



YIELD PREDICTIONS AND FOREST MODELLING TOOLS TO HELP YOU GET THE MOST OUT OF YOUR INVESTMENT

INTRODUCTION

Making informed decisions helps you to get the most out of your forest investment. What information do you need to make the right decisions and what information does your forestry adviser need to help you make that decision?

Forest owners decide:

- whether to plant and/or replant and if so what species, type of tree stock and initial stocking rates;
- whether to prune and if so, when this should happen;
- whether to thin for production and when to undertake the thinning; and
- when to harvest their forest and how to market the produce.

Furthermore, financing requirements and/or change of ownership (sale and purchase of shares or the forest as a whole) will require advice as to the value of the standing tree crop.

TOOLS AVAILABLE TO SUPPORT ANALYSIS

The tools that are available to help us give you the advice you require when making decisions referred to above are computer-based and incorporate the results of many years of research and development. Olsens have recently purchased three new tools in order to improve the advice we give you. These are:

- **YTGen** – generates yield tables (estimates of yields by log grade for a range of clearfell ages) from tree crop pre-harvest inventory data.
- **Forecaster** – allows pruning and thinning to be scheduled, simulates the growth and development from establishment to a range of harvest ages, and generates a yield table.
- **Woodstock** – simulates the log volume and cash flows for a forest consisting of many stands; can be used to find optimum solutions within defined constraints.

YTGEN – YIELD TABLE GENERATOR

The YTGen software, developed by Silmetra Ltd, contains the results of many years of research undertaken by the Forest Research Stand Growth Modelling Co-operative.

In this research co-operative Forest Research is the research provider. Membership of the co-op consists of large forest owners, forest managers and consultants.

Olsens has supported this co-op since its inception in 1987.

The prediction of yields by log grade is based on a pre-harvest inventory. In this inventory we collect height, diameter and stocking data as well as information that describes the sample trees in terms of quality characteristics. This Method for Assessment of Recoverable Volume by Log types (MARVL) is commonly used to describe a stand of trees. This data can be analysed using MicroMarvl and GroMarvl or YTGen.

The YTGen tool has been developed as a collaborative project of several forest owners, forest managers and consultants. It is one of two leading tools used for harvest planning, marketing and valuations of mature forests. The advantages of using YTGen relative to MicroMarvl and GroMarvl are as follows:

- More efficient: it takes less time to generate a yield table and revise yield tables using alternative cutting strategies;
- More accurate: it allows the use of single tree growth models, whereas GroMarvl only uses stand growth models; and
- More flexible: while GroMarvl can be used for predicting yields up to 5 years into the future, YTGen in combination with single-tree growth models can be used for a longer forecast period.

For those forests that have Permanent Sample Plots (PSPs) the accuracy and flexibility of the YTGen tool is better still.

Data from PSPs can be used to validate the growth model used in “growing the inventory data forward”, thus increasing the confidence in the prediction of yields.

YTGen is up and running and can be used to assist Olsens’ clients to get harvest-ready.

FORECASTER

Forecaster is a replacement tool for Standpak. Both these tools have been developed by Forest Research and both use the results of research and development undertaken by the Growth Modelling Research and the Forest & Farm Plantation Management Co-operative.

The Forecaster will do all that Standpak used to do, but it will do it:

- More efficiently - it will be easier to use;
- More accurately - it will incorporate the "300 Index" national growth model for radiata pine which is accurate for a wide range of forest and farm sites in New Zealand. When generating yield tables it will take account of not only the average, but also the distribution, of the relevant stand variables; and
- More flexible - Forecaster will consist of three distinct modules: a scheduler of pruning and thinning, a management regime simulation module, and a yield table generator, whereas in Standpak all three functions are not as easy to separate.

The use of this tool must be supported by field data: data collected from sample plots following pruning or thinning and mid-rotation inventory data allow the tool to be calibrated and improve the accuracy of the predictions. The more accurate the prediction, the better the management decision is likely to be.

Again, for those forests that have Permanent Sample Plots (PSPs) the accuracy and flexibility of the Forecaster tool is better still.

Data from PSPs can be used to validate the growth model used in "growing inventory data forward", thus increasing the confidence in the prediction.

Forecaster is still in development, and is expected to be released by the end of 2004. Olsens expect to acquire this improved tool once it is released. Until its release we will continue to use Standpak to help clients make those informed decisions.

WOODSTOCK

No, this is not a return of the 70's music festival! The Woodstock forest modelling system, developed by Remsoft, allows the user to take stock of the wood and other attributes of the forest. Woodstock can be used for a wide variety of analyses including harvest scheduling and wood supply analysis, wildlife management and simulation of forest ecosystems.



The system is flexible, allowing us to create models using both simulation and linear programming (LP) formulations.

Woodstock is used by many of the large NZ forest owners including CHH, Weyerhaeuser, Earnslaw One and City Forests. It is one of two forest estate-optimising tools used in NZ.

Olsens' staff can continue to use the Interactive Forest Simulator (IFS) for forest estate simulations, but increasingly we will apply the additional power of Woodstock.

Olsens' have used IFS for simulating target woodflows and generating estimates of associated forest operation, harvesting and transport costs. Woodstock will do all of this and more:

- Linear programming – the user specifies the objectives and constraints and the model assesses what activities need to be undertaken and when to achieve the optimal solution;
- Landscape modelling – determine the impact of forest management and harvesting decisions on the resulting landscape; and
- Woodstock can take account of uncertainty – provided we know the chances of specific events happening we can use the model to assess the likely outcome.

The optimising ability of the linear programming tool will allow us to be:

- More efficient, no need to run as many simulations to achieve the output target(s) and excellent links with YtGen;
- More accurate, the selection of the optimal simulation run can now be done using a linear programming function; and
- More flexible, incorporating in the model uncertainties that can be quantified, while subject to chance, will provide a better answer than a mere guess.

CONCLUSION

The three new tools described above will help us to improve our services to you.

*Man is a tool-using animal... Without tools he is nothing, with tools he is all.
Thomas Carlyle*

Efficiency, accuracy and flexibility are important features of these new tools. With these tools we can help you make the right decisions. Please contact our company staff at any of our offices if you need some help. We've got the tools!