



PROJECT SUMMARY

Ecosystem
Management

Forest Productivity

Public Involvement

Adaptive
Management

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.

Development of Growth and Yield Curve Sets to Support Morice & Lakes IFPA Requirements



Fraser Lake Sawmills

Introduction

Yield curves are used to quantify various timber and non-timber values on the land base. The Morice & Lakes Timber Supply Areas' (TSA) Innovative Forest Practices Agreement (IFPA) is relying on this information to help support the forecasting and reporting of indicators within a number of learning scenarios. Yield curves that reflect natural stand development and the performance of plantations based on Timber Supply Review 2 (TSR2) management assumptions have been developed to support the Morice Base Case Scenario. Special curve sets were developed to support the forecasting of indicators under the forest Productivity, ecosystem-based management and recreation scenarios.

The forest productivity scenario curve sets were developed based on the Morice base case curve sets and additional forest productivity studies and data, which were not incorporated in the last Timber Supply Review of the Morice Timber Supply Area.

The ecosystem-based management scenario curve sets were developed based on the Morice base case curve sets and include additional curves to account for forest succession in different ecosystem types.

Objectives

The objectives of the project are as follows:

- To produce a set of base case curve sets that reflect natural stand development and the performance of plantations based on TSR2 forest management assumptions;
- To produce a set of forest productivity curve sets that provide an insight into the timber and non-timber resource implications of applying revised estimates of site productivity and various silvicultural regimes and treatments, and;
- To produce a set of ecosystem-based management curve sets that mimic natural forest successional pathways in order to assess the timber and non-timber resource implications of managing the land base using current knowledge of natural ecosystems.



Methods

The base case yield curve sets were the first curve sets to be developed. These curve sets were required for modelling the Morice Base Case in the fall of 2003. The Variable Density Yield Prediction (VDYP) model was used for estimating timber attributes in natural stands. The Table Interpolation Program for Stand Yields (BatchTIPSY) model was used for estimating timber and non-timber attributes in managed stands.

The initial phase of the base case curve sets involved updating the forest inventory data to better reflect the status of the land base as of August 31, 2001. Using the silviculture survey measurement data from ISIS (the standard BC Ministry of Forests reporting tool for silviculture information) and some general assumptions, the Non-Satisfactory Restocked (NSR) stands within the forest inventory were updated. The second phase of the base case curve sets involved the generation of a curve set for every stand. Additionally, curve sets were produced for each analysis unit, as defined in the TSR2 document.

The forest productivity curve sets are required for modelling the forest productivity learning scenario. All silviculturally treated areas and their regeneration assumptions were provided by the licensees and added to the Morice resultant file. Site indices were adjusted to account for increased productivity using SIBEC values (and OGS1 for areas outside of SIBEC study). Initial stand densities & species composition were determined from free-growing data provided by licensees and ISIS records. Genetic worth was incorporated into the growth & yield inputs using seed orchard data. A lookup table outlining all the parameters was completed, and the curve sets were generated based on this lookup table.

The ecosystem-based management curve sets are required for modelling the ecosystem-based management scenario. Each forested stand was assigned to a successional pathway box (a current position on a successional pathway). Area-weighting each existing Morice base case natural stand curve set created a single representative curve set for each successional pathway box. Existing Lakes TSA base case natural stand curve sets were area weighted to create a single representative curve set for successional pathways boxes still needed but not found on the Morice land base. VDYPBatch and input from a local ecologist were used to create additional curve sets for successional pathways boxes not found on the Morice or Lakes land bases but still needed for the full successional pathway. Each successional pathway box was assigned to position 1 for the managed and future managed stands on the Morice land base.

Additional documents describing the data inputs and assumptions that went into developing these curve sets are available from the Morice & Lakes IFPA. They include:

- The M&L IFPA Information Package
- Base Case Yield Curves, Morice TSA, March 2003
- Forest Productivity Scenario Yield Curves, Morice TSA, April 28, 2004
- Ecosystem Scenario Yield Curves, Morice TSA, April 28, 2004

Results

The procedures outlined above resulted in the preparation of three types of curve sets. Additional items were added to the curve set output to account for other stand attributes such as: coarse woody debris, snags, equivalent clearcut area and additional utilizations (7.5 cm, 12.5cm, 17.5cm, and 22.5cm as well as the TSR2 utilizations).

Existing Natural Stands

Natural Stand Yield Tables (NSYT) were developed using VDYP. NSYT were developed for each of the three curve sets. In addition to the attributes VDYP currently provides, equivalent clearcut area, crown closure, snag, coarse woody debris and large live tree curves were also added.

For the base case curve set, curves were prepared by forest cover polygon and by analysis unit (AU) as per TSR2 AU definitions.

For the forest productivity curve sets, curves were prepared by GISTAG (the unique polygons resulting from the spatial union of the predictive ecosystem mapping with the updated forest cover).

For the ecosystem-based management curve sets, curves were prepared by GISTAG. A total of 2,568 yield curve sets were developed to describe natural succession using the base case natural stands curve sets.

Existing Managed Stands

Managed Stand Yield Tables for existing managed stands (MSYT_E) were developed using TIPSY. MSYT_Es were developed for each of the three curve sets prepared under the IFPA. In addition to the attributes TIPSY currently provides, equivalent clearcut area, crown closure, snag, coarse woody debris and large live tree curves were also added.

For the base case curve set, curves were prepared by forest cover polygon and by analysis unit (AU) as per TSR2 AU definitions.

The forest productivity curve sets were prepared by GISTAG.

For the ecosystem-based management curve sets, curves were prepared by GISTAG. Natural regeneration is assumed, so future management and growth and yield projections were developed using VDYP. These curves were identical to the set developed for the base case.

Future Managed Stands

For the base case curve set, curves were prepared by forest cover polygon and by analysis unit (AU) as per TSR2 AU definitions.

The forest productivity curve sets were prepared by GISTAG. Additional genetic worth columns were required to model genetically improved stock correctly. Genetic gain was applied to species-specific components within the managed stand. The only time genetically improved (GI) factors would be applied to the leading species is if it happened to be a species that the licensees indicated would come from a GI seed orchard.

Discussion and Conclusions

The IFPA analysis is relying heavily on these growth and yield curve sets to support the modelling of a variety of resource values under a range of alternate management strategies. Many of the innovative management practices proposed for the IFPA will be assessed based on the use of this information.

This product is a good example of cooperation between IFPA participants. The end result is a series of innovative growth and yield projections that facilitate the modelling and analysis of innovative forest management practices.

Recommendations

The following recommendation stems from the development of the growth and yield curve sets:

- That the methodologies used to develop these yield curve sets be applied on other management units in the province to further enhance the current approaches to sustainable forest management.

References

SIBEC Site Index Estimates in Support of Forest Management in British Columbia, BC Tech. Rep. 004

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For More
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