Agriculture WESTERN AUSTRALIA

Farm Forestry Advisory Service

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

TreeNote

No. 28
August 1999

Growing Tasmanian blue gum for pulpwood — the profit potential

in the greater than 600 mm rainfall zone

This TreeNote outlines the costs, returns and profitability of growing Tasmanian blue gum (*Eucalyptus globulus*) to produce short-rotation pulplogs.

Types of costs

The largest cost (apart from land) is crop establishment which includes site assessment, ground preparation, planting, weed control, fertilising, pest control, and fencing if needed. To maximise profitability it is important to minimise these early costs but not at the expense of good establishment and growth.

Later costs include growth monitoring, fertilising, weed control, pest and disease control, fire prevention, insurance and fence maintenance. In Western Australia pest and disease control has not been a major expense to date but it could increase in future as pests and diseases adapt to the wider availability of blue gums. Pruning is not normally needed for pulplogs grown in large blocks. However, edge trees and trees grown in widely spaced rows tend to develop heavy side branches and may need pruning to be suitable for mechanical harvesting.

For later rotations, coppice thinning (or replanting) and fertiliser are the main costs.

Actual costs

Costs per hectare depend on the scale of operation (higher for smaller plantations), as well as site factors such as soil type, soil fertility, slope, and the incidence of pests and weeds.

For a 20 ha plantation, contractors charge about $1200 per hectare for full establishment (from ground preparation to planting), and usually guarantee a specified survival rate. Growing costs during the first rotation add a further $700 per hectare. For each subsequent rotation, total costs are about $1200 per hectare.

A range of typical costs for each step is shown in Table 1. These costs are for a pulplog crop harvested at year 10, then grown for a further 10 years from coppice. The 'example' column in Table 1 shows one possible combination of contract rates and farmer costs.

Farmers can make tree establishment more affordable by:

- using farm machinery and labour for some or all of the jobs
- minimising the amount of extra fencing needed, and using electric fencing where possible
- spreading planting over several years

A landowner who is unable or unwilling to finance tree growing independently can arrange a joint venture with a plantation company in exchange for a share of the final crop or an annuity.

Table 1. Costs to establish and grow blue gums

Year	Type of cost	Range ($/ha)	Example ($/ha)
	Establishment costs		
Year 0	Soil assessment	20 - 50	35
	Plan, prepare and supervise	80 - 250	160
	Rabbit control	0 - 20	10
	Fencing	0 - 80	40
	Ripping and mounding	60 - 200	150
	Pre-plant spray(s)	70 - 150	100
	Seedlings	230 - 370	270
	Planting	80 - 100	80
	Fertiliser	50 - 70	50
	Fertiliser application	30 - 70	60
	Insect surveillance	0 - 20	10
	Insecticide and spray	0 - 30	20
	Over-spraying weeds (say 40%)	0 - 40	20
	Firebreaks	10 - 20	10
	Insurance	0 - 50	25
	Overheads (inc. supervision)	0 - 100	0
	sub-total	$630 - 1620	$1040
	Growing costs – first crop		
Year 1	Weed control	100 - 150	100
Year 1	Insect surveillance	0 - 20	10
Year 2	Fertiliser	70 - 200	200
	Growing costs – second crop		
Year 11	Thin coppice	300 - 700	500
Year 13	Fertiliser	70 - 200	200
Year 15	Fertiliser	70 - 200	200
	Annual costs		
Years 1 - 20	Firebreaks	10 - 20	10
	Insurance	0 - 50	25
	Overheads	0 - 100	0

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Harvesting and transport costs

The cost of harvesting and log extraction is about $15 per tonne, including supervision at $2 per tonne. The cost of road transport varies with distance (10 to 12 cents per km) plus $2 per tonne for loading. Efficient, specialist harvesting contractors are available but farmers may harvest their own trees if they wish.

Harvest costs are higher for thinning operations and for trees that are small, poorly formed, or very close together (for example, unthinned coppice). Costs are also higher for small stands, or if access with conventional equipment is difficult, such as on steep slopes. Extra internal roading may be needed for large plantations.

Returns

Some growers arrange their own harvesting and transport and sell their logs at the mill (for a 'mill-door' price). However, about 90 per cent of blue gum logs are sold on the farm (for a 'stumpage' price), with harvesting and transport to a mill organised and paid for by the buyer.

At present (1999), the only chip mill regularly processing blue gum logs is Diamond Mill near Manjimup, operated by Bunnings Pulpwood Operations. In August 1999, the mill-door price for debarked pulplogs is $43 per green tonne (price subject to change). Logs delivered with the bark on receive less, to allow for the 13 per cent of total weight made up by the bark, and to cover the cost of debarking.

Stumpage (the price paid for timber standing in the paddock) varies with distance from the mill and is calculated by deducting the costs of harvest, supervision and haulage -from the mill-door price.

New chip mills near Albany and Bunbury are expected to be operational by 2001 and the chip mill at Greenbushes may process blue gum pulplogs as well. Growers in the South West could have access to two or more mills and be able to choose the best combination of mill-door price and haul distance to maximise their stumpage.

Budget for a tree block - single rotation

Table 2 contains a simple budget for a single rotation of pulplogs grown in a 1 ha block. Costs are taken from the range shown in Table 1. Returns are based on a harvest volume of 200 tonnes of pulplogs per hectare after 10 years and a stumpage (price to the grower net of harvesting and transport costs) of $25 per tonne. The 'present value' of net return is found by discounting all amounts by 6% per annum - the average rate for 10-year Government bonds from 1997 to 1999. Benefits to surrounding farmland are not included.

Usually, blue gums grown for pulplogs would be allowed to coppice or be replanted for a second rotation. A coppice rotation produces another crop at lower cost than the first, raising profit.

Table 2. Budget for 1 ha of blue gum plantation (single rotation)

Year	Expenses A	Revenue B	Net return C = B-A	Present value of net return $D = C_{pv}$
0	$1,200		-$1,200	-$1,200
1	240		-240	-226
2	140		-140	-125
3	40		-40	-34
4	40		-40	-32
5	40		-40	-30
6	40		-40	-28
7	40		-40	-27
8	40		-40	-25
9	40		-40	-24
10	40	5,000	4,960	2,770
Profit (net present value)				$1,020 per ha
Annual equivalent				$129/ha/year

Budget for a timber belt over 2 rotations

Table 3 contains an example showing the profitability of a blue gum timber belt that is designed to give shelter and use excess water as well as produce timber. For comparison, returns from grazing are also included. After two harvests the blue gum belts give net returns 72 per cent higher than grazing alone (per hectare planted, but including an estimate of the net benefits to adjoining farmland).

The size of secondary effects on surrounding farmland depends on timber belt design, and local hydrology and climate. Shading and root competition (negative), and shelter (positive) all increase with tree size. Benefits from water control are likely to keep increasing beyond the second tree harvest.

Table 3. Budget for 20 ha of blue gums in timber belts, compared with grazing

Year	Tree costs A	Log sales B	Secondary effects C	Net return E= B+C-A	Present value of tree crop $F = E_{pv}$	Present value of grazing $100/ha/yr
0	$24,000		0	-$24,000	-$24,000	
1	4,800		334	-4,466	-4,213	1,887
2	2,800		400	-2,400	-2,136	1,780
3	800		-182	-982	-825	1,679
4	800		-562	-1,362	-1,079	1,584
5	800		-1,072	-1,872	-1,399	1,495
6	800		-978	-1,778	-1,253	1,410
7	800		-842	-1,642	-1,092	1,330
8	800		-658	-1,458	-915	1,255
9	800		-430	-1,230	-728	1,184
10	800	100,000	-180	99,020	55,292	1,117
11	13,000		1,788	-11,212	-5,906	1,054
12	800		1,564	764	380	994
13	2,800		1,018	-1,782	-835	938
14	800		1,138	338	149	885
15	2,800		648	-2,152	-898	835
16	800		702	-98	-39	787
17	800		736	-64	-24	743
18	800	80,000	758	79,958	28,013	701
Profit (net present value)					$38,492	$21,655
Annual equivalent					$172/ha/yr	$100/ha/yr
Tree benefit					72% gain	

Assumptions are the same as in Table 2 – wood production is 20 tonnes per hectare per year, stumpage is $25 per tonne, discount rate is 6% per annum. Grazing is assumed to return $100 per hectare per year.

Profit range

Profit from blue gum pulplogs is very sensitive to changes in stumpage and tree growth rate, as shown in Table 4. These profit projections are based on the two rotation timber belt described above, over a range of different growth rates and stumpages. The assumptions used in Table 3 are shown in bold type.

Table 4. Effect of stumpage price and timber yield on timber belt profits ($/ha/yr)

		Stumpage ($/tonne)				
		15	20	**25**	30	35
Annual growth rate (t/ha)	10	-91	-53	-15	22	60
	20	22	97	172	248	323
	30	135	248	360	473	586
	40	248	398	548	699	849

On high quality sites close to the market, annual returns from blue gums far exceed normal grazing returns. For example, land capable of producing 40 tonnes of pulpwood per hectare per year can return over $500 per hectare, assuming a stumpage of $25 per tonne. On land with low growth rates and in areas long distances from the market, returns from pulplogs are unlikely to exceed grazing returns. On these sites, pines or eucalypts grown for high-grade sawlogs are likely to be a better farm forestry option.

Relationship between stumpage and export price

Lancefield Consultants showed how stumpage could be derived from the export price per bone dry unit (BDU), by subtracting the costs of each step in the process. In Table 5, stumpage is calculated by this method from two samples 'free-on-board' (f.o.b.) woodchip prices (that is, the price for woodchips loaded into a ship). All values are in $A. All timber volumes are 'solid under bark' (s.u.b.). The examples assume logs are transported 100 km to a chip mill and chips are hauled 40 km to a port.

Points to note:

- To compare prices it is important to know the basis of each price (that is, moisture content, location, and stage of processing).
- A change in export price causes a larger percentage change in stumpage because many of the costs are fixed per unit volume or unit weight.
- Some costs may be reduced for growers who market through a cooperative.
- As processing in Western Australia becomes more efficient and competitive, growers may be able to secure higher stumpages than currently available.

Table 5. Calculation of potential stumpage for blue gum pulplogs

Woodchip prices – f.o.b at southern WA port			**High**	**Low**
Price per Bone Dry Unit (BDU)			**$173.00**	**$145.00**
Conversion from BDU to BDMT (1 BDU = 1.08864 BDMT)		0.9186		
Price per Bone Dry Metric Tonne (BDMT)			$158.91	$133.19
Basic density of globulus woodchips (BDMT/m³)		0.525		
Price per green cubic metre			$83.43	$69.93
Wood losses – 3% at chipper, plus 2% at port		-5%		
Price per green cubic metre (before wood losses)			$79.26	$66.43
Less harvesting, handling and processing (per m³ at the stump):-				
Loading at port ($5.00 per tonne)	0.874 t/m³	$4.37		
Chip transport ($4.40 per tonne, 40 km haul)	0.923 t/m³	$4.06		
Chip production ($10.00 per tonne)	0.923 t/m³	$9.23		
Log transport ($13.00 per tonne, 100 km haul)	1.060 t/m³	$13.78		
Log harvest and extraction ($15.00 per tonne)	1.060 t/m³	$15.90		
Gross residual stumpage $/m³			$31.92	$19.09
Less contractual costs:-				
Discount to contracted forward buyer		-7.5%		
Price paid by contracted buyer (per m³)			$29.53	$17.66
Coordination of harvesting and marketing		-10%		
Theoretical stumpage available to grower (per m³)			$26.57	$15.89
Theoretical stumpage available to grower (per tonne)		x 1.060	**$28.17**	**$16.85**

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Further information

- Agroforestry News - a national newsletter for farm foresters, distributed from Agriculture Western Australia Bunbury.
- Farm Budget Guide - information on joint venture options.
- Contact Peter Eckersley, Agriculture Western Australia, Bunbury, Ph. (08) 9780 6204.

Acknowledgments

This TreeNote draws on information generated by Lancefield Consultants, Department of Conservation and Land Management, Bunnings Treefarms, David Jenkins, and other industry sources, but the conclusions are reached independently by the writer.

Supported by:

AGRICULTURE, FISHERIES AND FORESTRY - AUSTRALIA

ISSN 1329–3273 Print Post Approved 606811/00013

8/99TN28DT-2500