



## 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.

# Economic Impact Modeling in the Morice & Lakes IFPA Region



Fraser Lake Sawmills



### Introduction

Pressure from human demands, global market influences, and natural disturbance on the landscape are increasing the need for examining complex natural resource management tradeoffs. In addition to environmental concerns, sustainable development requires an examination of economic and social concerns. A detailed description of the current level of economic activity on the land base within a region can facilitate the formulation and adoption of policies designed to reduce natural resource user conflicts and promote sustainable development. In addition to providing a baseline of activity, this regional economic database can be used to develop regional economic impact models that are frequently used to simulate future levels of economic activity under a variety of existing or proposed changes to natural resource management policy or changes on the landscape that result from natural disturbance.

This research initiative develops a baseline overview and regional economic impact decision support system that can be used in the simulation and assessment of a variety of alternative futures for the Morice and Lakes Innovative Forest Practices Agreement (IFPA) region. The Morice & Lakes Innovative IFPA funded this study in an effort to enhance knowledge about the existing levels of economic activity in the region and inform land use decision-making through a decision sup-

port system that simulates future levels of economic activity in response to changing policy or natural disturbance regimes in forestry and other sectors. The Social Science Research Group of the Canadian Forest Service, Natural Resources Canada, conducted this research.

### Objectives

The objectives of this project are to estimate baseline levels of regional economic activity and to develop a decision support tool based on a regional economic impact model for the Morice and Lakes IFPA region. While natural resource management decisions are frequently applied on regional landscapes, data related to regional economic activity is scarce. This project makes use of an innovative methodology for estimating and compiling region-specific economic data. The economic impact model or decision support tool is populated with the region-specific baseline data and used to simulate alternative future levels of economic activity under different management or disturbance scenarios.

## Methods

The study of regional economies in Canada poses a challenge. On the one hand, using existing average provincial data is relatively easy and inexpensive, but may misrepresent the unique characteristics of regional economies and send confusing signals to decision-makers. On the other hand, conducting a comprehensive primary investigation accurately detailing the level activity in a regional economy can be prohibitively costly.

A hybrid or mixed-methods approach was adopted in this study thereby achieving a balance in cost, accuracy, and complexity. The hybrid approach involves both primary and secondary data collection techniques. Secondary data exists in the form of a Statistics Canada custom census profile for the M&L IFPA (years 2001, 1996, and 1991), the British Columbia Input-Output Tables (1999), and previous reports. Primary industry data was collected through a survey of businesses in the M&L IFPA study area. Respondents were asked to provide information with respect to their personal employment history, business revenue and expenditures, business employment, and business wage bill. The hybrid data (secondary and survey derived) were used to create a region-specific economic database for the study area. For the purpose of monitoring, this database should be updated every five years following census updates.

This hybrid approach involves a series of steps starting with the provincial input-output tables (a set of three tables that detail the annual transactions in, and structure of, a market economy) as a base. The provincial input-output tables are then transformed into a social accounting matrix (SAM - a double entry, square accounting framework that ensures data consistency when using hybrid sources). The provincial database (SAM) is then mathematically regionalized using location quotients (the proportion of regional employment divided by the proportion of provincial employment for each sector). This step results in a preliminary region-specific SAM. Superior (primary) data is then inserted through a process of selective precision. Selective precision involves choosing the major sectors of interest and focusing primary data collection efforts. Data consistency is crosschecked with secondary sources throughout the above steps.

Once consistent, the region-specific hybrid database is used to construct a regional economic impact decision support system (DSS). The DSS is based on a computable general equilibrium (CGE) framework. The M&L IFPA CGE contains six sectors and three primary factors of production (land, labour, and capital). The six producing sectors include: agriculture, forestry, service, public, visitor (tourism), and a composite sector comprised of the 'rest of the economy'. Various assumptions are made with respect to the treatment of these variables in the model. The labour supply is assumed fixed (i.e., the migration of labour between the region and the rest of the world is not considered). The labour market is modeled under the Keynesian assumption of a rigid wage rate. Under this assumption, adjustments in the labour market occur from changes in employment levels. It is assumed that over the long run, unemployed individuals will migrate out of the region to find employment. The other two primary inputs, capital and land, are assumed to be sector specific.

There are five economic indicators that baseline data were collected for and that future levels are simulated. These include gross revenue, net regional product, royalties and indirect taxes, labour income, and employment.

## Results

### Baseline Analysis

The economy of the M&L IFPA study region is dependent on the land base and the endowment of natural resources in the region. Agriculture (a large land using sector) in the region is limited in terms of its current economic contribution. While potential may exist to develop new agricultural opportunities, the sector provides low labour incomes. Agriculture in its current form may be more important in the region as a lifestyle choice and as a source of supplementary income.

Forestry is the dominant sector in the region. The forestry sector contributes the largest single share to regional total revenue, net regional product, labour income, and the vast majority of royalties and indirect taxes collected from the region. Forestry contributes less in terms of the number of employment positions available; however, the existing employment positions are relatively high paying.

The visitor sector (the component of services, retail, transportation that is dedicated to outside spending) is second only to forestry in terms of single share revenue generation in the region. Visitor expenditures in the region fuel a large proportion of employment in the region, but visitor sector employment tends to be associated with lower paying jobs. Comparatively, domestic services (services fuelled by resident spending) are fairly limited. The majority of services in the region are industry specific, whether for forestry or visitor hospitality.

The public sector (education, health, and government) can be both a source of stability and instability. In natural resource dependent regions the public sector acts as a source of diversification and a buffer against negative impacts associated with fluctuations in resource sectors. However, changes in the public sector can also act as a source of instability. In the M&L IFPA region, the public sector is an important source of employment with above average wages.

The rest of the economy consists primarily of the mining industry and the retail industry. Although the importance of mining has declined in the region, development potential remains an important source of short to medium term economic stability. The retail sector is moderate in terms of monetary contribution, but contributes the greatest number of employment positions. However, like the service sector and the visitor sector, a high proportion of part-time or seasonal jobs and low wage rates characterize retail sector employment.

## Scenario Analysis

In total, six scenarios were examined involving positive and negative impacts on annual allowable cut (AAC) in the Morice Timber Supply Area (TSA), increased tourism in the overall M&L IFPA region, and an increase in agricultural exports from the overall region. The purpose of this scenario analysis is to provide an examination of the sensitivity of the economy to various changes in land using sectors. The following table provides a brief description of the scenarios that were simulated for the M&L IFPA. These scenarios are hypothetical and were selected in order to provide a preliminary sensitivity analysis.

Under Scenario 1 a 5% increase in the AAC of the Morice TSA results in increased economic activity across all sectors of the economy. Similarly, under Scenarios 2 and 3 a 5 to 10% reduction of the AAC in the Morice TSA leads to decreased economic activity across all the sectors of the economy. The 10% increase in visitor activity simulated under Scenario 4 can partially, but not completely offset the negative impacts of a 5 to 10% decrease in the AAC of the Morice TSA. The 10% increase in agricultural exports under Scenario 5 benefits all the sectors of the economy, but can only minimally offset any negative impacts associated with reduced AAC in the region.

Table 1. Description of M&L IFPA Scenarios

Scenario	Description
1	5% uplift in Morice AAC (equivalent to 2.83% of the total M-L IFPA AAC)
2	5% reduction in Morice AAC (equivalent to 2.70% of the total M-L IFPA AAC)
3	10% reduction in Morice AAC (equivalent to 5.15% of the total M-L IFPA AAC)
4	10% increase in M-L IFPA visitor activity
5	10% increase in M-L IFPA agriculture exports

Table 2. Simulated Future Indicator Levels

	Baseline	Scenario 1 +5% AAC	Scenario 2 -5% AAC	Scenario 3 -10% AAC	Scenario 4 +10% visitor activity	Scenario 5 +10% agricultural exports
Total revenue (\$ millions)	1,069.3	1,086.3	1,053.0	1,038.3	1,091.2	1,070.0
Total net regional product (\$ millions)	403.6	413.7	394.0	385.3	410.8	403.9
Total revenue and indirect taxes (\$ millions)	105.5	108.8	102.3	99.4	106.6	105.6
Total labour income (\$ millions)	231.7	236.9	226.9	222.4	236.5	231.9
Total employment (primary jobs)	5,345	5,426	5,268	5,197	5,520	5,355

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Table 3. Simulated Change From Base

	<b>Scenario 1 +5% AAC</b>	<b>Scenario 2 -5% AAC</b>	<b>Scenario 3 -10% AAC</b>	<b>Scenario 4 +10% visitor activity</b>	<b>Scenario 5 +10% agricultural exports</b>
Total revenue (\$ millions)	17.0	-16.3	-31.0	21.9	0.7
Total net regional product (\$ millions)	10.1	-9.6	-18.3	7.2	0.3
Total revenue and indirect taxes (\$ millions)	3.3	-3.2	-6.1	1.1	0.1
Total labour income (\$ millions)	5.2	-4.8	-9.3	4.8	0.2
Total employment (primary jobs)	81	-77	-148	175	10

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**Acknowledgements**

This project was supported through a collaborative research agreement between the Morice & Lakes IFPA and the Canadian Forest Service. The researchers are grateful for the assistance of a large number of survey respondents, the IFPA committee members, and the many individuals from local and provincial agencies and organizations that assisted us with locating region-specific information.

**For More Information...**



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