



# DIVERSIFIED SPECIES TECHNICAL NOTE

Number: DSTN-027  
Date: August 2011

## A New Web-based Calculator for *Eucalyptus fastigata*

### Summary

A new web-based calculator for *Eucalyptus fastigata* is now available on the FFR web site. The calculator uses the same format as the earlier FFR cypress calculator and can be accessed on the Diversified Species page (<http://www.ffr.co.nz/research-themes/diversified-species>), on the right hand side of the page, via 'Software Links'.

The calculator uses the *E. fastigata* growth model developed by the Eucalypt Cooperative<sup>[1]</sup>. It contains a series of pages that allow users to tailor the growth model to suit their site and product. Users can input individual stand information, costs and discount rates. On the output side, users can examine the influence of the input variables on net present value and predicted stand growth.

The calculator is based on the best information available to FFR at this time. The underlying model<sup>[1]</sup> will predict growth, yield and financial outcomes of growing *E. fastigata*, and is intended as a decision support tool. Future work on the model should include improvements to the mortality functions, as the current functions appear to be unrealistic at high stockings. We have addressed this in the current calculator by limiting the initial stocking to a maximum of 1500 stems per hectare. Furthermore, the model is known to under-predict growth outside the central North Island. Adjustments to the model are important with increased carbon planting opportunities, particularly on the east coast of the North Island. This first version of the calculator does not estimate carbon sequestration. Inclusion of carbon in the model will be programmed for the 2011-12 financial year.

This new calculator will be a valuable tool for forest managers to evaluate afforestation with *E. fastigata*.

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### A New Calculator

The *E. fastigata* calculator is now available to allow FFR members to evaluate the economics of growing this species in New Zealand. The purpose of this Technical Note is to provide users with some basic guidance in operating the calculator. The calculator's structure is outlined in individual sections below.

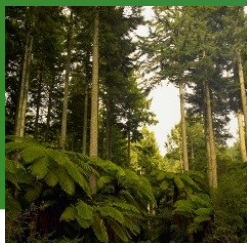
### The Log in Page

The calculator is accessed through the Diversified Species page (<http://www.ffr.co.nz/research-themes/diversified-species>), on the right hand side of the page, via 'Software Links'. The log in page is the point of entry to the calculator. Enter your FFR username and password to access the calculator.

### The Calculator Page

On the home page of the calculator (Figure 1) the stand parameters are entered on the left hand side of the screen and the predicted stand parameters are displayed in graphs on the right. Parameters displayed include stems per hectare, mean top height, basal area and standing volume. At any point on the graphs, the user can obtain predicted values through a pop-up that appears when the mouse is dragged over the graphs. This can be a useful function for looking at time to recovery after thinning, for example.

There are two levels of information. First, the calculator tabs directly above the graphs give access to stand growth data "**Stand growth**", individual stand information "**Stand information**", the economics of the scenario tested "**Economics**", and any measurements entered by the user to adjust the model predictions, in "**Measurements**".



# DIVERSIFIED SPECIES TECHNICAL NOTE

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At the top of the page, to the right of the FFR logo, users are able to access and manage the stands that they have input in “**Stand manager**”, adjust the plot size for

measurements entered in “**Settings**”, adjust the settings for log prices and grading in “**Assortment distributions**”, and access the manual under “**Manual (pdf)**” (Figure 1).

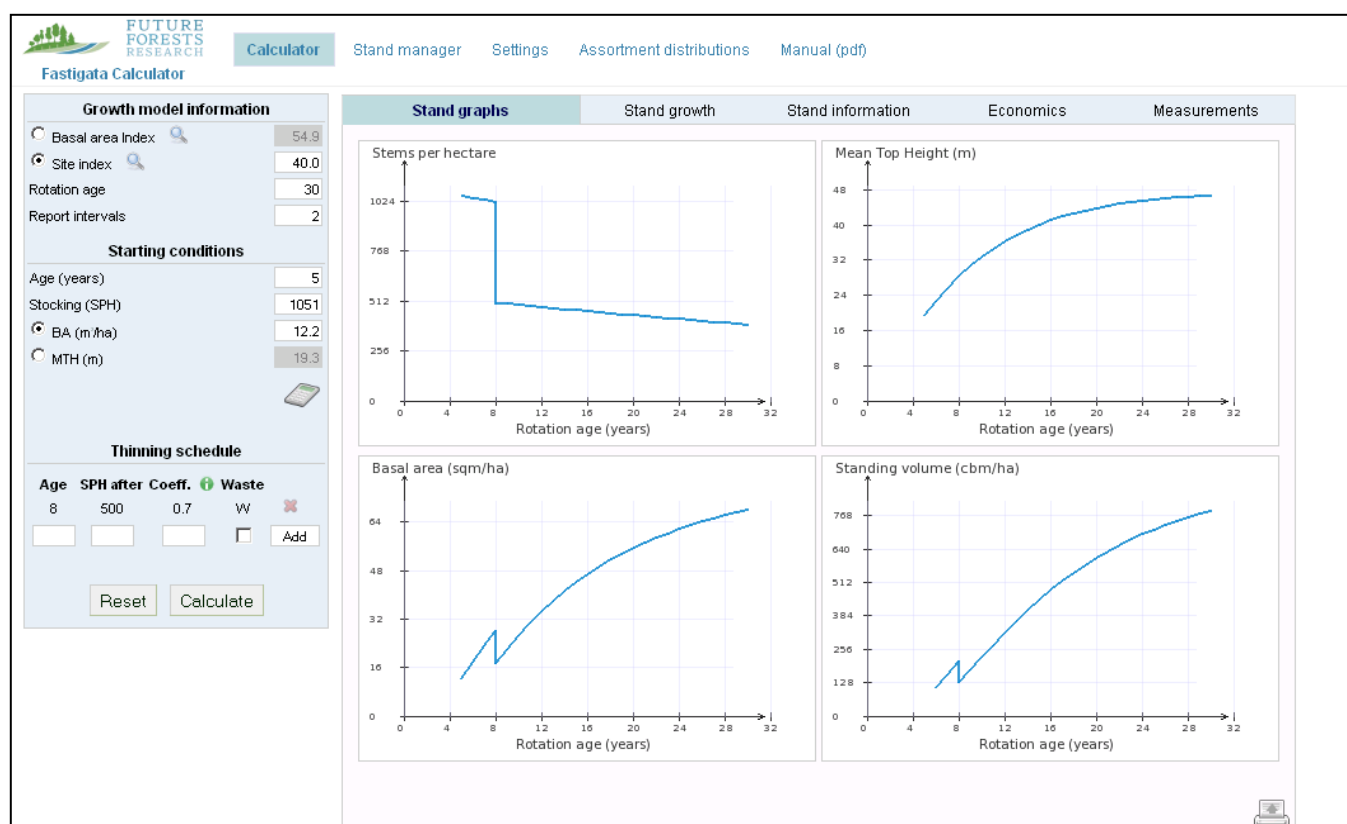


Figure 1: The home page of the calculator.



# DIVERSIFIED SPECIES TECHNICAL NOTE

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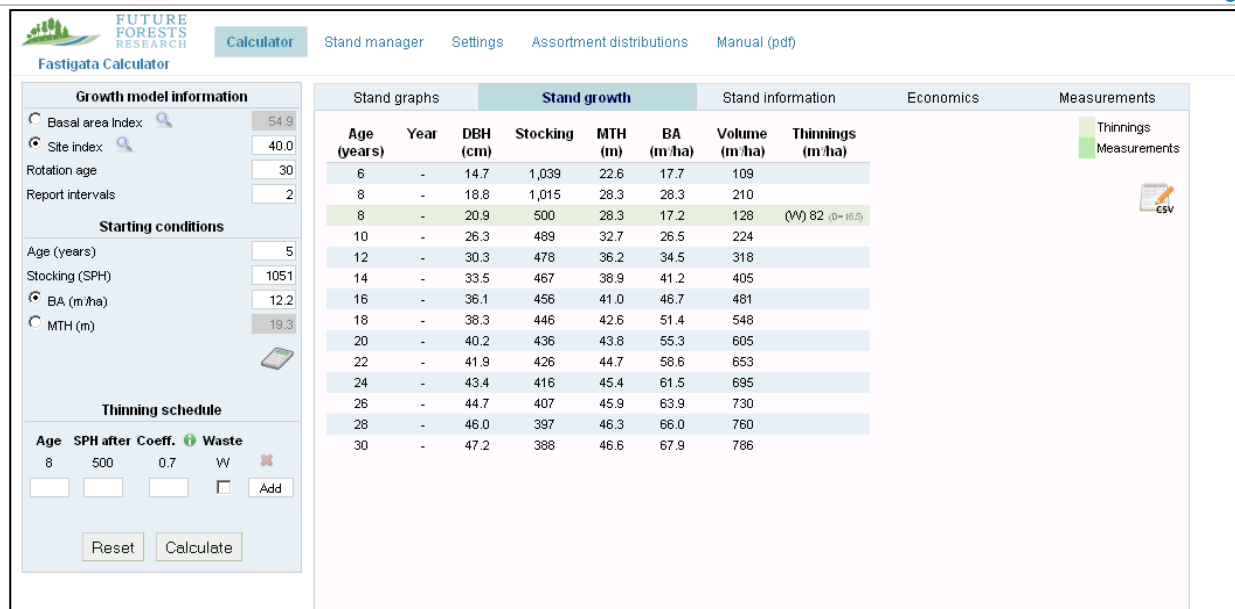
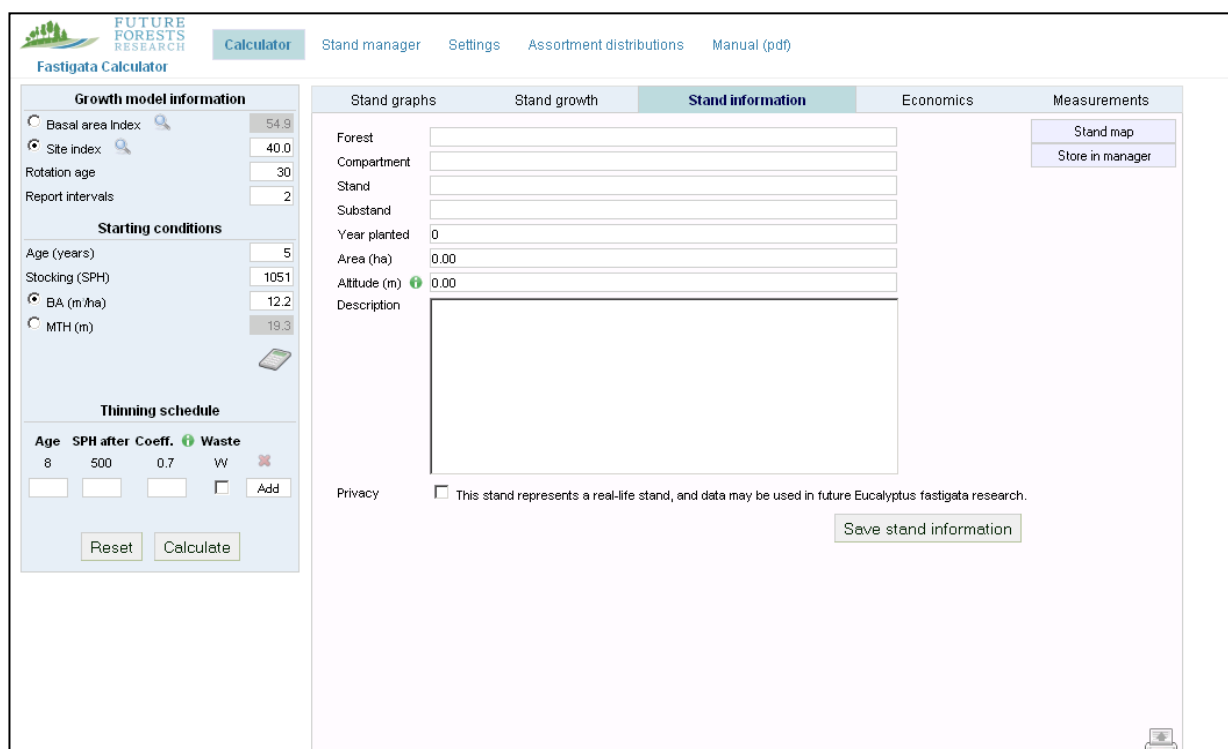


Figure 2: The Stand growth page of the calculator.

## The Stand Growth Page

This page displays the predictions at given reporting intervals (reporting interval is entered on the left hand side; Figure 2). The data in this page may be exported via a 'csv' button. This exporting facility is very useful for reporting or using the data in other applications.



**Fastigata Calculator**

**Growth model information**

- Basal area Index: 54.9
- Site Index: 40.0
- Rotation age: 30
- Report intervals: 2

**Starting conditions**

- Age (years): 5
- Stocking (SPH): 1051
- BA (m/ha): 12.2
- MTH (m): 19.3

**Thinning schedule**

Age	SPH after	Coeff.	Waste
8	500	0.7	W

**Stand information**

Forest:

Compartment:

Stand:

Substand:

Year planted:

Area (ha):

Altitude (m):

Description:

**Economics**

**Measurements**

Stand map:

Store in manager:

Privacy: ☐ This stand represents a real-life stand, and data may be used in future Eucalyptus fastigata research.

[Save stand information](#)

Figure 3: The Stand information page of the calculator.



# DIVERSIFIED SPECIES TECHNICAL NOTE

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## The Stand Information Page

The Stand information page allows the user to enter and save specific stand details (Figure 3). The user must save using the 'Save stand information' button before storing any details in the Stand manager (via the 'Store in manager' button).

## The Economics Page

The Economics page is the point of entry for operational costs (e.g., establishment, thinning, pruning), discount rates and land values, as well as any overhead costs (Figure 4). This page also displays the total volume and economic return expected from growing *E. fastigata* under the specified conditions. This is given as volume (m<sup>3</sup>/ha), gross value (\$/ha), the net present value (NPV \$/ha at the specified discount rate) and internal rate of return (%). Several scenarios for different discount rates are also graphed on the right hand side of the page.

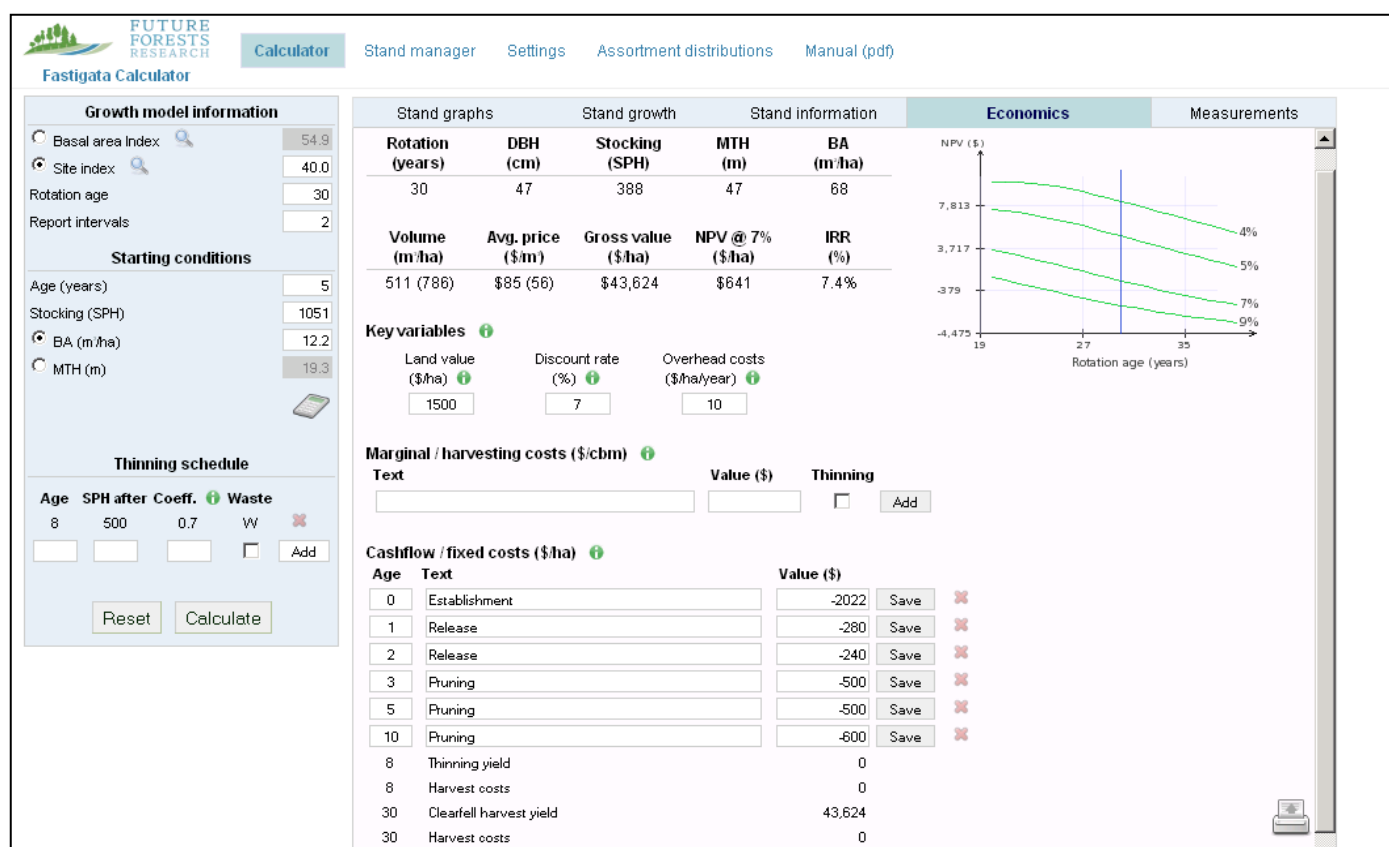


Figure 4: The Economics page of the calculator.



# DIVERSIFIED SPECIES TECHNICAL NOTE

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## The Measurements Page

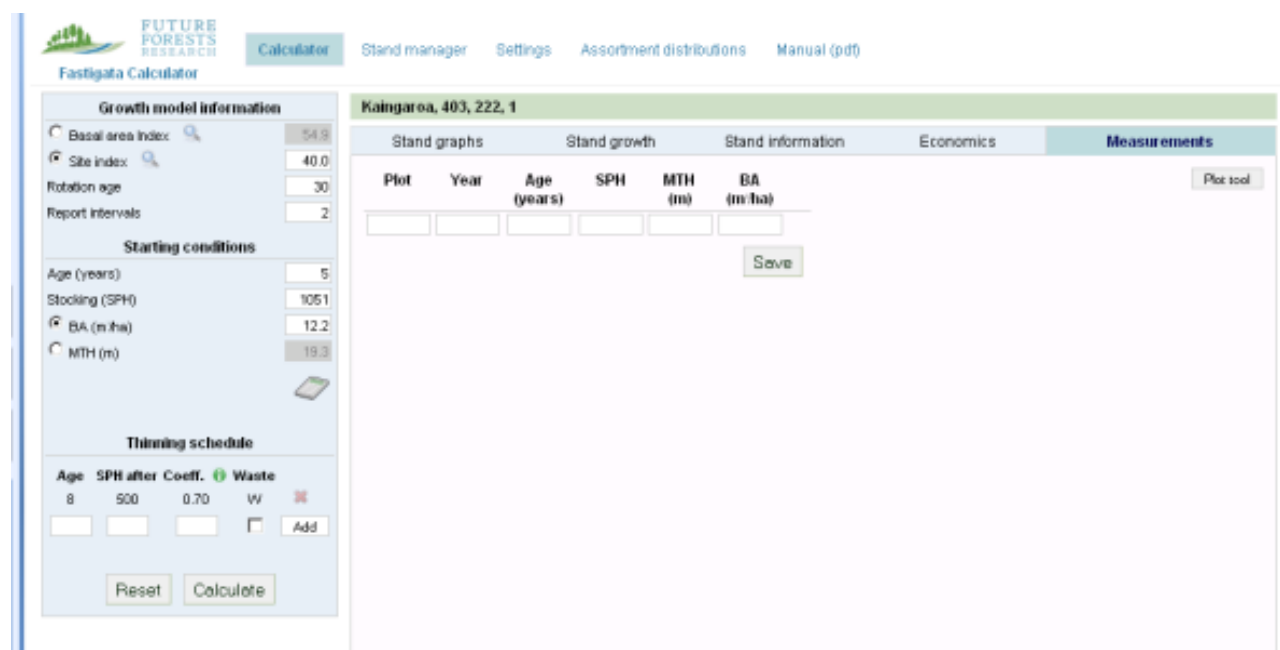
Users can enter data into the Measurements page in order to calibrate the underlying model to the site data (Figure 5).

## Other Features

- Stands that have been saved will appear in the Stand Manager area. This area allows previous data on stands to be recorded, and allows estate-wide management of *E. fastigata*.
- Plot size settings can be set in the “Settings” area. This allows the user to define a default plot area for measurements entered in the “Measurements” tab.
- Log class distributions for different log diameters may be entered in the “Assortment distributions” area. This information is vital for the economic evaluation of growing *E. fastigata*. Distributions can be deleted and added according to the user’s requirements.

## The Manual

Users can access the user manual by clicking on the “Manual (pdf)” heading at the top of the page. The manual contains more detailed instructions on how to use the new *E. fastigata* calculator.

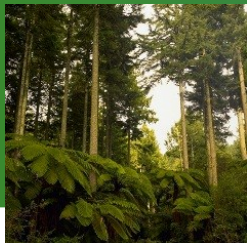


The screenshot shows the 'Fastigata Calculator' web application. The top navigation bar includes 'Calculator', 'Stand manager', 'Settings', 'Assortment distributions', and 'Manual (pdf)'. The left sidebar contains sections for 'Growth model information' (Basal area index, Site index, Rotation age, Report intervals), 'Starting conditions' (Age, Stocking, BA, MTH), and 'Thinning schedule' (Age, SPH after, Coeff., Waste, Add). The main content area is titled 'Kaingaroa, 403, 222, 1' and has tabs for 'Stand graphs', 'Stand growth', 'Stand information', 'Economics', and 'Measurements'. The 'Measurements' tab is active, showing a table with columns: Plot, Year, Age (years), SPH, MTH (m), and BA (m/ha). A 'Plot tool' button is in the top right of the table area, and a 'Save' button is at the bottom right. The table currently contains one row of data.

Figure 5: The Measurements information page of the calculator.

## Recommendations for Future Work

The calculator is based on the best information available to FFR at this time. The underlying model<sup>[1]</sup> will give predictions, and is intended as a decision support tool. Future work to improve the model should include improvements to the mortality functions, and the model is also known to under-predict growth outside the central North Island. Adjustments to the model are important with increased carbon planting opportunities, particularly on the east coast of the North Island.



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## Reference

1. Van der Colff, M., and Kimberley, M. *Modelling Eucalyptus fastigata growth in New Zealand*. In Eucalypt Cooperative Vol 3. 2005 Ensis.