ecologically important characteristics can assist in forest management by allowing relevant private and public sector organisations to manage for desired ecological types and species.

Iskut Road Project

The original Iskut Road project sought to provide road access to three proposed gold mines (Eskay Creek, Snip and Johnny Mountain) in northwestern British Columbia. Subsequently, the project was modified to service the Eskay Creek project only, when Cominco decided to service the Snip mine by hovercraft and Skyline decided to service the Johnny Mountain mine by aircraft.

Construction of the road requires three bridges, twenty-three culverts and encroachment on the Iskut and Ningunsaw River floodplains at eleven different locations. Potential cumulative environmental effects include effects on resident fish populations, wildlife habitat, rare ecosystems and unique land forms, such as the lava beds in Volcano Creek.

The discussion following presentation of this case study focussed on the need to consider the 'growth-inducing potential' of a project. Roads, such as this, into unopened territory can encourage further development to occur. As well as considering the cumulative environmental effects of the project itself, e.g., cumulative loss of fish habitat from culvert installation, it is necessary to consider the extent to which the proposed road will lead to, or encourage other development in what is currently virtually a wilderness area. Types of development that could be facilitated include other mining operations, resource harvesting (e.g., logging) and increased access by non-traditional users of the land.

Two additional issues were discussed:

- It is difficult to consider the cumulative environmental effects of multiple projects in an area, or multiple activities comprising a project whenever there are multiple proponents involved,particularly if the proponents are unwilling to cooperate with the responsible authority; and

- The potential for using section 16(l)(e) of the new Act to broaden the scope of a screening beyond considering the factors listed in section 16(l)(a) to (d) inclusive.

Three Sisters Resort

The recent proposal to develop an international mega-resort at Three Sisters, at Canmore, on the east boundary of the Banff National Park focussed concern about the cumulative environmental effects of resort development in the whole valley, including the Banff National Park. Alberta's Natural Resources Conservation Board (NRCB) conducted public hearings on the project. Environment Canada (Canadian Parks Service) intervened in the provincial hearings. The NRCB approved the project, subject to environmental protection requirements.

The proponent claimed that these requirements would eliminate about 75% of the project's economic benefits.

Environment Canada made several recommendations to the NRCB, including:

- The need to establish a multi-jurisdictional, multi-stakeholder committee to prepare land use plans for the Bow Valley that would take account of cumulative environmental effects; and
- That proposed developments should be required to undergo an assessment of their cumulative environmental effects.

The first of these recommendations was made a condition of approval by the NRCB.

Much of the discussion following this case study focussed on the cumulative environmental effects of the Three Sisters resort and other proposed resorts and tourist facilities on wildlife movement in the Bow Valley. This movement has already been restricted by existing development in the valley. Although some mitigation measures have been implemented and have been successful at reducing, for example, road kills, the cumulative environmental effects can not be fully mitigated. It will be important to attempt to slow the pace of development until the effectiveness of the mitigation measures implemented for earlier projects can be fully evaluated.

The Slave Lake Pulp Mill

Slave Lake Pulp Corporation has constructed and is operating a bleached chemi-thermo-mechanical (BCTM) pulp mill at a rated monthly average capacity of 350 air-dried tonnes per day. Key issues associated with cumulative environmental effects include:

- Effluent water quality;
    - Contaminated wood chips
    - Total suspended solids
    - Effluent toxicity
    - Tainting of fish by resin acids

- Chlorinated organic compounds in relation to potential fish contamination
- Effluent plume thermal regime
- Colour
- Nutrients
- Biochemical oxygen demand

- Groundwater quality;
- Water quality for human consumption;
- Construction and operation of in-stream works; and
- Air quality.

The Department of Fisheries and Oceans undertook an EARP screening of the Slave Lake pulp mill considering the above issues and how they affected primarily the fisheries resources of the Lesser Slave and Athabasca Rivers. Forest harvesting activities were not addressed.

Following the recommendation of the ALPAC review board, the governments of Canada and Alberta initiated the Northern River Basins Study to examine the cumulative environmental effects of pulp mills in the Peace-Athabasca-Slave River system. This study is intended to improve the scientific understanding of the biological and chemical processes in the river system. The Slave Lake Pulp Mill is one of the mills being considered in this study.

The framework for assessing and monitoring cumulative environmental effects in the river system was discussed. An important part of this is the model for predicting the instream biochemical oxygen demand (BOD) associated with discharges from the various pulp mills involved. Ambient BOD levels in the rivers is being used as a way of regulating discharges of BOD from individual pulp mills, assuming a maximum acceptable ambient BOD level. In this case, BOD is being used as an indicator of the cumulative environmental effects of pulp mill discharges.

Several points were raised following the presentation of this case study including:

- The need to determine environmental management objectives, either in terms of managing to a standard or guideline (as in this case study) or in terms of managing to a presumed baseline condition. It was pointed out that it is often very difficult to identify what baseline conditions (e.g., a pristine environment) were, and that setting a standard or guideline can allow industries to pollute up to the standard or guideline; and

- One key challenge with assessing cumulative environmental effects is defining what future projects should be addressed and what their environmental effects are likely to be.

3. ISSUES

After the presentation and discussion of the case studies, the workshop participants identified four main issues associated with addressing cumulative environmental effects in screening under the new Canadian Environmental Assessment Act. These were:

- The need for common frameworks, standards and/or resource management plans;

- Identifying future projects and activities;

- Determining whether a project is likely to cause significant adverse cumulative environmental effects; and

- The need for additional time and resources.

These are discussed in more detail below.

The Need for Common Frameworks. Standards and/or Resource Management Plans

There was a consensus among the workshop participants that in order to address cumulative environmental effects adequately at the project level, it would be necessary to develop more common frameworks and approaches for resource and environmental management. Two examples were discussed. In the Northern Rivers Basin Study a BOD model was being used to manage and control BOD loadings from individual pulp mills. The model provided a

common framework for understanding the cumulative environmental effects of BOD loadings from individual mills, and there was an ambient water quality standard for BOD that could be used as the management criterion or objective. The second example was management plans for resources such as fishing, coal, timber etc. Resource management plans also provide a common framework for understanding the cumulative environmental effects of multiple projects in an area. The goals or objectives of a resource management plan are similar to the BOD standard, in that they provide a measure that can be used to determine whether a project is likely to cause significant adverse environmental effects. In other words, they can be used as a method for determining the significance of adverse cumulative environmental effects.

There was agreement that there is a need for more frameworks, resource management plans, as well as standards and goals to assist in determining the significance of cumulative environmental effects. These should be developed by multi-stakeholder, multi-jurisdictional committees. They could include such matters as:

- An analysis of the sensitivity of the existing environment (i.e., how stressed it is already);
- Statements of standards and/or management goals that reflect the desired environmental condition or state; and
- An examination of the location/types and extent of development that are compatible with the standards and /or management goals.

Thus, development would be steered away from sensitive or stressed areas and would be compatible with standards and/or management goals.

Several examples of existing resource management plans were discussed, especially current initiatives in British Columbia with regard to timber management.

Identifying Future Projects and Activities

The draft Reference Guide states that the minimum requirement for addressing the cumulative environmental effects of the project in combination with future projects and activities is those projects and activities that have been approved by a regulatory authority (e.g., federal, provincial or municipal). Many workshop participants were of the opinion that this interpretation of the new Act is too narrow. In many cases, it will be appropriate to consider other proposed or likely projects and activities that have not yet been approved. Examples of this include the proposed developments for the Bow Valley in Alberta.

As well, it is difficult, if not impossible to identify the environmental effects of future projects and activities, as well as to assess their combined cumulative environmental effects. Another issue that was raised was that often projects will change or be revised after they have been approved, but before construction. If this cannot be anticipated, assessments of cumulative environmental effects may not be accurate.

Determining; Whether A Project is Likely to Cause Significant Cumulative Adverse Environmental Effects

During the workshop, the criteria for determining whether a project is likely to cause significant adverse environmental effects (described in the Reference Guide on significance) were outlined and related to cumulative environmental effects.

Several workshop participants asked if a responsible authority could determine that a project was likely to cause significant adverse cumulative environmental effects (when the effects of the project were considered in combination with those of past and future projects and activities) but that it was not likely to cause significant adverse environmental effects when considered in isolation from other projects. Would the courts uphold such a determination?

Another issue raised was the Reference Guide on significance itself. At present, it suggests that responsible authorities should first determine if the environmental effects are adverse, then if the adverse environmental effects are significant and then if the significant adverse

environmental effects are likely. Although the Reference Guide recognises that determinations are not, and will not be made in this way, one participant felt strongly that the Guide was somewhat misleading in this regard.

The Need for Additional Time and Resources

Most, if not all of the workshop participants were of the opinion that additional time and resources would be needed to address the cumulative environmental effects of projects adequately. In some cases the amount of effort put into screening a project is not dependent on the size or nature of the project or its possible environmental effects, but rather on the level of public concern about the project. If screenings are not done thoroughly, the responsible authority may well be taken to court.

The new Act will increase the amount of time and level of resources needed to screen a project partly because of the requirement to address cumulative environmental effects but also because:

- It requires the responsible authority to ensure implementation of mitigation measures;
- It will require more reporting (public registry); and
- It provides the public with more 'levers' to influence an environmental assessment.

Although the use of class screening reports should facilitate assessments of routine, repetitious projects, workshop participants were of the opinion that there may not currently be enough time or people to prepare class screening reports. Environmental assessment practitioners in the two departments are already overloaded with work and cannot assume additional responsibilities.

4. FUTURE DIRECTIONS

In addition to the points outlined in Section 3 above, the workshop participants made several suggestions about general strategies that could improve and facilitate the assessment of cumulative environmental effects in federal environmental assessments. These included:

- Federal departments and agencies should ensure consistency in the strategies, approaches and methods being used to address cumulative environmental effects across the country. This relates to matters such as the need to define projects consistently on a comprehensive basis so as to facilitate assessments of cumulative environmental effects, and the need to ensure consistency in requiring mitigation, compensation measures etc. for cumulative environmental effects.

- Environmental assessments of projects that are likely to permit, lead to or otherwise encourage additional development (of similar or different types) in the same area should provide criteria that could be used in environmental assessments of future projects. For example, an environmental assessment of the first coal mine in an area could suggest that future project approvals be given only if the mitigation and compensation measures required for the first mine are shown to be effective. This would have the effect of slowing development until an evaluation of the effectiveness of the mitigation and compensation measures for the first mine could be completed.

5. SUGGESTIONS AND RECOMMENDATIONS

The workshop participants made suggestions and recommendations to:

- FEARO;

- The Department of Fisheries and Oceans and Environment Canada - headquarters; and

- The Department of Fisheries and Oceans and Environment Canada - regional.

These are described below.

5.1 FEAR0

- There will be a need to clarify the relationship between the definition of a 'project', the inclusion list and the law list. Exactly what types of projects will require a federal environmental assessment and how should they be defined?

- FEAR0 should facilitate consistency among different federal departments and agencies, across the country and among different sectors in terms of the interpretation and application of the Act:

- There is a need for harmonisation of environmental assessment processes between the federal and provincial governments;

- There is a need to define the role of the lead responsible authority, in a situation where there are several responsible authorities for a project. Will each responsible authority prepare its own screening report?

- There is a need for FEAR0 to clarify the legal liability of environmental assessment practitioners within the federal government, particularly with regard to adequate assessments of cumulative environmental effects.

5.2 THE DEPARTMENT OF FISHERIES AND OCEANS AND ENVIRONMENT CANADA - HEADQUARTERS

- There is a need for national policies and operational guidelines on assessments of cumulative environmental effects. This should be based on the Procedural Manual, the Reference Guide and departmental needs and circumstances;

- There is a need for training courses on procedures and methods on how to conduct federal environmental assessments under the new Act, emphasising assessments of cumulative environmental effects; and

- Both departments should ensure that there is a consistent approach to establishing and maintaining the public registry.

5.3 THE DEPARTMENT OF FISHERIES AND OCEANS AND ENVIRONMENT CANADA - REGIONAL

- Regional offices of the two departments could encourage the development of multi-jurisdictional, multi-stakeholder resource management plans. A list of priority areas for such plans could be developed.

- There is a need for further scientific research on assessing and managing cumulative environmental effects. This should include research on the carrying capacities or tolerance thresholds of various ecosystems;

- Support from the Director General of Science (DFO) for research on cumulative environmental effects would be helpful;

- There is a need for improved liaison between regional environmental assessment practitioners and scientists; and

- It may be appropriate to review job descriptions for scientists to ensure that they receive credit for involvement in environmental assessments. However, it is important to balance the role of scientists as providers of advice to environmental assessment practitioners with their research responsibilities,

APPENDIX A

SCHEDULE OF WORKSHOPS

DEPARTMENT	LOCATION	DATE
Transport Canada	Ottawa	November 10
National Capital Commission	Ottawa	November 26-27
Canadian International Development Agency	Ottawa	December 8-9
Department of Fisheries and Oceans	Ottawa	January 12
Environment Canada/Department of Fisheries and Oceans	Dartmouth	January 14-15
Environment Canada/Department of Fisheries and Oceans	Vancouver	January 25-26
Department of Indian Affairs and Northern Development	Vancouver	January 28-29
Energy, Mines and Resources	Ottawa	February 4-5
Environment Canada and other federal departments	Quebec	February 15-16
Environment Canada/Department of Fisheries and Oceans	Burlington	February 18-l 9

APPENDIX B

ENVIRONMENT CANADA/DEPARTMENT OF FISHERIES AND OCEANS
WORKSHOP AGENDA AND LIST OF PARTICIPANTS

WORKSHOP AGENDA
CUMULATIVE ENVIRONMENTAL EFFECTS AND SCREENING UNDER
THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT

Monday, January 25, 1993
8:30 am - 4:30 pm
Tuesday, January 26, 1993
8:30 am - 12:00 noon
Simon Fraser University Downtown
Room 2250 - Harbour Centre
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DAY ONE

8:30 am	Welcome and Introductions
8:40 am	Status of the Canadian Environmental Assessment Act (CEAA)
8:50 am	Cumulative Environmental Effects and the new Act
9:25 am	Case I: Expansion of Comox Harbour
10:00 am	Coffee
10:15 am	Case II: Coal Development in the Fording River Watershed
10:50 am	Case III: Battle Creek Dam
11:25 am	Case IV: Pulpwood Agreement #13
12:00 noon	Lunch Break
1:00 pm	Summarize Cumulative Assessment Issues Identified
1:20 pm	Case V: Iskut Road Project
2:00 pm	Case VI: The Proposed Three Sisters Resort
2:40 pm	Coffee

3:00 pm	Case VII: The Slave Lake Pulp Mill
3:40 pm	Summarize Cumulative Assessment Issues

DAY TWO

8:30 am	Procedure and Methods for Cumulative Assessment During Screening • Setting boundaries • Examining interactions • Identifying related projects
10:00 am	Coffee
10:15 am	Recommendations to DOE/DFO Recommendations to FEAR0
12:00 noon	Adjourn

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APPENDIX C

ENVIRONMENT CANADA/DEPARTMENT OF FISHERIES AND OCEANS

CASE STUDIES

1. EXPANSION OF COMOX HARBOUR

PROJECT DESCRIPTION

The Small Craft Harbours Branch proposes to expand their facilities at Comox Fishing Harbour to the east of the existing causeway to accommodate moorage of up to 85 vessels. Construction activities include the construction of a breakwater, dredging of a moorage basin and approach channel, installation of floats (including pile driving), and the installation of a floating log bundle breakwater. Some filling is also being considered adjacent to the causeway to accommodate parking for 35 vehicles.

The operational aspects of the harbour will not change significantly from what is already occurring in the immediate area of the proposed harbour facility. There will be no major boat maintenance and no new live aboard moorage. It is expected that the majority of berthing spaces (approximately 75%) in the first phase of development, which include berthing space for 45 boats, will be occupied by fishermen who presently moor their vessels in the existing fishing harbour at Comox.

IDENTIFICATION OF FISHERIES RESOURCES AND HABITAT UTILIZATION

The site for the proposed harbour expansion is on the eastern side of the Courtenay River estuary adjacent to the Town of Comox, within the confines of Goose Spit. It is sited in and adjacent to areas of significant fish and wildlife habitat. There is a high intertidal salt marsh to the north of the development area along the upper foreshore, which supports a variety of invertebrates which fish and shorebirds utilize for food. An eelgrass meadow grows along the shallow subtidal slope of the estuary (+0.3m to -3m) in the southern portion of the development zone. A mud/sandflat exists between the marsh and the eelgrass meadow. To the south of the eelgrass bed, the foreshore drops steeply into deep water (10m).

The development area is utilized by all species of Pacific salmon as well as steelhead and cutthroat trout. The estuary is also an important herring spawning area, although the immediate area proposed for the harbour expansion is not commonly spawned.

As well, the general area of the general area of the proposal exhibits significant utilization by waterfow and shorebirds. The specific study area has moderate to prime habitat for dabbling and diving ducks and gulls. The birds use the area as an over-wintering and staging area while feeding on eelgrass, marsh plants, invertebrates and a variety of juvenile fish.

Marine mammal use of the area includes year round feeding and staging by harbour seals, and seasonal (spring) use by stellar and California sea lions.

NO NET LOSS SCREENING CRITERIA

Alteration of the Land and the Upland

1) Detrimental Sedimentation

Minor siltation into shallow intertidal and subtidal areas will occur as a result of widening the causeway to improve access and facilitate parking. Use of granular material with minimum fines and scheduling the fill activity in a non-sensitive period to protect the fishery and wildlife will mitigate any potentially negative impact. No new loss of intertidal marine foreshore will occur since causeway widening will be accomplished by steepening the existing slope on the present structure.

Alteration of Bottom Substrate

1) Breakwater Construction and Dredging

Breakwater construction and dredging will alter or destroy 5 ha of intertidal and intertidal habitat, of which 1.2 ha is eelgrass meadow; the remainder being gravel/sand/mudflat.

Experience with dredging similar marine sediments at other marina projects has shown that localized, short-term turbidity occurs which results in insignificant impact to fish and wildlife, provided dredging is carried out during non-sensitive periods for the species of concern.

The eelgrass and intertidal sandflat that will be buried or remove by the project will have a negative impact on fish and wildlife utilization in the area, particularly rearing salmonids and over-wintering dabbling ducks. A replacement eelgrass bed will be established adjacent to the new breakwater using substrate dredged from the basin. Additional habitat replacement will be provided by construction of an intertidal lagoon near the Courtenay Air-park where a *Carex* saltmarsh will be established.

Rock riprap used to construct the breakwater will also provide attachment substrate for marine vegetation and invertebrates which will offset some of the habitat losses at the site.

2) Contaminated Soils

Sediments proposed to be dredged may be contaminated by operation of marinas in the vicinity and/or a sewer outfall formerly located at the site. Appropriate sampling for heavy metals, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, total organic carbon and oil and grease will be conducted prior to consideration of appropriate disposal methods for dredged materials.

3) Shading of Intertidal Substrate

Installation of floats and access structures will decrease photosynthetic activity and inhibit algal growth within the new harbour. The floats and breakwater will provide new attachment surfaces for vegetative growth which may, in part, compensate for the loss of marine algae dependent on intertidal substrates or open water columns for growth.

Water Quality

1) Currents and Flushing

The new facility will change current patterns and flushing characteristics along the foreshore both within and outside the marina basin. Marine hydrologists have determined that the new rubble breakwater and associated log bundle breakwater will result in a small gyre being set

up in the rnoorage basin in a direction counter to the bay. This will facilitate adequate flushing and may cause sediment accretion seaward of the existing saltmarsh, resulting in expansion of the marsh over time.

2) Temperature, Salinity, Chemistry

Water temperatures within the new basin will probably increase while no significant alteration of other chemical constituents is expected, due to presence of marinas already present within Comox Harbour. The environmental impact is expected to be insignificant.

Construction Activity

Toxic spills, deposit of construction wastes and noise pollution may negatively impact fish and wildlife resources at the marina expansion site. Appropriate clean up and disposal facilities will satisfy the first two concerns while construction will be timed to occur between 7 am and 7 pm, during a period when wildlife does not heavily use the area. This is expected to reduce the impacts on waterfowl.

Operation of the Facility

Hazardous substances, wastes and noise pollution are concerns with operation of the new marina. Fuel will not be sold at the facility and live-aboard moorage will not be provided. Appropriate spill cleanup and abatement materials will be available on-site, as will disposal facilities for waste oil and sewage. Since new moorage is expected to alleviate overcrowding at the existing adjacent fishing harbour, significant new noise pollution is not expected to occur with the new facility.

SCREENING DECISION

The Department of Fisheries and Oceans, as the initiating department pursuant to the EARP Guidelines Order, reached the conclusion that the potentially adverse effects that may be caused by this proposal are mitigable with known technology and that the proposal may proceed with mitigation (Section 12(c) of the EARP Guidelines Order).

CUMULATIVE EFFECTS ISSUES FOR CONSIDERATION UNDER CEAA

Proj ects

Three marinas already exist on the eastern foreshore of the Courtenay River estuary. Breakwaters direct migrating juvenile salmonids into deep water and into harbour basins where they may be exposed to piscivorous fish or birds or toxic substances. Adult salmon migrants may be directed into the path of mammalian predators. The cumulative effect of a fourth marina on the eastern side of the estuary could be significant to both the early nearshore survival and adult escapement of salmon originating in the Courtenay River.

Proire ects

Two other marina projects are being considered for the Courtenay River estuary. Sampling and assessment associated with environmental approval of these projects should be assimilated into a site monitoring program currently proceeding as part of the assessment of the success of compensatory habitats provided for the fishing harbour expansion.

Marina development along the entire east coast of Vancouver Island should be considered in relation to cumulative habitat degradation.

Interactions Between Environmental Effects

Marinas, and foreshore development generally contribute to an overall degradation in water quality and consumptive use of natural resources.

2. COAL DEVELOPMENT IN THE FORDING RIVER WATERSHED

The Fording River, a tributary of the Elk River, is located in southeastern British Columbia. Cumulative impacts to the aquatic and wildlife habitat have been observed in the Fording River watershed as a result of coal mine development. A slide presentation will show the extent of the land disturbance that has occurred in the watershed. The presentation will focus

on key assessment issues associated with the development of several coal deposits in a watershed. A number of issues that have arisen in the Fording River watershed will be discussed. For example :

1. The difficulties associated with assessing individual coal developments where the extent of the coal deposits in a watershed are not known or known to be extensive. This situation occurs when a mining company applies to mine a deposit in a virgin watershed.

2. The importance of mining leases, reclamation plans, mitigation and compensation plans and monitoring programs as instruments in the protection of the environment.

The lessons learned from this development will be covered with the view of providing review process guidance and assessment criteria for future mining developments in a watershed or region where several mineral deposits are known to be present. Recent approaches and principles that have or are being developed in order to protect fish and wildlife habitat in the Fording River watershed will be discussed.

Siting of coal fired plants associated with coal developments in the valley has been proposed. Such projects could have international air quality ramifications.

3. CONSTRUCTION OF THE BATTLE CREEK DAM

BACKGROUND

Battle Creek has its source on the southern slopes of the Cypress Hills in southeastern Alberta/southwestern Saskatchewan and flows south into Montana as a tributary of the Milk River. It is considered an international stream under the Boundary Waters Treaty and the International River Improvements Act (IRIA).

The Prairie Farm Rehabilitation Administration (PFRA) is proposing to build a dam and reservoir, along with an access road, at a point approximately 4 km from the international

boundary. The dam would flood 130 ha and extend a reservoir 2.5 km up the river valley. The project would be located within a PFRA pasture, that is, within federal lands. PFRA would also be co-funding the project with the province of Saskatchewan.

ENVIRONMENTAL ASSESSMENT STATUS

PFRA is the lead federal initiator for the purposes of the EARP. Environment Canada is also an initiator as it has an affirmative regulatory duty to issue a license for the structure under the International River Improvements Act (IRIA). Transport Canada is also an initiator as it has an affirmative regulatory duty to issue a permit for the structure under the Navigable Waters Protection Act. As well as the federal assessment, the project is under-going a provincial review because a crown corporation of the Saskatchewan government is a co-proponent and a co-funder of the proposal.

PFRA did the initial screening of the proposal and concluded that the construction and operation of the proposed dam and reservoir would have insignificant or mitigable adverse environmental effects. Environment Canada and Saskatchewan raised objections with this conclusion. New guidelines were subsequently developed and PFRA is now preparing a further, in-depth, Environmental Impact Assessment.

CUMULATIVE ENVIRONMENTAL EFFECTS

The Canadian arid mixed prairie grassland or ‘short grass prairie’ is a unique habitat and Canada’s most altered ecosystem. Initially, hunting, trapping, poisoning of ‘problem’ wildlife took their tool on many species, including bison, wapiti, grizzly bear, prairie wolves, and swift foxes. Later, widespread cultivation of cereal crops resulted in a significant amount of native grassland being converted to monocultures, resulting in a loss of biological diversity. The increased use of agricultural chemicals and decreases in soil quality and quantity also occurred. Increased human presence and development has resulted in wildlife habitat fragmentation and alienation to the point where an estimated 75% of the native grasslands have been lost to agriculture.

The end result of this development process is that there are now just a few areas remaining to provide habitat for smaller numbers of increasingly less diverse wildlife species. The habitat which remains supports a nucleus of primary or endemic species of birds. It also provides critical habitat for many COSEWIC listed species - one third (8 of 25) of the birds and mammals COSEWIC has classified as rare, threatened, endangered or extirpated are either confined to one short grass.

The ecological significance of the basin from a provincial, national and international perspective is very high. It is the mix of stream valley, its related vegetation and the mixed prairie grassland that provides the great diversity in an area where that diversity is constantly stressed and has been significantly reduced.

HYDROLOGY ISSUES

Battle Creek is very much a prairie stream course and as such is subjected to the vagaries of prairie hydrology, specifically:

- Approximately 80% of the runoff, as measured at the international boundary, occurs during the months of March, April and May;
- Periods of 'no flow' frequently occur during the months of July, August, September and October; and
- Extended periods of no measurable flow occur frequently.

The flora and fauna have adapted themselves to the prairie hydrology; however, the human species has a tendency to adapt the hydrology to themselves. This is no more evident than in this basin where the majority of the water is available early in the agricultural growing season and is next to non-existent at the height of the season. In an attempt to redress this situation, the water resource is regulated; that is to say it is stored during periods of flow in a reservoir called Cypress Lake and later released during low flow periods so that it may be used to irrigate crops located in the three irrigation projects in the basin.

The basin's water resource is shared equally between Canada and the United States in accordance with the Boundary Waters Treaty; thus Canadian users must make do with 50% of the flow. This means that specific administrative procedures for allocating this water have had to be developed to ensure that 50% of the flow does in fact cross the border.

The need to allocate water for irrigation and to meet apportionment requirements at the border has let to PFRA's proposal to build a dam and reservoir close to the border. Releases made at this structure would have the secondary effect of 'freeing up' water in the existing Cypress Lake reservoir for use in irrigation.

CUMULATIVE ASSESSMENT QUESTIONS/SUGGESTIONS

Environment Canada believes that the ecological significance of the area was not addressed during the initial screening. Another weakness was a failure to compare the economic costs of ecological losses against the economic benefits. We believe that the proponent should identify the expected disturbances to wildlife brought about by project construction and operation and consider them in the context of past disturbances. Consideration of past and present agricultural policies in the basin and any future resource developments should be considered. Finally, the impacts should not focus narrowly on the small area1 extent of the reservoir inundation (130 ha and 2.5 km of riverine habitat) but should consider how significant the loss of the remaining habitat would be.

4. PULPWOOD AGREEMENT #13

BACKGROUND

On January 1, 1989, Louisiana-Pacific (LP) negotiated a pulpwood agreement with the British Columbia Ministry of Forests (MOF) to provide a 25 year timber supply for a bleached chemi-thermo-mechanical pulp mill to be constructed near Chetwynd, British Columbia. The agreement, known as Pulpwood Agreement #13 (PA 13), allows LP to obtain 452,000 cubic metres of aspen per year from the agreement area. The agreement area covers approximately 600,000 hectares of crown land and encompasses a timber supply zone situated west of

Chetwynd to Lemoray, north to Hudson's' Hope, and south to Tumbler Ridge, as well as a second parcel located adjacent to the Pine River between Chetwynd and Fort St. John.

The agreement also allows LP to exchange wood between PA1 3 and PA1 0, a second supply area that serves an LP wafer-board plant at Dawson Creek and to acquire supplies from the MOF Small Business Program. Collectively, these sources involve most of the Dawson Creek timber supply area (TSA).

Harvesting Operations

Aspen is a fast growing, short-lived, pioneer tree species. It is a prolific seeder, but also sprouts vigorously from stumps and root systems following logging or fire. Aspen is exceedingly shade intolerant, and while sun light is not required for sucker initiation, it si for survival of suckers and seedlings. After 20 to 30 years, competition causes much aspen to die, with trees serving as cover for more tolerant climax species as black and white spruce. Aspen is found in nearly pure stands over much of the South Peace Region, but occurs increasingly as mixed wood in higher elevations of the Rocky Mountain foothills.

Aspen harvesting in the Dawson Creek TSA is done using conventional logging equipment. Felling is by hand cutting or mechanical means depending upon equipment availability. Mechanical harvesting is usually supported by a wood processor. Because of its intolerance for shade and rapid propagation on disturbed sites, clear cutting is the preferred silvicultural system. Harvesting commonly employs roadside landings where whole trees are skidded to the landings using rubber-tired, grapple or line skidders or, less frequently, bulldozers. At roadside, trees are limbed, bucked and stacked for transport. Wood with high rot content, insufficient length or size is piled as waste and burned within the season of logging or the summer following winter logging. Soils in the South Peace Region are typically fine-textured lacustrine soils that are highly susceptible to compaction and can not support the weight of machinery when wet. For this reason harvesting is done on either frozen of dry ground with 70% done in winter.

Fish and Wildlife Resources

Information describing the distribution and abundance of fish species in the region is limited. Surveys undertaken as part of northeast coal-block environment studies in the last 1970s provide the majority of available information. Arctic grayling, mountain white fish, and bull trout are the most widely distributed species in the region. Rainbow trout, norther pike, burbot and lake trout are sports fish found in several areas. While some areas do provide excellent sport fishing the area is generally not recognized for sport fishing opportunities. Perhaps the most important use of area fisheries is by native peoples who undertake subsistence fishing near the community of Moberly Lake and as a secondary pursuit to hunting or trapping.

The area supports high densities of wildlife and is an important destination for both resident and non-resident hunters. Large populations of white-tailed and mule deer as well as moose and elk are found throughout the region. Furbearers are an important economic component to many local people although low fur prices in recent years have reduced the extent of active trapping. Beaver, mink, muskrat, otter, fisher, squirrels, martin, fox, lynx, coyote and wolf are commercial furbearers commonly taken from local traplines.

EARP SCREENING DECISION

The Department of Fisheries and Oceans (DFO) became involved in the evaluation of the LP mill and pulpwood harvesting agreement following the March, 1990 decision on the Old Man River Dam Appeal and notification by Department of Indian Affairs and Northern Development that the mill and agreement areas PA1 0 and 13 were located on Treaty 8 lands. Treaty 8 gave certain native tribes the rights to hunt, trap and fish throughout the region. An alliance of three local Indian bands requested the federal government undertake an EARP assessment.

Economic development of forest resources is a universally accepted land use in Canada. The extraction of timber requires development of forest road networks and removal of forest cover which permanently alter the landscape by changing natural forest ecosystems to man-modified

terrain, This process has the potential to create both positive and negative effects on forest inhabitants. Changes in the productive capacity of streams because of alteration in sediment and nutrient levels, stream temperatures, dissolved oxygen, stream flow and debris loading can occur as a function of poor logging practices, unwillingness to manage for integrated resources, and lack of understanding. However, enough is now known about good management practices that fisheries habitat degradation can be prevented or avoided, and habitat restoration and enhancement is possible.

The assessment of PA13 recognized the limited value of site-specific information in deriving an EARP decision concerning forest harvesting. To achieve a screening decision, the assessment did not undertake fisheries inventories to further identify species presence, availability of habitats, or examine life-history strategies of fish; rather it focused on developing an understanding of how logging was being undertaken, where logging would occur, silvicultural requirements for forest regeneration and assessing whether the application of existing or new resource management guidelines could mitigate or avoid unacceptable impacts. In this case, DFO's 'no net loss' principle was applied throughout the process. This principle recognized that forest harvesting may alter the landscape but provided harmful alteration to habitat(s) could be avoided or prevented by the application of best management practices, it would be possible to meet the Department's habitat conservation goal.

On the basis of field investigations, review of 5-year development plans prepared by LP, and a positive response to recommendations made by DFO to mitigate harvest impacts, it was concluded that the potentially adverse effects of pulpwood harvesting in PA1 3 were either insignificant or mitigable with known technology. Mitigative measures recommended and accepted by LP included among others the application of streamside buffers; increasing the time interval between harvesting adjacent cut blocks; application of a three pass harvesting system to control rate-of-cut while also maintaining favourable forage ratios for wildlife and distribution of seral stages to meet biodiversity objectives; undertaking total chance planning

in those areas where harvesting may compromise integrated resource objectives; varying cut block sizes; meeting wildlife security and winter thermal cover requirements; and adhering to post-harvesting forest road and landing deactivation requirements.

CUMULATIVE IMPACTS

The issue of cumulative effects and assessing their impacts is extremely complex. Within PA1 3 our screening assessment was based entirely on proposed deciduous harvesting as awarded to LP under the terms of the agreement. We did not include in our assessment the implication of other coniferous harvesting within the agreement area. Recommendations made by DFO which were anticipated to otherwise mitigate many issues concerning deciduous harvesting may not necessarily have applied to other leading timber types or silvicultural systems. In the context of our screening, rate-of-cut was the principal cumulative effects issue considered. Embedded within this issue were a range of secondary issues that supported the recommendations for mitigative measures. These include:

- Generation of water yield (peak flows, low flows, snow interception);
- Slope stability and surface soil erosion; and
- Stream channel stability(integration of the effects of all forest land use practices).

Other cumulative effect issues arose in the LP assessment. These included:

- Biodiversity (changes in forest composition, wildlife species composition/abundance); and
- Enhanced forest access by non-traditional users.

All of the above issues, whether evaluated singly or collectively, were addressed in a subjective manner. Quantitative analyses were not possible given both the lack of data and methodology upon which to base analyses. Some cumulative effects issues are unanswerable. The impact of enhanced forest access by non-traditional users for example, depends upon

point of view and is not quantifiable. It was argued that limiting harvesting to three passes while maintaining second or third pass blocks as reserves between cut blocks and increasing the time between harvest passes are effective mitigative measures to avoid measurable changes in hydrology. These decisions were not based on quantitative information, but on generally accepted approaches for managing negative impacts attributed to potential increases in water yield. Other issues such as surface soil erosion were handled similarly. It was argued that significant long-term impacts of soil loss could be avoided by systematic and effective application of best management practices. To this end were proposed progressive mitigative measures in the form of recommended guidelines and field practices.

5. ISKUT ROAD PROJECT

The original Iskut Road Project (Road) proposal was received in December 1990. Prime Resources Group Inc., Cominco Metals Ltd. and Skyline Gold Corp. proposed to service three proposed gold mines (Eskay Creek, Snip and Johnny Mountain) in northwestern BC. The proponents were to build access spurs to their respective mine sites from the Road. The project was revised in April 199 1, to service the Eskay Creek project, when Cominco decided to service the Snip mine by hovercraft from Wrangell, Alaska and Skyline decided to service Johnny Mountain by aircraft. The Eskay Creek mine property access road and the Snip hovercraft operations were reviewed separately within the Mine Development Review Process and the Environmental Assessment and Review Process, respectively.

The road through the Iskut Valley connects BC Highway 37, at Bob Quinn Lake, with the Eskay Creek mine access road, near the confluence of the Iskut River and Volcano Creek, a distance of 44 km. The Road is located upstream of the Iskut Canyon which is 79 km upstream of the confluence of the Iskut and Stikine rivers. The road, constructed in 199 1 and 1992, under the Mine Development Right of Way Act, is a Category C Resource Development Road. The road ensures access for other resource users, limits public access and will revert back to the Province of BC when mining at Eskay Creek is completed.

Construction of the road required three bridges, 23 culverts and encroached on the Iskut and Ningunsaw river floodplains at 11 different locations. The road affects resident fish populations upstream of the Iskut Canyon. The effects of the road on fish populations downstream of the canyon is thought to be negligible. Other environmental concerns about the road have also been expressed by the Tahltan people, local trappers, guide-outfitters and the Kitimat-Stikine Regional District.

These include potential impacts to wildlife habitat in the Iskut valley and to rare ecosystems and unique land forms such as the lava beds in Volcano Creek. The Iskut valley does not appear to contain critical habitat for migratory birds, waterfowl, raptors or songbirds. The area is not known to be critical to any rare, threatened or endangered species. However, there is limited information for the basis of these statements. The valley has good habitat for large mammals such as grizzly bear, moose and mountain goat, but population sizes are not known. Population sizes of fur bearers such as beaver, marten, wolverine, fisher and weasel are also unknown.

As a result of the road, Alaska has proposed to connect the lower panhandle by road to Canada. The Alaskan alternatives include the Bradfield Canal/Craig River connection to an extension of the Iskut Road. However, the most current route proposal skirts the coast and ties in with existing roads at either Haines or Skagway.

What will BC's development policy be in the future and what cumulative effect will this have on the Iskut valley?

6. PROPOSED THREE SISTERS RESORT

THE SETTING

The Bow River begins at Bow Lake on the Great Divide in Banff National Park, 180 km west of Calgary, Alberta. The Bow joins the Old Man River to form the South Saskatchewan River 230 km downstream from Calgary. About 100 km of the upper Bow is contained within Banff National Park, and has been protected since about 1900.

THE ISSUE

The Bow River is the largest watershed system in Banff National Park. Most of the Montane ecosystem occurs in the lower 50 km of the Bow valley in Banff, and extends eastward outside of the park. This is a rich area for flora, fauna, prehistoric culture, and natural landscapes, and is specifically mentioned as an asset of the World Heritage Site. Banff, a town of 6,000 permanent residents and potentially 23,000 overnight visitors, is positioned in the lower valley. Three ski areas, the Lake Louise Visitor Service Centre and numerous recreational visitor facilities are located in the Bow watershed within the park. The Trans Canada Highway, CPR's transcontinental rail line, power transmission line, a natural gas pipeline and a fiber-optics cable traverse all or parts of the length of the valley. There are unrelenting pressures to enlarge, enhance, extend and expand all manner of modem visitor facilities and resident amenities.

The recent proposal to develop an international mega-resort at Canmore, on the east boundary of Banff National Park focussed the concern for cumulative environmental impact on the whole valley, including Banff National Park. Alberta's Natural Resources Conservation Board conducted public hearings which lasted for six weeks. DOE, lead by Canadian Parks Service intervened. The NRCB approved the project, subject to environmental protection requirements. The proponent claims the restrictions cancel about 75% of the projects potential economic activity.

THE FUTURE

The Canadian Parks Service will initiate a Park based cumulative impact assessment, and expects to participate in a Federal/Provincial Bow River watershed study which will emphasize cumulative impact issues.

7. SLAVE LAKE PULP MILL

BACKGROUND

Slave Lake Pulp Corporation (SLPC) has constructed and is operating a plant 20 km east of the town of Slave Lake, Alberta for the manufacture of bleached chemi-thermo-mechanical

(BCTMP) pulp at a rated monthly average capacity of 350 air-dried tonnes (ADT) per day. Expected annual capacity is 110,000 ADT of high brightness, low freeness pulp for the high quality printing and writing paper markets. The facility occupies about 400 ha of land.

The process uses hardwood (aspen) feed with mechanical debarking, with up to 20% softwood chips from local sawmills blended in. The wood chips are preimpregnated with caustic and sulfite to soften them. The pulping and bleaching process uses multiple stages of refining, interstage washing, and bleaching with hydrogen peroxide. No chlorine is used in the pulping or bleaching process. The finished pulp is bailed into 350 kg units.

The effluent treatment system includes use of in-plant containment of spills, a surge basin for hydraulic surges, controls for fibre shocking of the dissolved air flotation primary clarifier, secondary biological treatment in an 8-day capacity step feed activated sludge bioreactor, final clarification by a circular gravity clarifier and reaeration. Domestic wastewater is treated in the effluent treatment system and is not passed through the pulping or bleaching process. Treated effluent is released into the Lesser Slave River through a multi-port diffuser. All other on-site water is held in a storm pond and treated as required before release into the treated effluent stream.

The effluent outfall is located in the Lesser Slave River, approximately 32 km downstream of the outlet of Lesser Slave Lake and 43 km upstream of the confluence with the Athabasca River. The Lesser Slave River watershed is a sub-basin of the Athabasca River basin and its area (20 600 km^2) represents 14% of the total area of the Athabasca basin.

Air emissions from the mill include water vapour, particulates, sulphur dioxide, carbon dioxide and nitrogen oxides. Bark, chip fines and effluent sludge are burned in an on site silo-type facility.

SCREENING DECISION

The Department of Fisheries and Oceans, as the initiating department pursuant to the EARP Guidelines Order, reached the conclusion that the potentially adverse effects that may be caused by this proposal are insignificant or mitigable to insignificance with known technology and the proposal may proceed with mitigation (reference Section 12(c) of the EARP Guidelines Order). There is, however, an element of public concern which should be addressed under Section 13 of the EARP Guidelines Order.

IDENTIFICATION OF FISHERIES RESOURCES AND HABITAT UTILIZATION

- Determine presence of various fish species in the watercourse in order to forecast habitat requirements of all life stages.
- Inventory physical habitat types in various reaches of the Lesser Slave River ranging from upstream to downstream of the proposed project, including tributaries.
- Inventory food resources including benthic invertebrates and forage fish.
- Determine actual degree of habitat utilization in order to identify critical habitat areas for various life stages
- Assess potential impacts of the project on fish and fish habitat using the following criteria.

NO NET LOSS SCREENING CRITERIA

Water Quality Issues - Effluent

- Contaminated Wood Chips

  Concerns - Pulping of wood chips contaminated with preservatives could lead to the presence of such substances in treated effluent, resulting in subsequent contamination of fish and fish habitat.

- Total Suspended Solids

  Concerns - The pulp mill effluent may contain total suspended solids (TSS) which could potentially smother habitat, adversely affect fish physiology, or contribute biosolids resulting in increased sediment oxygen demand.

- Effluent Toxicity

  Concerns - i. Acute toxicity in the aquatic environment downstream of the SLPC effluent outfall;
  ii. Potential sublethal effects on fish and other aquatic biota.

- Biochemical Oxygen Demand

  Concerns - The release of pulp mill effluent may result in a biochemical oxygen demand (BOD) in the Lesser Slave River which could result in reduced dissolved oxygen (DO), potentially leading to acute toxicity to fish, or to sublethal effects such as avoidance behaviour or the synergistic effects of low DO and other contaminants.

- Nutrients

  Concerns - Nutrients in the pulp mill effluent have the potential to increase algal production in the Lesser Slave River leading to direct loss of fish habitat (periphyton smothering), reductions in DO, or to more generalized changes in the aquatic community resulting from increased biological productivity.

- Taste and Odour

  Concerns - The release of pulp mill effluent has the potential to impart a taste and/or odour to fish largely resulting from the presence of resin acids.

- Colour

  Concerns - Colour changes in river water resulting from the treated effluent may be detectable within the mixing zone (defined by SLPC as the distance from the diffuser outfall to the point where the concentration at any point in the cross-section of the river is within 5% of the average concentration).

- Chlorinated Organic Compounds in Relation to Potential Fish Contamination

  Concerns - Potential formation and discharge of chlorinated organic compounds.

- Effluent Plume Thermal Regime

  Concerns - Effluent discharge in the river may alter the downstream thermal regime. The discharge plume could possible attract fish, particularly during winter when the plume is expected to be continuously warmer than the ambient river water, increasing exposure of fish to mill effluent.

Water Quality Issues - Groundwater

Concerns - Potential for the contamination of groundwater from either in-plant or on-site sources.

Issues Pertaining @Construction and Operation of In-stream Works

- Impingement of Fish by the Water Intake System
  Concerns - There is potential for injury or death to fish from the Lesser Slave River resulting from impingement into the water intake system.

- Water Intake and Effluent Diffuser Construction
  Concerns - Potential impacts to fish and fish habitat include blockage of migration, physical destruction of habitat, release of suspended solids and turbidity, and reduced bank stability during construction and operation.

- Effluent Diffuser As a Barrier to Fish Movement
  Concerns - The diffuser could act as a physical barrier to fish migration due to poor design, installation or operation.

CUMULATIVE IMPACTS AS ADDRESSED UNDER EARP

The issue of potential cumulative impacts was raised on numerous occasions during the course of this review. The proponent undertook a number of modelling exercises to address the cumulative impact of effluent loading from the Slave Lake mill as well as four other mills, on the dissolved oxygen regimes in the Lesser Slave and Athabasca River.

To address other aspects of cumulative effects, the previous public EARP panel review of the Alberta - Pacific (ALPAC) mill, which addressed cumulative impacts resulting from ALPAC as well as other existing and proposed pulp mills on the Peace-Athabasca River system, was referenced. Following this joint Canada-Alberta Public Panel review of the ALPAC mill, the governments of Canada and Alberta initiated a $12 million study to provide greater precision to the scientific understanding of the biological and chemical processes in the Peace-Athabasca-Slave River system. On receipt of that information, governments will determine to what extent further regulatory controls will be required for all pulp mills on this river system.

Assurances were obtained from SLPC that the results of the above study would be considered in modifying and enhancing any mitigation strategies required to protect fisheries resources in the Lesser Slave-Athabasca River system.

CRITERIA FOR CONSIDERATION IN CUMULATIVE EFFECTS ANALYSIS UNDER CEAA

Defining Spatial Boundaries

Lesser Slave sub-basin, Athabasca River basin, Mackenzie River basin?

Past Projects

Mill developments on the Athabasca River

- Weldwood (Hinton)
- Alberta Newsprint (Whitecourt)
- Millar Western (Whitecourt)
- Alberta Energy Company (Slave Lake)
- Alberta-Pacific (Athabasca)

Other industrial, municipal or resource developments?

Future Projects

Approved industrial, municipal or resource developments?

Environmental Effects

Those already considered plus effects identified through interactions?

Interactions Between Environmental Effects

Synergistic, additive or antagonistic?

Determining Significance & Environmental Effects

Threshold Values?

FIGURE 1. MEAN **ANNUAL RIVER DISCHARGES**