



PROJECT SUMMARY

Ecosystem Management

Forest Productivity

Public Involvement

Adaptive Management

The ecosystem management component of the Morice & Lakes IFPA has embarked on several projects that assess biodiversity, ecological attributes, and fish and wildlife habitat. These projects provide important ecological data for Sustainable Forest Management Planning in the IFPA area.

Hydrological Objectives for the Lakes SFM Plan

Introduction

The Morice and Lakes IFPA has hosted joint government-licensee projects to develop biodiversity objectives in the Lakes Timber Supply Area (TSA) that developed recommendations for legal Sustainable Resource Management Plan objectives. There is now interest from the Ministry of Environment (MoE) and IFPA participants to continue this forum to develop hydrological objectives for the Lakes TSA. The Forest Investment Account (FIA) funds activities that support sustainable forest management planning such as the development of objectives or indicators and targets for management units or subsets (e.g. landscape units or watersheds). This information, which includes indicators and targets that can be monitored within the context of the sustainable forest management (SFM) plan monitoring and reporting process, can be incorporated into SFM Plans.

The MoE has a mandate to manage water quality and quantity and is concerned that the combination of forest management activities and forest mortality from the mountain pine beetle epidemic may have an adverse affect upon water quality and quantity and in turn upon aquatic habitats.

Members of the M&L IFPA met with MoE staff and agreed to pursue a joint project to coordinate their efforts related to establishing hydrological objectives for the Lakes management unit.

Objectives

The purpose of this project is to define hydrological objectives for the Lakes TSA that will be housed and managed within the Lakes SFM Plan. Specific objectives of this project are to:

- Define hydrological objectives for high risk watersheds to mitigate effects upon water quantity and quality and aquatic habitats; and
- To recommend indicators and targets for hydrological objectives that can be managed and monitored within SFM plans.

The rationale for managing these objectives within an SFM plan is that these plans are routinely monitored and audited and doing so can be cost effective. Government and industry participants will work within the IFPA technical committee framework and will utilize other projects within the Morice & Lakes IFPA program to inform and support the development of hydrological objectives.



Fraser Lake Sawmills



Methods and Results

A hydrology expert (Pierre Beaudry - P. Beaudry and Associates Ltd.) was retained to provide technical input, information and local knowledge in support of the hydrological objectives discussions, and to define hydrological objectives and make recommendations for developing indicator targets.

A working group was established to assist with the delivery of the project. The working group members consisted of representatives of the IFPA Technical Committee, the BC Ministry of Forests and Range (MoFR) and the MoE. Two working group meetings were held; one in Smithers and one in Burns Lake. Agenda items for these meetings included methodology for risk, hazard criteria refinement and hydrological indicator refinement.

Methodology for Risk & Hazard Criteria Refinement

Different watersheds have different sensitivities to land use disturbance. It is a challenge to define a process of classification that is meaningful, objective, transparent and repeatable. Defining watershed sensitivity is only half the picture in terms of watershed management. Hazard also needs to be quantified (e.g. harvest, natural disturbance, riparian removal, etc.). Watershed sensitivity and hazard rating combined help to define risk ($\text{Risk} = \text{Hazards} \times \text{Watershed Sensitivity}$). There are three types of watershed sensitivities:

1. Sensitivity of the stream channel to increased peak flows and coarse sediment.

This sensitivity is a function of:

- The type of channel/reach at the point of interest
- Dominant climate type
- Topography
- Lateral connectivity
- Generalized geology (vertical connectivity)
- Drainage efficiency
- Potential for flow synchronization

A moderately sensitive watershed with a high hazard (such as Equivalent Clearcut Area) could lead to a high risk rating; further development of the watershed becomes a management decision based on these parameters.

2. Sensitivity of the stream channel/habitat to increased fine sediment

This sensitivity is a function of:

- Sensitivity of specific fish species in the watershed to increased fine sediment (use the most sensitive fish species present)
- Fine sediment transport buffer (effective lakes and wetlands)
- Fine sediment drainage efficiency (related to general topography)
- Climate

A provincial fish sensitivity ranking based on sensitivity to disturbance (turbidity / temperature) is available. Fish inventory data and all knowledge should be used to determine presence / absence of species to establish the relative sensitivities of the fish species found in each watershed. A cultural screening could be applied to modify ratings in different areas based on traditional use.

3. Sensitivity of the stream channel/habitat to decreased riparian function

This sensitivity is a function of:

- Most sensitive fish species present
- Climate
- Stream channel type and its dependence on large woody debris

When applied to watersheds in the Lakes TSA, this sensitivity did not provide the resolution needed and is not satisfactory as a qualifier.

To identify and rank sensitive watersheds the following methodology is proposed:

- Determine presence / absence of sensitive fish species
- Determine sensitivity to increased peak flows
- Determine sensitivity to increases in fine sediment

If a watershed is classified as “fish sensitive” and the peak flow sensitivity or sediment sensitivity is identified as “high” or higher, then the watershed will be declared “sensitive.” Hazard indicators can then be computed in this watershed to identify risks. Managers have to determine if high risk is acceptable in these sensitive watersheds. If not, then hazard reduction is required (i.e. lower ECA or fewer active stream crossings). Field work will be required to determine if a stream channel is stable and functioning well and / or to determine the density of high hazard stream crossings in the watershed. The field work can help determine a more accurate risk assessment.

Hydrological Indicator Revisions

The working group developed draft recommendations for revisions to hydrological indicators in the Lakes SFM Plan. These draft revisions provide a reasoned balance between timber supply and water quality and quantity.

L7 – Percentage of Identified High Risk Stream Crossings with Actions Plans Implemented by Licensee

The intent with this indicator is to focus attention on high hazard stream segments and assessing stream sediment at these locations in an effort to minimize the effects of sediment delivery on new and maintained roads and graded surfaces. Monitoring efforts should focus on active roads (old or new). As soon as a road has no action, then sediment sources decrease.

L9 – Percent of Cut Blocks Harvested that are Consistent with Riparian Management Area Commitments by Licensee

This indicator was formerly described as *Percent Area less than 3m in Height in stream RMAs by Sensitive Watershed by Licensee*. Riparian

indicators are very hard to measure on maps using Geographic Information Systems (GIS). An operational focus is required to effectively monitor riparian management practices. The IFPA participants currently have implemented riparian management procedures and are monitoring for contravention. This revised indicator is intended to ensure that the riparian management area commitments made by the IFPA participants are implemented on the ground.

L45 - Road Density Index (RDI) by Sensitive Watershed by Licensee

In the opinion of the working group, this indicator is not an effective hydrology indicator. Road density does not correlate well to hydrologic hazard. The risk rating for a sensitive watershed with high road density and a few stream crossings may not be significantly different from a sensitive watershed with a low road density and many stream crossings. The working group recommendation is that this indicator be removed from the Lakes SFM Plan. No replacement indicator is being considered at this time.

The working group's recommended revisions to indicator detail sheets will be presented to the Lakes Public Advisory Group for endorsement. The Lakes SFM Plan can be downloaded from the IFPA Website (www.moricelakes-ifpa.com/publications/index.html).

Discussion

The next phase of project work will focus on confirming the methodology to identify and rank sensitive watersheds. The working group will reconvene in a series of meetings. Tasks will include:

Establishing Size of Watershed Boundaries

In the Lakes TSA there are 32 small, 24 medium and 5 large watersheds. These three scales capture 99% the area within the TSA (not including parks). The working group will have to determine if the recommended watershed sizes are reasonable for landscape level watershed planning.

Complete Watershed Reviews and the First Draft of Sensitivities

A domain expert will provide the working group with a first draft of watershed sensitivity rankings based on the recommended methodology. The working group will determine the cut-off for fish sensitivity based on relative sensitivities. Watersheds above that cut-off line will be further analyzed. Watersheds may be added if the working group agrees that certain species are more important in these watersheds. The initial list of watersheds will be referred to fisheries biologists for verification and fish species' presence / absence will be augmented and updated as required.

Review ranking and adapt / modify or reject sensitivity scores

A domain expert will provide the working group with sensitivity scores. All discussions will be documented so licensees are aware of any sub-watershed issues.

Contact

Dwight Scott Wolfe, RPF, Cert. ConRes.
Operations Manager
Tesera Systems Inc.
Email: dwight.wolfe@tesera.com
Tel: (250) 614-3122

Acknowledgements

The domain expertise provided by Pierre Beaudry (Hydrologist - P. Beaudry and Associates Ltd.), David Wilford (Research Officer/Hydrologist Team Leader - BC Ministry of Forests and Range) and Rick Heinrichs (Ecosystem Specialist – BC Ministry of Environment) greatly assisted the IFPA Technical Committee in the completion of this project.

For More
Information...



For more information on the Morice & Lakes IFPA,
please contact:

*Jim Burbee, RPF, IFPA Manager
c/o Tweedsmuir Forest Ltd.
3003 Riverview Road
Prince George, B.C. V2K 4Y5
Tel: 250-564-1518
e-mail: venturefc@telus.net*

www.moricelakes-ifpa.com