Morice & Lakes IFPA

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Summary No. 55

Morice & Lakes Innovative Forest Practices Agreement

Project Summary

Ecosystem Management

Forest Productivity

Public Involvement

Adaptive Management

Developing and implementing Sustainable Forest Management Plans for both the Lakes and Morice Timber Supply Areas is the central objective of the Morice and Lakes Innovative Forest Practices Agreement. The adaptive management cycle and public involvement are both important components of this planning process.

Lakes Timber Supply Area:
FRPA Scenario Resource Analysis

Introduction

The Morice & Lakes Timber Supply Areas (TSA) Innovative Forest Practices Agreement (IFPA) encompasses two Timber Supply Areas in north central British Columbia, Canada. Covering more than 2.6 million hectares, the area has a population of over 12,000 people. The Sustainable Forest Management (SFM) Plan developed for the Lakes TSA details explicit management objectives that guide current management practices.

Objectives

The objectives of the FRPA Scenario Resource Analysis are as follows:

- To spatially model a suite of resource management strategies that best reflects current knowledge and practice, with particular attention to the mountain pine beetle epidemic.
- To provide SFM indicator forecasts to assist with indicator target setting requirements in the Lakes TSA SFM Plan.
- To provide an account of the factors related to timber supply and other resource values and the impact that these factors have on achieving indicator targets.

Methods

An integrated approach involving a licensee and government technical team and the general public was used to facilitate sustainable forest management planning.

Resource Analysis

The Forest, Range and Practices Act (FRPA) resource management scenario was assembled by the technical team. In this scenario, the policies and practices associated with the full implementation of the FRPA are explored. The intent of this scenario is to fully implement the FRPA while mitigating the negative effects of the current MPB epidemic to the forest industry. The data and assumptions of the learning scenarios are implemented along with any legally required management constraints absent in the learning scenarios.

The scenario was spatially modelled and reviewed by the technical team. The review focused on assessing the impacts of the alternative management strategies in each scenario to a number of key indicators (timber supply, growing stock, age class distribution, etc.)

FRPA implementation sensitivities were designed to further test and strengthen the operational strategies identified in the FRPA Implementation Scenario. The IFPA Technical Committee developed a list of appro-

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priate sensitivities upon reviewing the results of the FRPA Implementation Scenario. Descriptions and results of these sensitivities are included in the Timber Supply Analysis Report.

Adjusted Desired Patch Distribution

In the FRPA Implementation Scenario patch targets were applied by landscape unit and natural disturbance type (NDT) to create a desired patch size distribution based on an interpretation of the Lakes South SRMP. In this interpretation the entire Crown Forested Area belongs to one patch size class or another, and within the different patch size classes are patches of different seral stages. A selective approach was used to attempt to create the desired patch distribution. Analytical forecast indicators showed that in the Base Case the desired patch distribution was achieved over the long term in NDT 3 without setting targets. Therefore no patch targets were set for NDT 3 areas. In contrast, in the NDT2 areas a shortage of small patches and an excess of medium and large patches was observed throughout the planning horizon. Therefore in the FRPA scenario patch targets were set to increase the amount of area within small patches in the ESSF throughout the TSA. And again, small patches could be early, immature, mid, or mature plus old.

For the patches sensitivity, patch targets were applied by landscape unit and natural disturbance type based upon a different interpretation of the Lakes South SRMP in which only the amount of area in the early seral stage was of concern. One difficulty with this approach was that the amount of area in the early seral stage varies over time within each NDT of each landscape unit. It varies for a number of reasons including changes in periodic harvest levels, changes to average volume per hectare of the harvest over time, and because the Tesera Scheduling Model (TSM) was not required to maintain consistent harvest levels within these geographic areas.

A 'work-around' was developed to deal with this difficulty of fluctuating amounts of area in the early seral stage. The maximum area in the early seral stage during the long term portion of the planning horizon was determined from previous Lakes IFPA scenarios. Of the three scenarios conducted, Base Case, Beetle Mitigation, and FRPA Implementation the highest long term harvest levels were achieved in the Beetle Mitigation Scenario and consequently the largest amounts of early seral area were also achieved. From these early seral area amounts and the percent ranges in Table 12, targets for the patches sensitivity were developed. Unlike the FRPA Implementation Scenario patch targets, the patch targets for this sensitivity were created and applied only for small, medium and large early patches. Also in contrast to the FRPA Implementation Scenario where there were small patch targets only in NDT 2, in this patch sensitivity the early patch targets applied in both NDT 2 and NDT 3.

Adjusted MPB mortality projections

In the Base Case, Beetle Mitigation and FRPA Implementation scenarios, projections from the British Columbia Mountain Pine Beetle (BCMPB) project as of 2003 were incorporated within the volume curves of the existing natural inventory. The assumption was that stands 60 years and older would experience MPB mortality.

In this sensitivity, projections from the BCMPB project as of 2005 were incorporated and the assumed minimum age of pine trees experiencing MPB mortality was lowered to 40 years. The method of including these non-recoverable losses in volume curves was the same as was that followed for the Base Case. The method of volume matching used in the Beetle Mitigation Scenario was also reproduced for this sensitivity.

Waive Early Seral Targets

The first portion of the preparation for this sensitivity entailed waiving early seral targets for 80 years rather than the five years that was in place in Lakes Base Case, Beetle Mitigation, Mitigation Composite and FRPA Implementation scenarios. The five year deferral of this type of target was consistent with the Expedited TSR. There were three early seral targets in the High and Very High Value Caribou Migration Corridors; one for ESSF, one for SBSmc2, and one for SBSdk. Those three targets were not waived for any period of time in any of these scenarios, and were not waived for this sensitivity. Incidentally, these were the only early seral targets that were binding. The other 32 early seral targets were not binding, so waiving them for 0, 5 or 80 years made little difference.

The second portion of preparing this sensitivity involved removing the volume matching component of succession pathways. Instead assumptions similar to those used in the Expedited TSR were used. Stands that were not harvested but were expected to drop below and stay below MHV (140m^3/ha) were allowed to recover on VDYP curves with a five-year regeneration delay from 2013. That much was consistent with the Expedited TSR. However the method of applying this assumption was adjusted to avoid widespread old seral target violations. Instead of setting these stands to their regenerating yield curves in 2018, they were allowed to age on their original, depleted curves until the regenerating curve had reached minimum harvest age.

Rehabilitate MPB Affected Stands – Case 1

The idea in this sensitivity was to test what would happen if a program was undertaken to rehabilitate stands that do not appear in TSM's harvest schedule and that were projected to be severely damaged by the MPB epidemic. Rehabilitation to an area equivalent to 10% of the area harvested in each of the first four, five year planning periods was assumed.

Rehabilitate MPB Affected Stands – Case 2

The foundation assumption of this sensitivity was that there was $1B available over 20 years to rehabilitate stands decimated by the MPB epidemic. For modeling purposes, the cost for this type of silviculture treatment was estimated at $3,000.00 per hectare allowing a maximum of 333,333 hectares to be rehabilitated. Only THLB stands were targeted, and within that only stands depleted below minimum harvest volumes. Within that, only stands not harvested from the natural inventory. Determination of which stands were harvested from the natural inventory was based on the final run of the FRPA Implementation Scenario.

Based on the FRPA Implementation Scenario, there were 178,726 hectares of THLB eligible for succession that were not harvested in the first 20 years of the planning horizon– stands depleted below 140 m3/ha that would not recover to that level unless allowed to recover along a regeneration pathway. Rehabilitating this much area would cost $536 million which was just over half of the 'available' budget. Distributed over 20 years this was approximately 8,936 hectares per year or 45,000 hectares in a five-year period. This 20 year period of rehabilitation was set to occur between 2006 and 2025.

After an initial run of this sensitivity, it was realized that since rehabilitation of large areas was creating large amounts of additional early seral areas a different spatial harvest distribution had occurred. As a side effect, this was preventing the rehabilitation to occur as planned. As a remedy to these unintended effects the projected harvest schedule from the FRPA Implementation Scenario was fixed scheduled for the first 5 periods of the planning horizon in this rehabilitation sensitivity.

Forest Genetics Council – Genetic Gains

In the Base Case Scenario there were no genetic worth factors applied to any of the future managed stands. In the Beetle Mitigation and FRPA Implementation scenarios, the following genetic worth factors were applied.

In setting up this sensitivity, genetic worth was applied according to the available Forest Genetics Council species plans. There was no species plan available for Pl BV high so a genetic improvement of zero was applied at 100% availability for all future pine planted there.

Adjusted Operational Adjustment Factor 1

The forest productivity curves used in the Beetle Mitigation and FRPA Implementation scenarios used an OAF 1 of 12% for pine leading stands and 7% for other conifer leading stands. These numbers actually came from the Babine EFMPP study, since the results of the IFPA study were not available when the IFPA forest productivity curves were being developed. The IFPA sponsored a study suggesting that a smaller OAF 1 of 5% is reasonable for pine and other conifer leading stands. Therefore timber supply impacts would be more conservative.

In order to test the sensitivity of the FRPA Implementation Scenario harvest flow to changes in OAF 1 values, managed stand yield curves were generated with TSR2 OAF 1 inputs of 20% for pine leading stands and 15% for other conifer leading stands. Aside from the OAF 1 adjustments, all growth and yield inputs were consistent with those used in the FRPA Implementation Scenario

Old Growth Site Index Adjustment

The intent of this sensitivity was to test the differences in site productivity estimates for future managed stands from two different sources; SIBEC and OGSI. The SIBEC estimates were already built into the forest productivity yield curves used in the FRPA Implementation Scenario.

In preparing this FRPA Implementation Scenario sensitivity, a set of future managed stand yield curves were developed using OGSI site productivity estimates. These OGSI adjustments were calculated for stands where the existing natural inventory was older than 140 years.

The area weighted average site indices were then calculated for both sets of future managed forest productivity stand groups: those in the FRPA Implementation Scenario and those prepared for the OGSI sensitivity. These statistics were compared and the difference was found to be minimal. As a result this sensitivity was taken no further.

Results

This section presents the results of the Timber Supply Analysis for the following scenarios and sensitivities:

1. Base Case Scenario
2. Beetle Mitigation Scenario
   a. Reserved COGMAs in Lakes South SRMP Area;
   b. Reduced Minimum Harvest Volume in Beetle Attacked Stands;
   c. Relaxed Binding Seral Targets;
   d. Future Managed Species Mix - Sx 60%: Pl 40%; and,
   e. Future Managed Species Mix - Sx 80%: Pl 20%;
3. Mitigation Composite Scenario
4. FRPA Implementation Scenario
   a. Adjusted Desired Patch Distribution;
   b. Adjusted MPB Mortality Projections;
   c. Waive Early Seral Targets;
   d. Rehabilitate MPB Affected Stands – Case 1;
   e. Rehabilitate MPB Affected Stands – Case 2;
   f. Forest Genetics Council – Genetic Gains; and
   g. Adjusted Operational Adjustment Factor 1.

The Base Case was compared to the Expedited TSR of 2004 since that was the basis of the current five-year uplift. Additionally, as described in the inputs and assumptions section of this report, there were many common assumptions in the IFPA Base Case and the Expedited TSR. There were significant differences in the resulting harvest forecasts and these differences will be explained.

The Beetle Mitigation, Mitigation Composite, and FRPA Implementation scenarios are compared with the IFPA Base Case since it was intended to function as a baseline scenario. As described previously, there were significant changes to modeling inputs and assumption moving forward from the Base Case to the other scenarios.

Within the Beetle Mitigation Scenario, the five sensitivity tests on harvest flow to changes in specific assumptions were compared to the Beetle Mitigation Scenario rather than to the Base Case. Similarly, within the FRPA Implementation Scenario the seven sensitivity tests were compared to the FRPA Implementation Scenario rather than to the Base Case.

The Mitigation Composite Scenario is the result of applying modelling inputs and assumptions from the Beetle Mitigation Scenario sensitivities. The results of the Mitigation Composite Scenario are compared with the IFPA Base Case.

Table 1. Lakes TSA Scenario Projected Harvest Levels.

Planning Horizon	Year	Expedited TSR	Base Case	Mitigation	Mitigation Composite	FRPA
Short-Term	2003-2007	3,130,000	3,130,000	3,130,000	3,130,000	3,130,000
Short-Term	2008-2012	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Short-Term	2013-2017	1,341,000	1,202,824	1,350,000	1,350,000	1,226,033
Short-Term	2018-2022	1,341,000	734,824	678,824	678,824	459,096
Mid-Term	2023-2027	1,341,000	438,824	606,605	582,383	459,096
Mid-Term	2028-2032	1,341,000	274,024	736,127	694,223	595,762
Mid-Term	2033-2037	1,341,000	274,024	869,995	836,862	743,228
Mid-Term	2038-2042	1,341,000	283,296	977,504	979,502	890,694
Mid-Term	2043-2047	1,341,000	332,731	1,075,013	1,122,141	1,038,160
Mid-Term	2048-2052	1,341,000	389,918	1,167,523	1,264,781	1,185,626
Mid-Term	2053-2057	1,341,000	456,071	1,265,032	1,407,421	1,333,092
Mid-Term	2058-2062	1,341,000	532,597	1,372,542	1,550,060	1,480,558
Mid-Term	2063-2067	1,341,000	621,123	1,490,051	1,692,700	1,625,024
Mid-Term	2068-2072	1,341,000	723,529	1,617,561	1,774,839	1,625,024
Mid-Term	2073-2077	1,341,000	841,993	1,759,070	1,774,839	1,625,024
Mid-Term	2078-2082	1,341,000	979,033	1,759,070	1,774,839	1,625,024
Mid-Term	2083-2087	1,341,000	1,137,560	1,759,070	1,774,839	1,625,024
Mid-Term	2088-2102	1,341,000	1,320,944	1,759,070	1,774,839	1,625,024
Long-Term	2103-2192	1,600,000	1,320,944	1,759,070	1,774,839	1,625,024
Long-Term	2193-2202	1,600,000	1,320,944	1,813,547	1,846,432	1,731,524
Long-Term	2203-2252	1,600,000	1,320,944	1,868,024	1,918,024	1,838,024

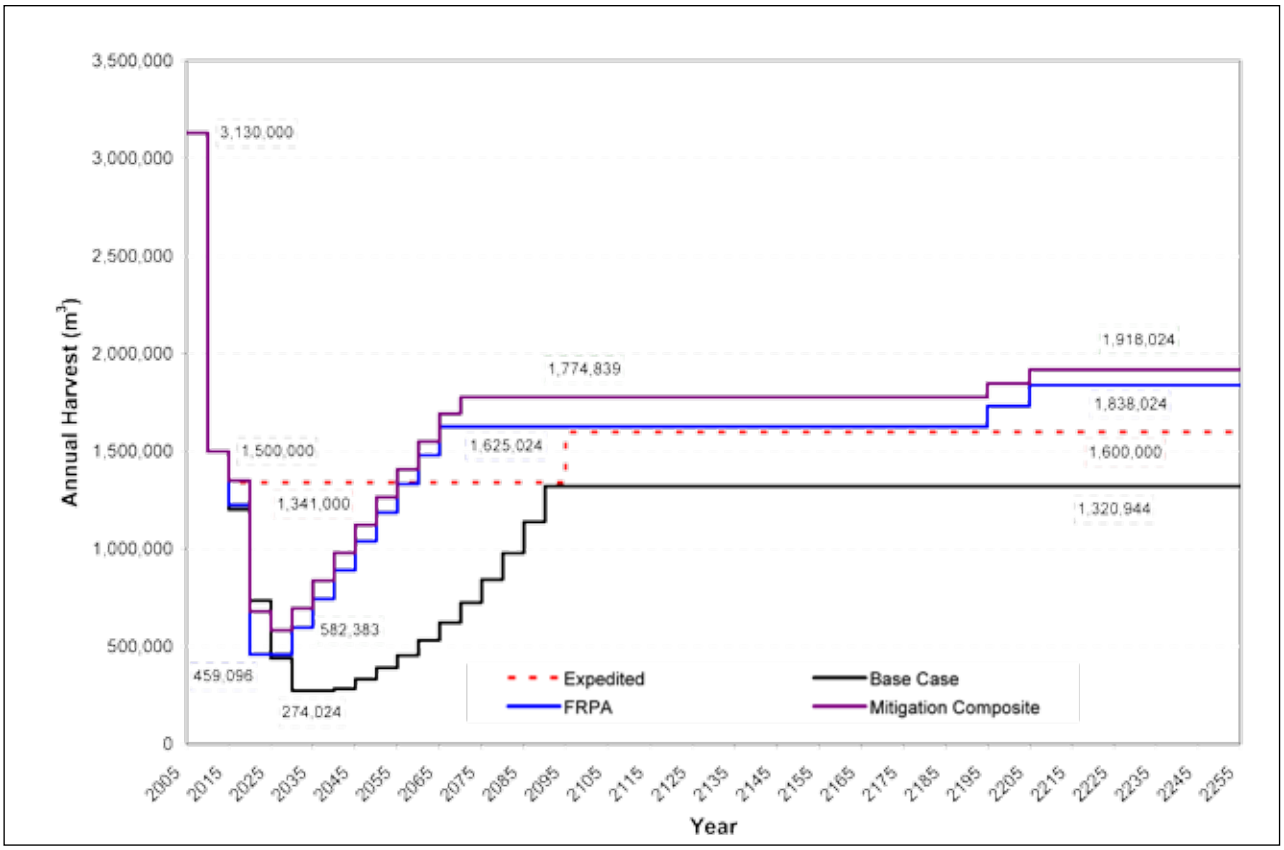

Figure 1. FRPA Scenario Harvest Flow Forecast.

Discussion

As with the Beetle Mitigation Scenario there were several modeling assumptions adjusted at once making it difficult to isolate the magnitude of the effect from each contributing factor. Instead it was easier to discuss the results more generally as being due to the structure of the scenario as a whole.

The harvest levels of the Beetle Mitigation Scenario and the FRPA Implementation Scenario were compared in this report to the Base Case. The FRPA Implementation Scenario, like the Beetle Mitigation and Mitigation Composite scenarios, generated harvest flow forecasts much higher than that exhibited in the Base Case. However the difference was not as great for the FRPA Implementation Scenario as it was in the Mitigation Composite Scenario. Otherwise stated, comparing the FRPA Implementation Scenario to the Mitigation Composite Scenario it was apparent that harvest levels were somewhat lower in the FRPA Implementation Scenario.

This was due to several modeling assumptions that were applied in the FRPA Implementation Scenario but not the Mitigation Composite Scenario:

- Application of desired patch size distribution targets;
- Additional land base targets for Lakes South SRMP wildlife connectivity corridors;
- THLB reduction due to incorporating Lakes South SRMP OGMAs;
- THLB reduction due to increasing wildlife tree retention; and
- Including the Burns Lake Community Forest and the Cheslatta Community Forest in the THLB for the purpose of including those areas in land base target assessment areas.

While the FRPA Implementation Scenario harvest forecast was not as optimistic for harvesting activities as the Mitigation Composite Scenario was, the FRPA Implementation Scenario incorporated more forest management requirements.

Recommendations

The following recommendation stems from the completion of the FRPA Scenario Resource Analysis:

- That this analysis should be used as a reference, and that further analysis is undertaken to refine modeling assumptions and confirm any potential opportunities for mitigation of Allowable Annual Cut (AAC) impacts.

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