

User's Guide for the
Woodlot Analysis Tool

The Woodlot Analysis Tool (WATS) is a web-based tool¹ that provides semi-specific costs and returns from harvesting a woodlot described by a forest owner. A WATS user pinpoints where her woodlot is located on a digital map, gives a basic description of the woodlot, and then enters representative log grades to be harvested, yields and the log prices. WATS then reports expected gross and net returns and costs associated with the harvesting and cartage of wood from the woodlot to the wood buyers (Figure 1).

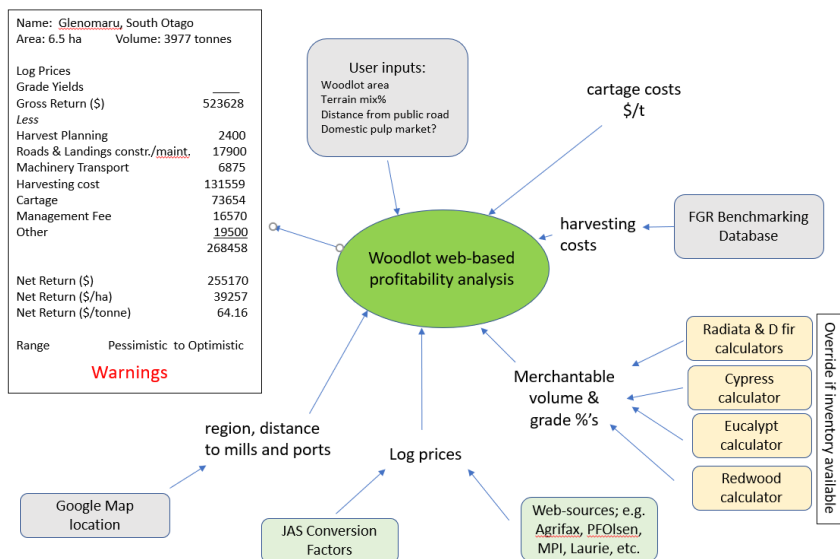


Figure 1: Flow of information into and out of the WATS.

WATS is located at <https://fgr.nz/programmes/calculators/woodlot-analysis-tool/>. It has been designed to run on desktop and mobile platforms, such as tablets and smartphones.

Use of WATS is demonstrated with two fictitious case studies. The locations of both of the woodlots used in the case study are real. No

¹ WATS is compatible with Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari web browsers. It is not compatible with the legacy Internet Explorer browser.

attempt was made, however, to visit either of these woodlots or obtain real tree crop information related to them.

Case Study 1

The woodlot in Case Study 1 is located about 480 m from the end of Tyntesfield Road on flat terrain in the Marlborough region. Google Maps was used to measure the woodlot area (10.56 ha).

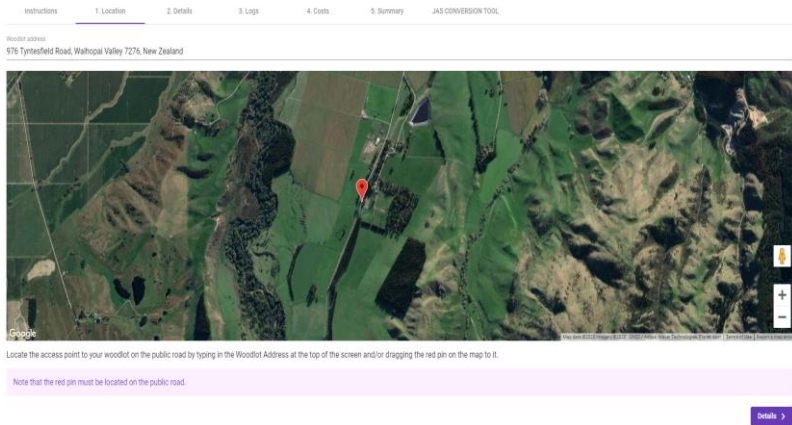


Figure 2: Screenshot from the Location page of the tool showing the Access Point (red pin) from the public road to Case Study 1 woodlot.

When you click on the Woodlot Analysis Tool you are first taken to an Instructions Page which, among other things, advises you to read this Users Guide and suggests information you should have available before you start to use the tool. After having read the Users Guide and the Instructions you next Click the Start button which takes you to the Location Page. The Location Page will have a red pin somewhere on or near a map of New Zealand. You click on Woodlot Address (top left) and enter the address – in this case Tyntesfield Road (select the Tyntesfield, Waihopai Valley, New Zealand address). The red pin moves to an approximate location on Tyntesfield Road. The woodlot you are interested in is located about 2.5 km further to the south on Tyntesfield Road. Zoom in and drag the pin to the access point to the woodlot from the public road (Figure 2). [Note that if you get a message saying the map needs to be updated it is likely to be due to one of three things; (1)

your computer is slow and is having trouble determining the coordinates (be patient and wait for a minute), (2) the red pin is not sitting on the road (go back to the map, zoom in and carefully locate it on the road), or (3) the red pin is on a road but the road is not a public road at that point and so is not included in the Google Maps road network (move the pin to a new location).]

You now select the Details Page by clicking the purple button at the bottom of the Location Page or the Details label at the top of the page.

Enter a name for the woodlot; e.g. Case Study 1 Marlborough.

Select the location zone for the woodlot using the drop-down menu. If you click the Information icon you will see approximate boundaries for the zones (Figure 3). Select NM (Nelson Marlborough).

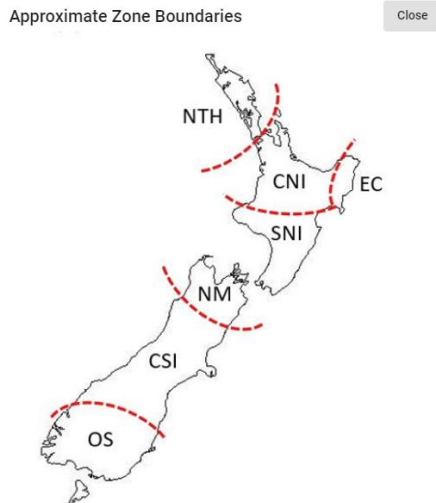


Figure 3: Approximate boundaries for the seven location zones. Some costs differ between zones.

Enter the woodlot area. It is 10.56 ha.

Enter the distance that a truck would travel from the public road to the woodlot edge. Enter 480 m.

Select from the drop-down menu whether the Woodlot Access road is New (YES) or only has to be upgraded (NO). In this case study a new access road across farmland has to be constructed, so select YES.

Describe the terrain mix in terms of fifths using the drop-down menus. For this case study select 4 fifths Flat and 1 fifth Moderate. This data is used to calculate an average slope which is used in the costing model. It is also used to determine the number of metres of roads that need to be built or upgraded and the average roading cost.

Now click the Logs button on the bottom right of the screen. On this page log price data and inventory data is entered. Inventory data preferably comes from pre-harvest inventory measurements. If that is not available, models, regional averages or “eye-ball” estimates can be used. Data for up to 10 log grades can be entered.

In Case Study 1, the Forecaster model is used to predict the volumes by grade that could be expected to be harvested from the woodlot. The Forecaster model is located at:

<https://fgr.nz/programmes/calculators/forecaster-calculator/>

The woodlot is assumed to have been planted at 1000 stems per hectare and to have received two lots of thinning and three pruning lifts in the first 10 years of its history. It would be 30 years old when harvested. Forecaster provided estimates of log yields in standard log grades (see yield table on next page).

Given the proximity of export facilities, you can expect to send logs to a mix of domestic and export markets. To do this you must first convert some of the standard grades to equivalent domestic and export log grades (see grade conversion table on next page). The larger pruned logs (~40%) are allocated to an export pruned grade. The remainder you allocated to a domestic pruned grade. Under most New Zealand conditions it is reasonable to assume a conversion factor of 1:1 from m³ to tonnes.

FORECASTER Standard domestic log grades	Yield (m ³ /ha)
Pruned	133.7
S1	4.0
S2	195.8
S3	77.3
L2	68.4
L3	74.0
Pulp	42.9

FORECASTER Standard Log Grade	“Equivalent” Domestic Grade	“Equivalent” Export Grade*
Pruned	Domestic Pruned	Export Pruned
S1/S2	Structural (S30)	Export A
S3	Structural (S20)	Export K
L1/L2		Export KI
L3		Export KIS
Pulp	Pulp	Export Pulp/KIS

* Domestic and Export grades do not translate exactly to the standard FORECASTER log grades. Differences in log lengths, minimum small end diameters, knot sizes and other features make translating from one log type to another difficult.

Mill door or At Wharf Gate log prices (\$ per tonne) can be obtained from a forest industry website (such as Te Uru Rakau). Note that export log prices (\$ per JAS m³) were converted to \$ per tonne using the JAS Conversion tool shown at the top of WATS. The JAS Conversion Tool provides JAS² conversions for different export grades and zones around New Zealand. If you use the JAS Conversion Tool and then want to move back to the Logs Page just click on Logs at the top of the screen.

² JAS stands for Japanese Agricultural Standard, and is simply a different way of measuring usable log volume.

Log Grade	Yield (t/ha)	Log Price (\$/t)
Export Pruned	54	205
Domestic Pruned	80	198
Export A	200	159
Export K	77	140
Export KI	68	127
Export KIS	74	123
Pulp	43	48

You now enter the inventory data column by column as follows:

Using the drop-down menus select Grades, i.e., Export Pruned, Domestic Pruned (P30), Export A, Export K, Export KI, Export KIS and Pulp.

WATS uses this information and a list of mills/ports to automatically find the distance by road from the woodlot to the closest mill/port, of each market type.

You next enter the expected yields (t/ha) for each grade; 54, 80, 200, 77, 68, 74, and 44.

Finally, on the Logs Page you enter the log prices (\$/t); 205,198, 159, 140, 127, 123 and 48. The gross value per grade for the whole woodlot area is automatically calculated, as is the grand total gross value (\$942,924) and total volume (6294 t).

You next click the Costs button at the bottom of the screen.

Costs are shown for:

- Harvest Planning - includes inventory costs, plan preparation, resource monitoring and notification fees, resource consents, etc.

- Road and Landing Construction and Maintenance – assumes a mix of new roads and upgraded roads. Roading intensity and cost per km are terrain dependent
- Machinery transport – ground-based or cable system dependent.
- Harvesting costs – terrain and zone dependent
- Cartage costs - the distance by road to 88 mills and ports are “known” by WATS.
- Management fee – this is assumed to be 6% of net returns (gross returns minus all costs other than management fees).
- Other costs – includes forest growers’ levy, weighbridge, site rehabilitation, professional advice

You can over-ride any cost – if you have better information - by typing in a new number. The total cost including management fee is updated.

You next click the Summary button on the bottom of the screen.

The Total Gross Returns (\$942,853), Total Costs (\$399,165) and Net Return (excluding GST) is shown for the woodlot (\$543,688). Net Return is also shown on a per ha and per tonne basis. Also provided is an indicative range in Net Return – Pessimistic to Optimistic. Pessimistic assumes log prices may be down by 5% and costs up by 15%. Optimistic is vice versa.

You click the Print button to obtain a printout of the Details, Logs, Costs, and Summary pages (Figure 4). If you have over-riden a cost, an asterisk appears beside that cost. The printout can either be in hardcopy paper format or in digital format saved as a PDF file.

If you want to make changes you can go back to the screen of interest by clicking on the name (e.g. Logs) at the top of the form. You can tweak the parameters and see what effect this has on the net returns.

Clicking on the Reset button clears all the data and takes you back to the opening Google maps screen.

Forest Growers Research Woodlot Analysis Tool

Details

Name	Case Study 1 Marlborough
Zone	NM
Area	10.56
Volume	6,294
Distance to from public road to woodlot edge(m)	480
Fibre Mill within 200km	YES
Woodlot access new	YES

Logs

Grade	Yields	Price	Gross Returns
Export Pruned	54	\$205.00	\$116,899
Domestic Pruned (P30)	80	\$198.00	\$167,270
Export A	200	\$159.00	\$335,808
Export K	77	\$140.00	\$113,837
Export KI	68	\$127.00	\$91,196
Export KIS	74	\$123.00	\$96,117
Pulp	43	\$48.00	\$21,796
Total Gross Returns (exc. GST)			\$942,924

Costs

Harvest Planning	\$8,342
Roads & Landings Construction and Maintenance	\$65,224
Machinery Transport	\$5,750
Harvesting Cost	\$168,961
Cartage	\$108,046
Management Fee	\$34,710
Other	\$8,105
Total Costs (exc GST)	399,138

* Costs with an asterisk have been over-ridden by the user.

Summary

Net Return (exc. GST)	\$543,786
Net Return (exc. GST) per Hectare	\$51,495/ha
Net Return (exc. GST) per Tonne	\$86.40/t
Net Return Range*	\$436,769 to \$650,802 -20% to 20%

Figure 4: Screenshot of the Print Summary related to Case Study 1.

Case Study 2

The woodlot in Case Study 2 is near Raupiu Road to the northeast of Wanganui. Fewer explanations are provided for Case Study 2.

You enter Raupiu Road under Woodlot Address. The location pin moves to the road about a kilometre further down Raupiu Road to the south east of the woodlot. You then move the location pin to a point on the public road where you think the beginning of the woodlot access road might be (Figure 5).

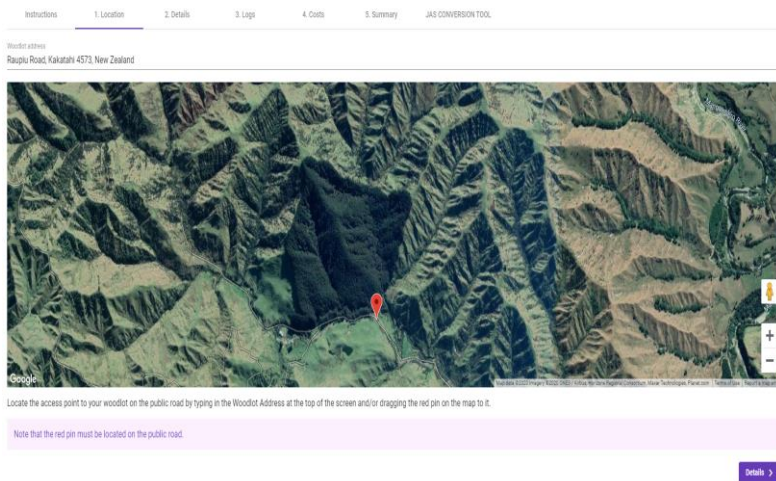


Figure 5: Screenshot of the Location page of the Woodlot Analysis Tool showing the Access Point (red pin) from the public road to the Case Study 2 woodlot.

Click the Details button.

Enter a name for the woodlot – call it Case Study 2 Southern North Island.

Select the location zone for the woodlot using the drop-down menu - SNI

Enter the woodlot area. It is 74.93 ha.

Enter the distance from the public road to the woodlot edge - 50 m.

Select YES for whether the woodlot access road is to be newly constructed.

Describe the terrain mix in terms of fifths using the drop-down menus – it is 1 fifth Steep and 4 fifths Very Steep.

Now click the Logs button.

For case study 2 it is assumed that pre-harvest inventory has been collected for the woodlot. There are only 5 grades – Domestic Pruned (P30), Export A, Export K, Export KI, and Pulp. Select these using the drop-down menus in the Grade column.

Enter the expected yield (t/ha) for each grade. - 150, 214, 121, 58 and 112.

Enter the price (\$/t) for each grade - 169, 133, 121, 111 and 45.

Now click the Costs button.

Costs are shown. You have no better information than shown for costs so leave them unchanged:

Now click the Summary button to see the net returns for the Case Study 2 woodlot.

When you click the Print button and obtain a printout of the Details, Logs, Costs, and Summary pages you should see output similar to Figure 6. The cost data behind the WATS model will be updated regularly so there may be some differences to what is shown.

Forest Growers Research Woodlot Analysis Tool

Details

Name	Case Study 2 Southern North Island
Zone	SNI
Area	74.93
Volume	49,079
Distance to from public road to woodlot edge(m)	50
Fibre Mill within 200km	YES
Woodlot access new	YES

Logs

Grade	Yields	Price	Gross Returns
Domestic Pruned (P30)	150	\$169.00	\$1,899,476
Export A	214	\$133.00	\$2,132,658
Export K	121	\$121.00	\$1,097,050
Export KI	58	\$111.00	\$482,399
Pulp	112	\$45.00	\$377,647
Total Gross Returns (exc. GST)			\$5,989,230

Costs

Harvest Planning	\$16,224
Roads & Landings Construction and Maintenance	\$355,785
Machinery Transport	\$11,500
Harvesting Cost	\$1,908,160
Cartage	\$984,476
Management Fee	\$158,592
Other	\$69,885
Total Costs (exc GST)	3,504,622

* Costs with an asterisk have been over-ridden by the user.

Summary

Net Return (exc. GST)	\$2,484,608
Net Return (exc. GST) per Hectare	\$33,159/ha
Net Return (exc. GST) per Tonne	\$50.62/t
Net Return Range*	\$1,659,453 to \$3,309,763
	-33% to 33%

* Pessimistic assumes log prices may be down by 5% and costs up by 15%. Optimistic is vice versa.

Figure 6: Screenshot of the Print Summary related to Case Study 2.