

Economic modelling of a *C. ovensii* clonal regimes for a range of growth rates

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EXECUTIVE SUMMARY

The outcome from this analysis of a short rotation (20 year) no prune and no thin *C. x ovensii* regime using the FGR Cypress Calculator appears to be profitable based on a range of site productivities, log prices and starting land values. The analysis was carried out using *C. x ovensii* PSP data from a range of sites supplied by Industry.

Table below shows the sensitivity of returns to land price with some combinations in orange where projected IRR falls below 7% and some combinations in yellow where land with a high site index is unlikely to be available at the low per hectare price.

Sensitivity to land price (Rate of return 7% and log price average \$166/cm ³)								
	Site Index 31		Site Index 28		Site Index 26		Site Index 24	
	NPV@7%/ha	IRR(%)	NPV@7%/ha	IRR(%)	NPV@7%/ha	IRR(%)	NPV@7%/ha	IRR(%)
\$3000/ha	10492	12.1	7802	10.5	4655	9.8	4213	9.8
\$4000/ha	9699	11.3	7008	10.5	3862	9	3419	9
\$5000/ha	8905	10.5	6215	9.8	3068	8.2	2626	8.2
\$6000/ha	8112	9.8	5421	9	2275	8.2	1832	8.2
\$7000/ha	7318	9.8	4628	9	1481	7.4	1039	7.4
\$8000/ha	6525	9	3834	8.4	688	7.4	245	7.4
\$9000/ha	5731	9	3041	8.2	-106	6.6	-548	6.6
\$10000/ha	4938	8.2	2247	7.4	-899	6.6	-1342	6.6

INTRODUCTION

Traditional cypress regimes involve pruning and thinning and rotation ages are often 30 to 40 years, making return on investment at harvest variable. Recently the SWP programme conducted a sawing/recovery study using 20-year-old un-tended *C. x ovensii* and a *C. lusitanica* clone GH5 from Rotoehu forest. To complement the sawing study, this evaluation looks at the economics of growing a 20-year untended *C. x ovensii* regime over a range of sites by modelling exist PSP data to predict volumes at age 20 and returns to the grower for a range of scenarios.

METHODS

A request was made to owners of *C. x ovensii* permanent sample plots identified via the Scion database for data for use in this project. 35 plots were supplied, of which 17 plots were identified as suitable, having initial stockings of around 1000spha and data collected before any thinning or pruning had taken place. Twelve plots were from the CNI region and five from Northland. Site index predictions for the plots ranged from 23 to 33.

Measurements for each plot were loaded into the FGR Cypress Calculator software which can be found here; <http://fgr.nz/cypresscalc/index.php> (Hansen 2010). The Cypress Calculator has options for modelling *C. lusitanica* and *C. macrocarpa*. At one of the CNI sites, additional *C. lusitanica* plots were made available which, at the same age, were 10cm taller than the *C. x ovensii*. For the purpose of this evaluation, the *C. lusitanica* model was used. Figure 1 below shows a screen shot of the Cypress Calculator showing the input fields and output information.

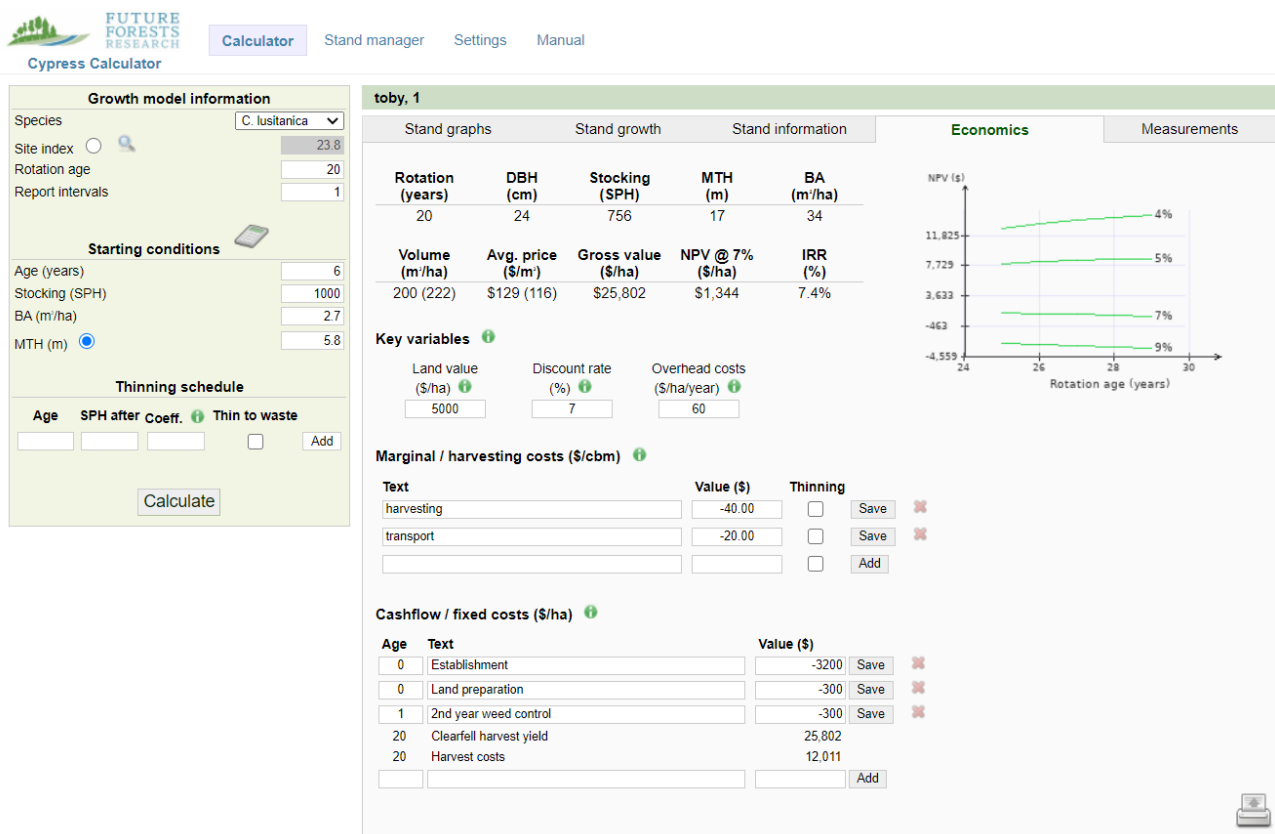


Figure 1: Cypress Calculator example.

All plots supplied had their starting values added to the calculator, and then grown to age 20. Predictions of standing volume were made and predicted stumpage values were calculated.

Starting assumptions were as follows:

Weed control (year 1)	\$300/ha
Cost of plants and planting	\$3200/ha
Weed control (year 2)	\$300/ha
Annual overhead costs	\$60/ha per annum
Land value	\$5,000/ha
Discount rate	7%

Harvest cost	\$40/t
Transport	\$20/t

Log Recovery Mix;

10% Waste

20% Firewood

30% Small branch SED 20cm

40% Small branch SED 30cm

The Cypress Calculator was also used to look at sensitivity of returns to different land values. Current land values for forestry can range from \$3-5,000/ha for cutover and \$6-10,000/ha for new land.

RESULTS

Variations in predicted volume for a given site index were found to be generally driven by stems per hectare at time of PSP establishment, which ranged from 799 to 1050 (Figure 2).

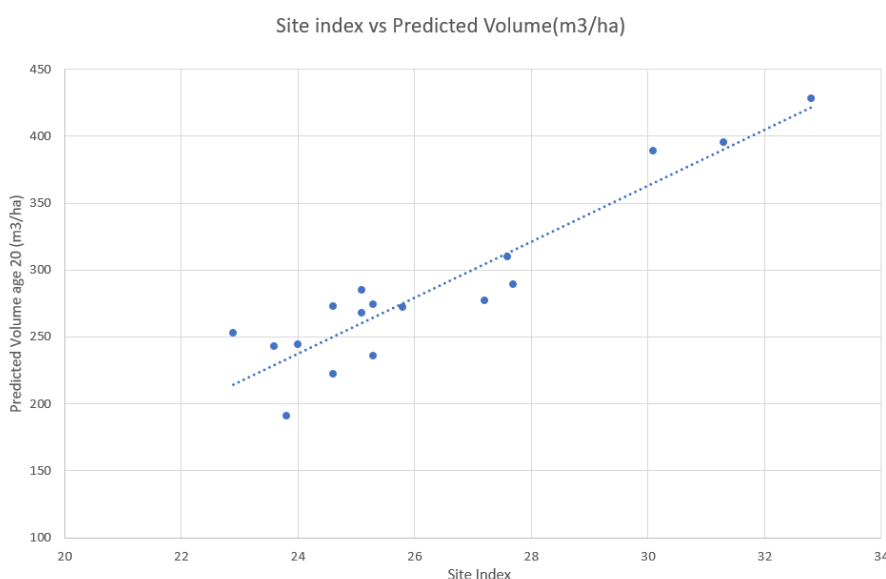


Figure 2: Site index and predicted Volume at age 20 for supplied *C. x ovensii* plots.

Four representative plots were identified based around site index 24, 26, 28 and 31 with predicted average total standing volumes (TSVs) of 244, 272, 310 and 395m³ respectively.

Using the above starting assumptions, stumpage was calculated for a range of log prices (Mill door), shown in Table 1. Most recent published prices (Laurie Forestry August 2020) are highlighted.

Site Index	Predicted Volume(m3/ha)	Price/m3 for SED30/SED20/Firewood/(Average price)			
		130/112/50(96)	145/125/50(106)	160/140/50(116)	175/155/50(127)
24	244	\$23,424	\$25,864	\$28,304	\$30,988
26	272	\$26,112	\$28,832	\$31,552	\$34,544
28	310	\$29,760	\$32,860	\$35,960	\$39,370
31	395	\$37,920	\$41,870	\$45,820	\$50,165

Table 1: Net \$ per hectare for a range of site indexes and a range of log price scenarios (Land value \$5,000/ha - Discount rate 7%).

Sensitivity to Land Price

If the price of the land the trees are grown on is factored in to the equation, as expected returns generally decreased as land value increased. Table 2 below shows some combinations in orange where projected IRR falls below 7% and some combinations in yellow where land with a high site index is unlikely to be available at the low per hectare price.

Sensitivity to land price(Rate of return 7% and log price average \$166/cm ³)								
	Site Index 31		Site Index 28		Site Index 26		Site Index 24	
	NPV@7%/ha	IRR(%)	NPV@7%/ha	IRR(%)	NPV@7%/ha	IRR(%)	NPV@7%/ha	IRR(%)
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Table 2: Sensitivity to land price (rate of return 7% and log price average \$166/cm³).

CONCLUSION

Over a range of site quality and log price scenarios tested in this evaluation, a 20 year no prune and no thin regime using *C. x ovensii* appears to be profitable. One cautionary note is that the evaluation was carried out using a *C. lusitanica* growth model, which may not accurately represent the performance of *C. x ovensii*.

ACKNOWLEDGEMENTS

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