



PROJECT SUMMARY

Morice & Lakes IFPA projects are exploring ways to enhance forest productivity through a better understanding of factors affecting productivity, through intensive silviculture treatments, by increasing the area of productive forest land, and by improving site productivity estimates.

Cruise Plot Analysis Preliminary Report

Ecosystem
Management

Forest Productivity

Public Involvement

Adaptive
Management

Background

In this project, J.S. Thrower & Associates Ltd. (JST) compiled a preliminary product (the Cruise Plot Database) that demonstrates the strengths and weaknesses of cruise data to test the accuracy of inventory labels for a portion of the Morice & Lakes Innovative Forest Practices Agreement (M&L IFPA) area.

The recent Ministry of Forests (MOF) Inventory Audit in the Morice Timber Supply Area (TSA) showed sample volumes were similar to the forest cover inventory, but species composition in mature stands were correctly labeled in only 50-60% of the samples. These results reinforce the need to evaluate the existing forest cover information. Thus, the M&L IFPA Technical Advisory Committee determined that the accuracy of the forest cover attributes should be checked.

This initiative has been divided into two phases. In this project (Phase 1), JST compiled a preliminary product (the Cruise Plot Database) that demonstrates the strengths and weaknesses of cruise data to test the accuracy of inventory labels for a portion of the TSA. In Phase 2, (next fiscal year) the data will be analyzed for the entire Morice & Lakes IFPA area and the results will be provided to the Technical Advisory Committee.

Objectives

The specific objectives of this project were to:

1. Create and populate a spatial Cruise Plot Database.
2. Develop protocols and procedures for analysis and reporting.
3. Document the Cruise Plot Database and spatial coverages.
4. Provide limited comparative analysis between the Cruise Plot Database and inventory labels.

Methods

There are three main steps in achieving the objectives of this project:

1. Assemble the Cruise Plot Database.
2. Develop protocols and procedures to use cruise data as an analytical tool.
3. Assess the strengths and weaknesses of the forest cover inventory in specific polygons where spatially referenced cruise data can be found.



Fraser Lake Sawmills



Step 1: Assemble the Cruise Plot Database

The Cruise Plot Database (Figure 1), is a tool to store cruise plot data, cross-link the cruise plot data with spatial information, and provide summary reports. For this project, cruise plot data were collated, cleaned, and imported in the database. Spatial forest cover and ecological data for the entire Morice TSA were also imported. Cruise plots and spatial records were then cross-linked in a Geographic Information System (GIS) and a table linking cruise plots and spatial records were imported into the Cruise Plot Database.

Step 2: Develop protocols and procedures to use cruise data as an analytical tool

The user must first select the minimum number of plots within a polygon and the minimum distribution index of a polygon. Selecting stricter standards gives more accurate results at the polygon level but fewer polygons will meet the minimum criteria. Accuracy at the population level is therefore a trade-off between an accurate polygon-level measure and a large number of polygons. We recommend using three as the minimum number of plots and 0.7 as the minimum distribution index. (Figure 2)

The analytical process with the Cruise Plot Database has three steps:

1. Select polygons, trees, and the attribute of interest.
2. Select stratification variable.

3. Select scattergram parameters. Upon update, statistics and graphs on the accuracy of the inventory are returned.

Step 3: Assess the strengths and weaknesses of the forest cover inventory

The fourth objective of the project was to provide limited comparative analysis between the Cruise Plot Database and inventory labels. The purpose of the analysis was to demonstrate the usefulness of the database, rather than do a complete inventory accuracy analysis. Therefore, the analysis was limited to all inventory type groups, all BGC units, and live trees only. For each attribute, we performed two analyses: first with a minimum number of plots/polygon of 2 and minimum distribution index of 0.2 (weak selection) and second with a minimum number of plots/polygon of 3 and distribution index of 0.7 (strict selection). There were 8,836 plots, 1,459 polygons covering 44,018 ha in the weak selection, and 2,857 plots, 395 polygons covering 7,681 ha in the strict selection. The purpose of performing two analyses was to illustrate the impact of using more restricting selection criteria.

The inventory label under-estimated net volume and diameter at breast height (DBH), but over-estimated height and age. The results showed that the inventory type group is accurate about 44% of the time.

The results also indicate that although the inventory is estimating overall net volume reasonably well, balsam (B) net volume was under-estimated, while lodgepole pine (PI) and spruce (S) were

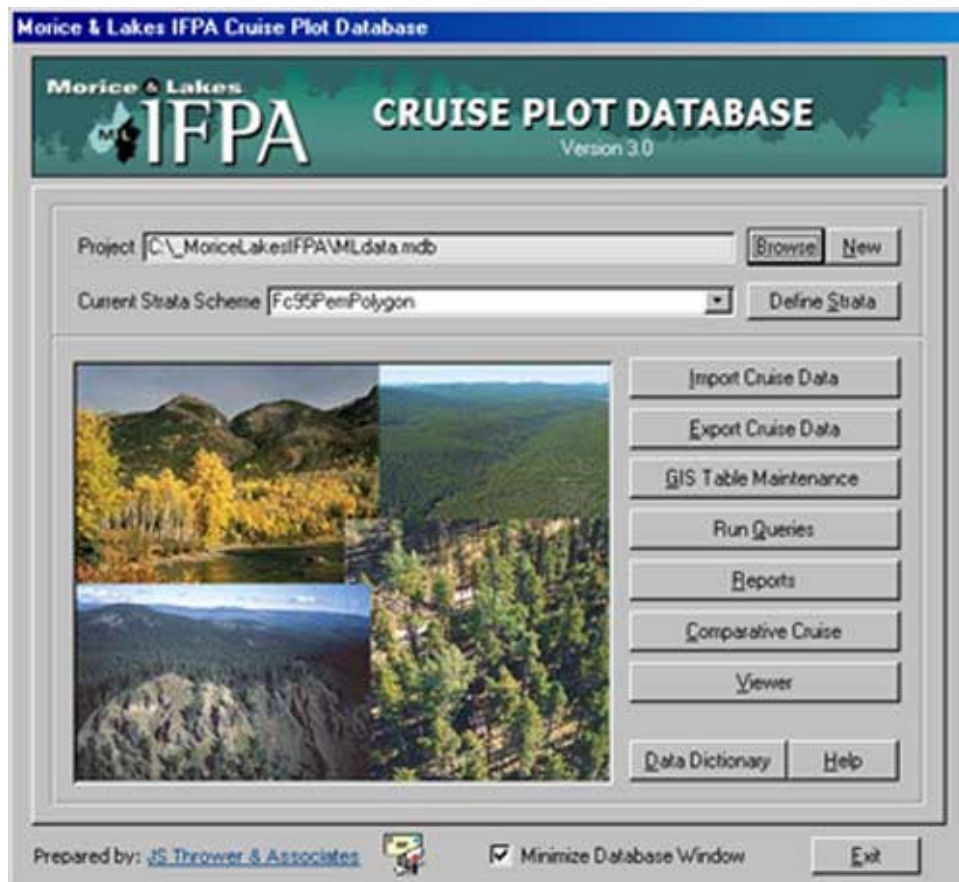


Figure 1. Cruise Plot Database main interface.

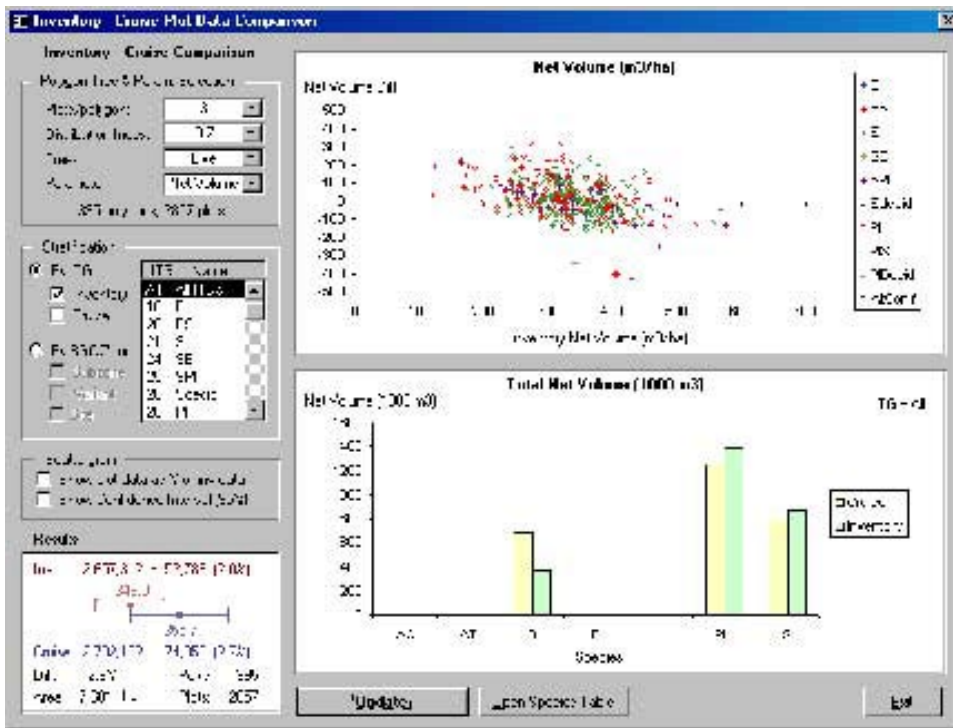


Figure 2. The Inventory-Cruise Plot Data Comparison Tool

over-estimated. Using the strict selection, there was 83% more B in the cruise than in the inventory data. However, PI and S was approximately 10% less in the cruise than in the inventory data.

Recommendations

1. Create consistent field data collection procedures across the Morice & Lakes IFPA area so that cruise plot data can be shared for mutual benefit. Data collection considerations include the following:
 - Ensure that cruise data is collected to at least the minimum DBH limit of the inventory.
 - Ensure that a representative tree in each plot is cored for age.
 - Ensure that the cruise date is recorded on each plot.
 - Collect the UTM coordinates for each plot in the field or calculate the UTM coordinates before cutting permit stage and input into the plots. This will save considerable time and expense when plots are required for spatial analysis.
 - Collect biogeoclimatic zone, subzone, variant and site series in the field for each plot.

2. Complete a more thorough analysis of the forest attributes. This analysis would determine if the attributes are comparable. For instance, can we compare the cruise net volume to the inventory volumes? How different are the assumptions when calculating height?
3. Evaluate the VDYP model by using spatial plot data. Evaluate the model prediction and input errors in the next phase by testing the inventory VDYP model in two ways:
 - Input the cruise species composition, age, height, QMD, and Site Index into the VDYP model and project a VDYP net volume.
 - Produce scatter diagrams as done in Phase I but plot VDYP net volume and cruise plot net volume.

Table 1. Cruise and Inventory Comparisons

Attribute		Weak Selection			Strict Selection		
		Cruise	Inventory	Difference	Cruise	Inventory	Difference
Net Volume	m3/ha	345.2	331.9	4%	355.7	346.0	3%
Total Age	yrs	160.2	171.0	-6%	160.5	167.1	-4%
Height	m	25.9	27.4	-5%	26.1	27.8	-6%
DBH	cm	31.5	30.2	4%	31.0	30.1	3%

References

Inventory Audit Results: Overview Morice TSA, February, 1998

Contact

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Morice & Lakes


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