University of South Australia
Centre for Markets, Values and Inclusion

APPENDIX 1

Unlocking opportunities for plantation forestry expansion in the Green Triangle.

The role of the Emissions Reduction Fund 2022

Methods and Caveats

Methods

FullCAM modelling

Carbon modelling was undertaken in the 2020 public release version of the Full Carbon Accounting Model (FullCAM). Figure 1 shows the extent of the modelling. The red area indicates the extent of the areas modelled in FullCAM for both *E. globulus and P. radiata.*

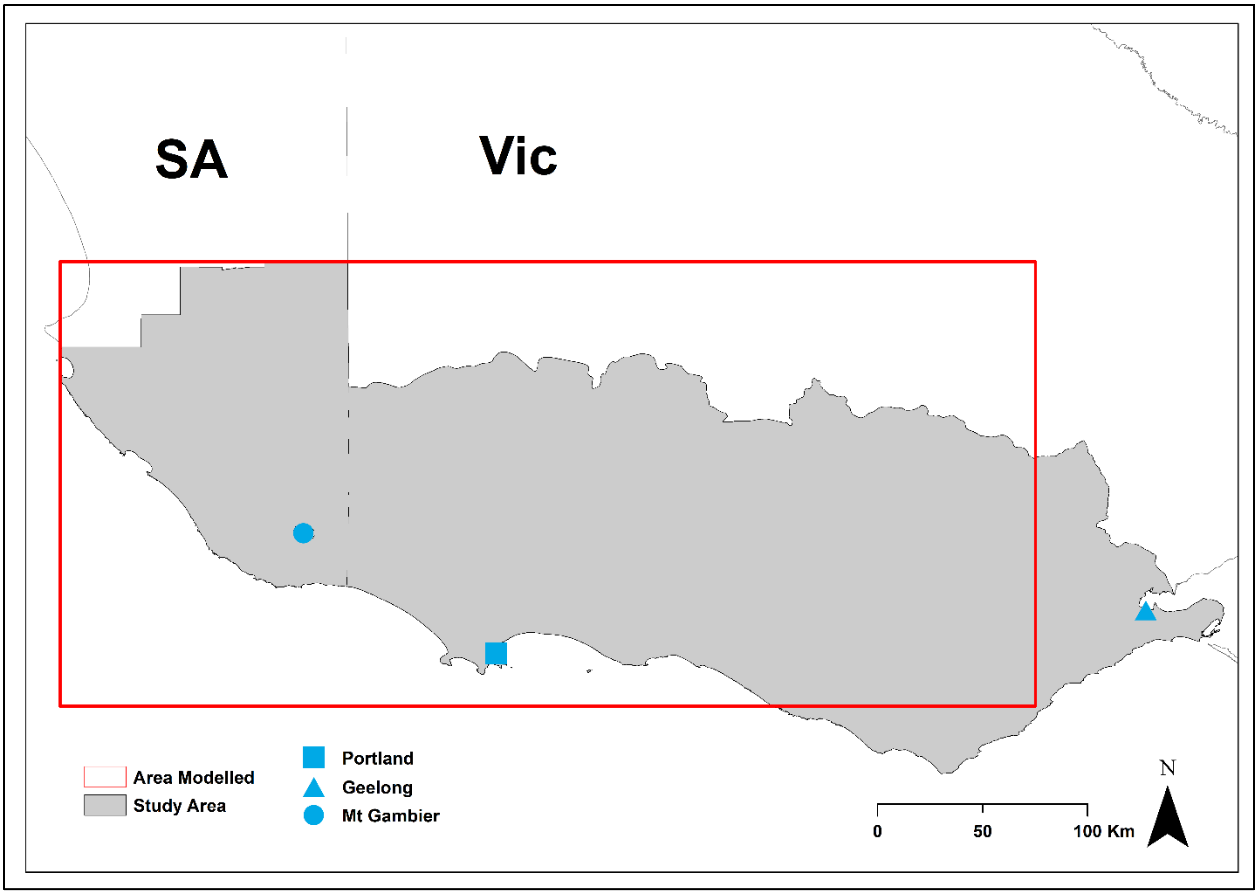


Figure 1: Greater Green Triangle study area and extent of FullCAM modelling.

The FullCAM modelling was undertaken following the FullCAM guidelines for plantation forestry methods (CER, 2022b). FullCAM requires a *project scenario* to be set up to enable the simulation of carbon estimates. CER (2022b) provides a detailed explanation of the process, however in short:

FullCAM runs simulations based on a *plot*. A plot is defined as a piece of land for which the event history, when modelled in FullCAM is the same across that area of land. Separate plot files are created for each *carbon estimation area (CEA).* A CEA is defined as an area of land within a project area on which the eligible project activity is established and modelled for the purpose of calculating carbon. CEAs may be many times smaller than a project area (e.g. a number of hectares within a larger farm (CER, 2022a)). FullCAM calculates abatement using a single ‘model point’ location. The modeller does not need to define CEA boundaries within FullCAM but rather input the coordinates for a single location within the CEA boundaries that is at the approximate centre of the CEA. A raster layer for the modelling area (red square Figure 1) with a spatial resolution of 500m x 500m was created. The centroid of each raster cell was calculated, and the spatial coordinates of each centroid were used as a location within FullCAM.

Plot files for each coordinate were created and simulations for each CEA undertaken using plot files. The plot files outline the details of the simulation including variables such as all the dates applicable, tree growth parameters, silvicultural practices implemented, and the harvested products being taken out of the forest.

A number of management activities such as fertiliser application, weed control and fire can be modelled in FullCAM as *Events*. Production based events such as fertiliser application and weed control ca be included in modeling, however they have the effect of advancing tree growth in the simulation. As such the inclusion of such events can positively bias the results of the simulation towards higher carbon accumulation. The FullCAM guidelines are explicit regarding the addition of such management activities to simulations. The wording for the use of fertiliser events suggests it only be included where evidence can be provided the fertiliser application has demosntrabably advanced tree growth. For example (CER, 2022b):

The fertilisation event has the effect of advancing the tree growth modelled by half a year. As such this event must only be modelled where the actual fertilisation undertaken results in boosting the growth of the trees by a similar amount over the rotation. Users are permitted to model one fertilisation event per rotation at most, where supported by evidence.

Given the the lack of empirical evidence from across the entire study area that supports the use of fertiliser and weed control (and general predilection towards conservative estimates), we did not include such events in the FullCAM modelling undertaken for this work. The FullCAM events modelled are presented in Table 1.

Another important variable in the FullCAM modelling, particularly for softwoods, is the percentage of the plantation affected by intermediate harvesting events like thinning. The initial FullCAM modelling undertaken used FullCAM default settings. These settings produced timber flows that did not match empirical yields for the region, especially for thinning 1 and thinning 2. The results were that the economic valuations of the estate were extremely low. Softwood forestry experts (O’Hehir, J., pers. Comms 2022) and empirical yield data for the region (Lewis et al., 1976) were consulted and the percentage of forest affected by each harvesting operation was amended (Table 1)

The initial extent of the study area for this work was the Green Triangle National Plantation Inventory region (NPI). One industry member requested that the central Victorian NPI be included in modelling. One of the difficulties in doing this is the FullCAM guidelines on how to model *P. radiata* in both of those NPIs differ. For example, in central Victoria *P. radiata* must be modelled with two thinning events and a clearfall harvest, whereas in the Green Triangle NPI, *P. radiata* is modelled with three thinning and a clearfall operation as outlined in Table 1. In addition, the harvested products for each harvesting operation differed slightly between the two NPIs.

Modelling the central Victorian NPI separately for *P. radiata* would have added significantly to the computation time for the project. To expedite the progress of the work we extended the Green Triangle FullCAM setting for *P. radiata* to the central Victorian NPI. The effect of doing this on the overall results was tested by running sample FullCAM simulations using the setting as prescribed for the central Victorian NPI and comparing those results to those presented in this report. The result of the comparison showed approximately 4 per cent difference in long-term carbon storage between the Green Triangle FullCAM setting and the central Victorian FullCAM setting. This is not enough of a difference to materially change the results of the analysis for *P. radiata* for central Victoria, however, caution should be taken with results for the central Victorian NPI as they are not strictly compliant with FullCAM guidelines. The same issue did not exist for *E. globulus.*

Table 1: Outline of FullCAM simulation settings used for this study

Species	Activity	FullCAM Action or Event	FullCAM Standard Event	FullCAM Parameters & destination percentages
E. globulus	Planting	Planting	Plant trees: seedlings, normal stocking	Defaults
Year 15	Harvest	Clearfelling with harvest	Initial clearing: product recovery	Deadwood 10% Paper and Pulp 90%. Percentage of forest affected 100%
	Slash Burning	Windrow and burn between rotations	Site prep: windrow and burn	Defaults
P. radiata	Planting	Planting	Plant trees: seedlings, normal stocking	Defaults
Year 13	First Thinning	Thin with harvest	Initial clearing: product recovery	Deadwood 15%, Paper and Pulp 73%, Fibreboard 11.4%, Mill residue 0.6%. Percentage of forest affected 46%
Year 20	Second Thinning	Thin with harvest	Initial clearing: product recovery	Deadwood 15%, Paper and Pulp 64.8%, Fibreboard 9.6%, Construction 7.1%, Mill residue 3.5%. Percentage of forest affected 31.2%
Year 27	Third Thinning	Thin with harvest	Initial clearing: product recovery	Deadwood 15%, Paper and Pulp 48.5%, Fibreboard 5.9%, Construction 21%, Mill residue 9.6%. Percentage of forest affected 25.2%
Year 32	Clearfall	Clearfelling with harvest	Initial clearing: product recovery	Deadwood 10%, Paper and Pulp 41.6%, Fibreboard 4.1%, Construction 30.6%, Mill residue 13.7%. Percentage of forest affected 100%
	Burning	Windrow and burn between rotations	Site prep: windrow and burn	Defaults

Economic parameters

The costs associated with the production of *E. globulus* and *P. radiata* were obtained through industry consultation. They represent an approximation of the costs of establishing and maintaining a plantation in the region and do not claim to represent the specific costs associated with developing and maintaining plantation forestry in any specific location. Specific establishment activities have been merged under the broad heading (i.e., *site preparation*) to protect commercially sensitive data that exists if this figure is disaggregated.

Table 2 shows assumed costs for establishing a hardwood plantation in the region. The total costs for *E. globulus* were approximately $2,890/ha which is in line with estimates from several industry sources.

Table 2: Costs associated with *E. globulus* production

Cost	**Value**
chip price ($/t)	120
transport cost ($/t/km)	0.16
Site preparation ($/ha)	1000
Planting costs ($/ha)	400
Establishment fertiliser ($/ha)	770[1]
2nd Year fertiliser ($/ha)	300
6th Year fertiliser ($/ha)	300
Annual Maintenance ($/ha)	100
Other Contractor costs ($/ha)	20
Harvesting costs ($/t)	35
Conversion factor (M^3 to GMT)	1.05

The costs associated with *P. radiata* again were taken from several industry sources and are presented in Table 3. The cost of establishing and maintaining a *P. radiata* plantation were approximately $2,300/ha.

[1] This figure includes weed and insect control.

Table 3: Costs associated with *P. radiata* production

Cost	Value
transport cost ($/m^3/km)	0.12
Site preparation ($/ha)	800[2]
Planting costs ($/ha)	400
Establishment fertiliser ($/ha)	250
2nd Year fertiliser ($/ha)	300
2nd Year weed control ($/ha)	150
Post thinning fertiliser ($/ha)	200
Annual maintenance ($/ha)	50
Annual weed control ($/ha)	115
Blanking ($/ha)	35
Other contractor costs ($/ha)	20

Softwood harvest parameters

Softwood harvests operations consisted of three thinning operations (T1-T3) and a final clearfell operation (CF). The proportions of log classes and log sizes vary between harvesting operations. Data from Forestry SA were used to assign the proportion of each log size to each harvest operation. Forestry SA data separates harvested products into 10 sizes based on volume ranging from 1 being the smallest logs harvested and 10 being the largest. The 10 log sizes presented in the Forestry SA data were merged into 4 main log sizes, namely *small, intermediate, medium and large* for manageability and to align to the log size categories in the Australian Log Price Index (KPMG, 2020). Forestry SA log sizes 1-3 became small, 4-6 intermediate, 7-8 medium and 9-10 large based on advice from industry foresters (O'Hehir, J., pers. Comms 2022).

Table 4 shows the proportion of each log class assumed for each of the harvest operations.

Table 4: Log size proportions for each *P. radiata* harvest activity.

	Log sizes			
	Small	**Intermediate**	**Medium**	**Large**
T1	1	0	0	0
T2	0.56	0.39	0.05	0
T3	0.17	0.56	0.26	0
CF	0.06	0.17	0.61	0.17

[2] This includes Mounding and drainage, burning, raking, and weed control.

The softwood harvests were further categorized by the likely log class distribution for each harvest operation. This data was obtained from Forestry SA data. The log classes include *sawlogs (SAW), recovery logs (REC), pulp logs (PLP), preservation logs (PRS)* and *chip logs (CHP).* Table 5 shows the proportions of each log assumed for each log size in each harvest operation. These proportions were used only in the economic analysis for this report and should not be confused with the *destination percentages* outlined in Table 1.

To calculate salable timber volumes, $STV,$ for each harvest operation ho, the following was applied to each harvest volume, HV.

$$STV_{ho} = HV_{ho} \times PLS_{ho} \times PLC_{ho,pls} \tag{1}$$

Where PLS_{ho} is the proportion of each log size in each harvest operation and $PLC_{ho,pls}$ is the proportion of each log class in each log size for each of the harvest operations (T1-CF).

Table 5: The proportion of log classes, by log size for each harvest operation (T1-CF)

	Log class				
	SAW	**REC**	**PLP**	**PRS**	**CHP**
T1 Small	0	0	0.72	0.28	0
T1 Inter	0	0	0	0	0
T1 Med	0	0	0	0	0
T1 Large	0	0	0	0	0
T2 Small	0.22	0.04	0.43	0.32	0
T2 Inter	0.54	0.06	0.34	0.06	0
T2 Med	0	0	0	0	0
T2 Large	0	0	0	0	0
T3 Small	0.25	0.01	0.67	0	0.07
T3 Inter	0.66	0.05	0.24	0	0.04
T3 Med	0.97	0.03	0	0	0
T3 Large	0	0	0	0	0
CF Small	0.25	0.01	0.67	0	0.07
CF Inter	0.66	0.05	0.24	0	0.04
CF Med	0.97	0.03	0	0	0
CF Large	0	0	0	0	0

The data above represents a simplification of real-world harvested products likely taken from softwood plantations in the region. Proportions of log classes and sizes are likely to vary spatial according to site quality. However, due to the spatial extent of the study, incorporating that variability was not seen as feasible as such data sets do not exist and the data presented was seen as a viable generalization.

Harvest costs were also taken from Forestry SA data. As seen in Table 6 harvest costs varied by log class.

Table 6: Harvest costs ($\$/m^3$) for each log class in each harvest operation (T1-CF)

Harvest costs ($\$/m^3$)					
	SAW	**REC**	**PLP**	**PRS**	**CHP**
T1	0	0	20.66	29.68	0
T2	12.65	12.85	11.77	25.3	12.98
T3	9.67	8.51	8.47	0	12.88
CF	8.43	8.06	9.08	0	12.35

Prices for each log class and size (Table 7) were estimated from the Australian Log Price Index (KPMG, 2020). The index represents aggregated information from contributing growers. The price presented in Table 7 is the weighted average price from June 2020.

Table 7: The assumed log prices for *P. radiata* taken from the Australian pine Log Price Index.

Log prices ($\$/M^3$)				
	Small	**Intermediate**	**Medium**	**Large**
SAW	34.7	55.78	79.6	84.87
REC	26.66	26.66	26.66	26.66
PLP	22.56	22.56	22.56	22.56
PRS	35.46	35.46	35.46	35.46
CHP	25	25	25	25

Land Expectation Value

The land expectation value (LEV) is the present value of the costs and revenues resulting from a perpetual sequence of forestry rotations, starting initially from bare land. The LEV is standard forest industry practice for valuing bare land in timber production, evaluating the value of various forest management alternatives and determining the optimal rotation age (Faustmann, 1995). In this study, the LEV is used to value land in perpetual hardwood and softwood rotations.

The first step in determining the LEV is calculating the present value of the first rotation PV_{R1}. PV_{R1} was calculated for all rotation lengths $r = 15$ for hardwood plantations and r = 32 for softwood.

$$PVR1_{h,s} = -Est + \sum_{t=1}^{r-1} \frac{I_t}{(1+i)^t} + \frac{A[(1+r)^r - 1}{i\,(1+i)^r} + \frac{\sum_{p=1}^{n} P_p\, Y_{p,r} - C_h}{(1+i)^r} \tag{2}$$

Where Est are the establishment costs, I_t are intermediate cost or revenue (i.e. thinning revenues), A the net cost or revenue from all annual costs and benefits (I.e. maintenance cost), P_p is the price of product p, $Y_{p,r}$ is the expected yield of product p for rotation length r and $C_h$is the cost associated with harvest (i.e. harvesting and transport). These costs are outlined above.

The next step is to convert the present value of the first rotation into a future value:

$$FVR1_{h,s} = PVR1_{h,s} \times (1+i)^r \tag{3}$$

Finally, the LEV of hardwood h, and softwood s , was calculated by applying the infinite periodic payment formula.

$$LEV_{h,s} = \frac{FVR1_{h,s}}{(1+i)^r - 1} \tag{4}$$

Valuation of carbon

As outlined in the main report, returns from carbon are only applicable for a finite period, generally for a proportion of the first rotation. Figure 6 in the main report demonstrated the carbon accumulation and issuance of carbon credits for a plantation forestry project. As such it was appropriated to calculate returns from carbon as net present value not as perpetual payments. For simplicity, carbon credits were assumed to be credited on an annual basis, however, companies are entitled push reporting and crediting out to every 5 years under ERF rules.

Participation in the ERF attracts many administration and reporting costs associated with compliance. These costs are difficult to estimate. To capture these costs, we adopted Cockfield et al. (2019) approach and assume a 20 percent brokerage fee is applied to carbon credits accumulated each year after permanence discounts and the risk of reversal buffer is accounted for.

The present value of revenue from carbon, PVC, for each plantation forestry method, m, and any carbon price p, was calculated as:

$$PVC_{m,p} = \sum_{y=1}^{Y} \frac{(C_{m,y} \times 1 - B) \times p}{(1+i)^y} \tag{5}$$

Where Y is the number of years carbon is accumulated in any ERF project, $C_{m,y}$ is the carbon accumulation for ERF method m, in each year y that carbon is eligible to be accumulated, B is the brokerage costs associated with participation in the ERF and selling credits into the spot market and p is the carbon price and i the discount rate applied.

The present value of carbon for each plantation forestry method, m, and any carbon price p was added to the LEV of the plantation species in question. The LEV that compensated for the opportunity cost of investment was selected as the threshold carbon price. In the case of Schedule 1- **Establishing a new plantation,** the carbon price that returned an LEV that compensated for establishment and land purchase was determined the closest to the real threshold carbon price. For Schedule 2 - **Converting an**

existing plantation from a short rotation to a long rotation the carbon price that first returned a higher LEV than the corresponding hardwood LEV was determined as the closest to the real threshold price.

Sensitivity analysis

The results were tested for sensitivity to discount rates. Discount rates of 5 percent and 10 percent were tested. The tables below display the estimated ACCUs available at carbon prices ranging from $30/t CO_2e - $60/t CO_2e at the discount rates tested. The figures below displays the spatial estimate of the carbon prices required for participation in ERF projects to be economically viable at the 5 percent and 10 percent discount rates.

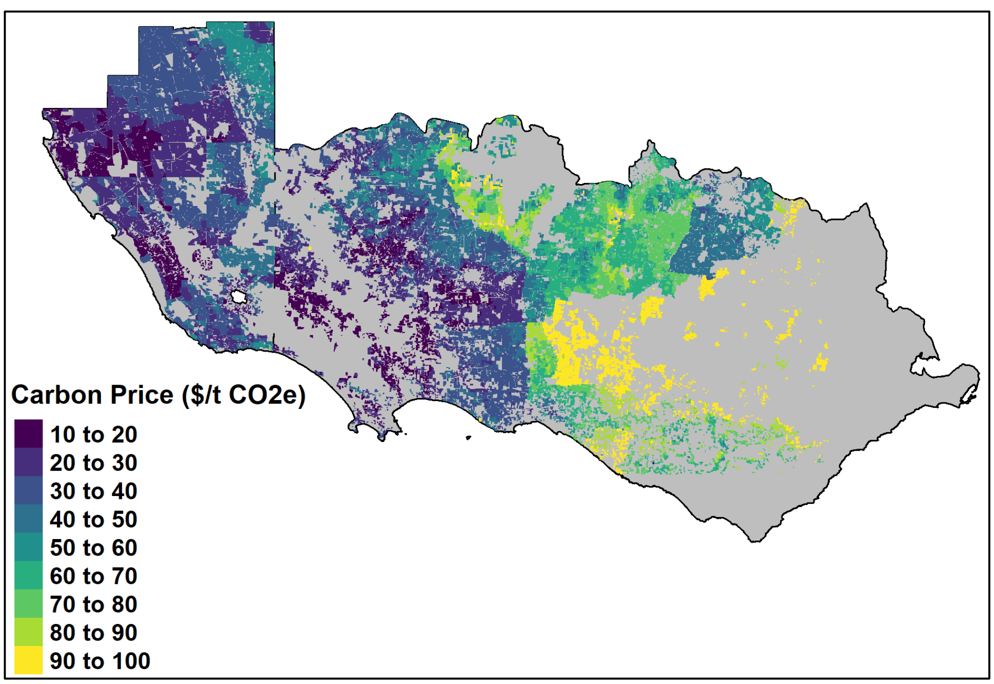
To calculate carbon sequestration potential and areas converted, the results of the raster based fullCAM modelling were mapped back to cadaster spatial data. This data contained area information for each cadastral unit across the study area.

Schedule 1- Establishing a new plantation

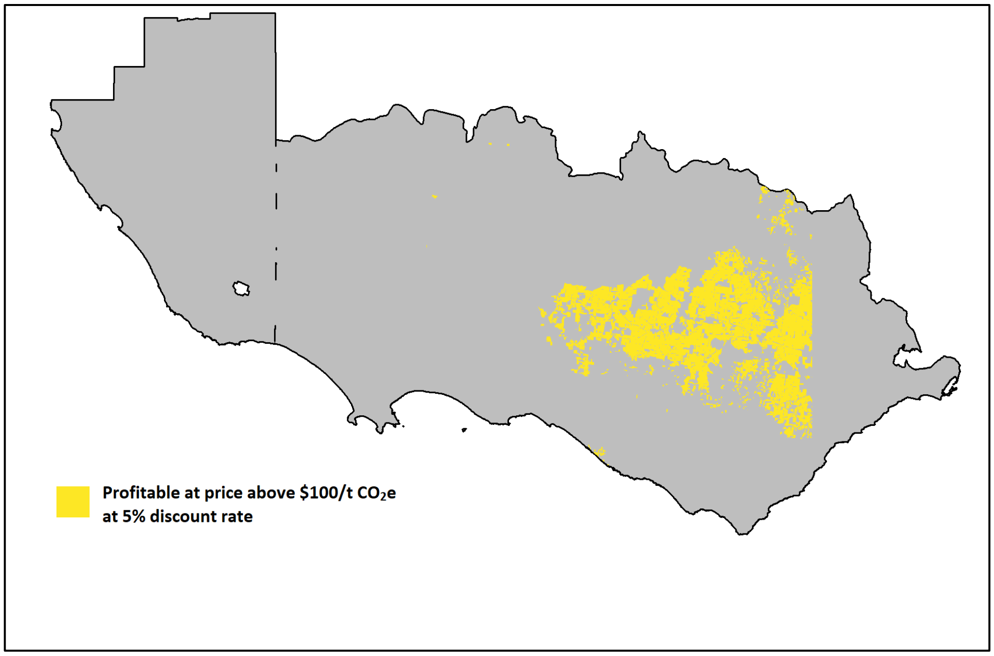
Softwood

Table 8: Estimate of ACCUs generated from establishing new P. radiata plantations at 5%, 7.5% and 10% discount rates at carbon prices o $30/t CO_2e - $60/t CO_2e.

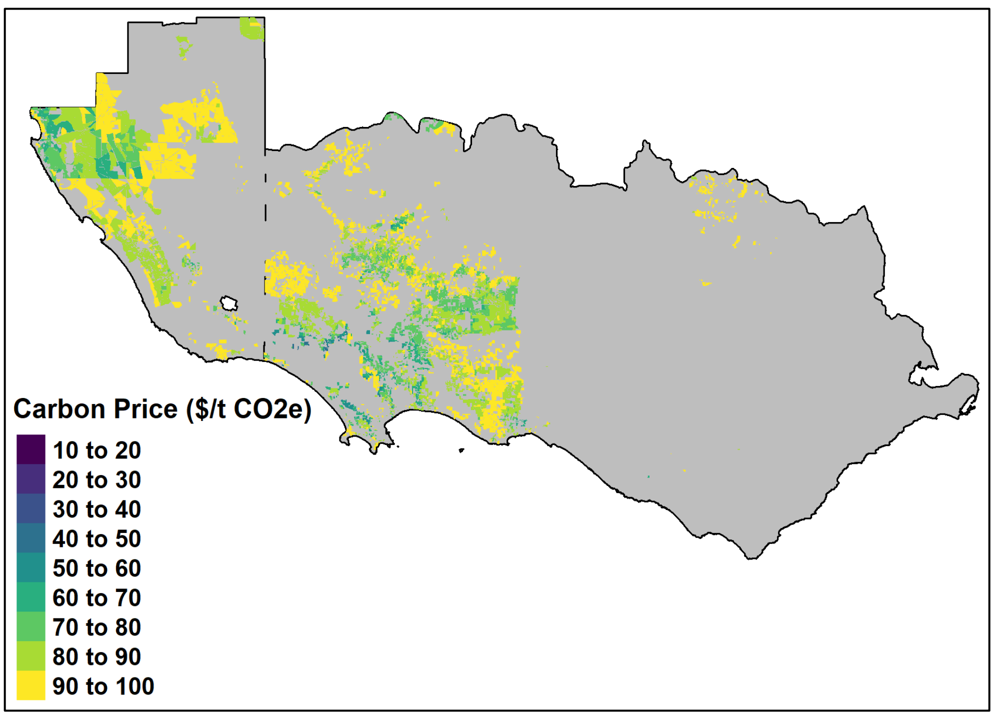
Discount rate	$30/t	$40/t	$50/t	$60/t
5%	315.3 million	499.8 million	596.7 million	643.9 million
7.5%	544,416	7.6 million	53.8 million	171.6 million
10%	0	0	822,703	4.8 million



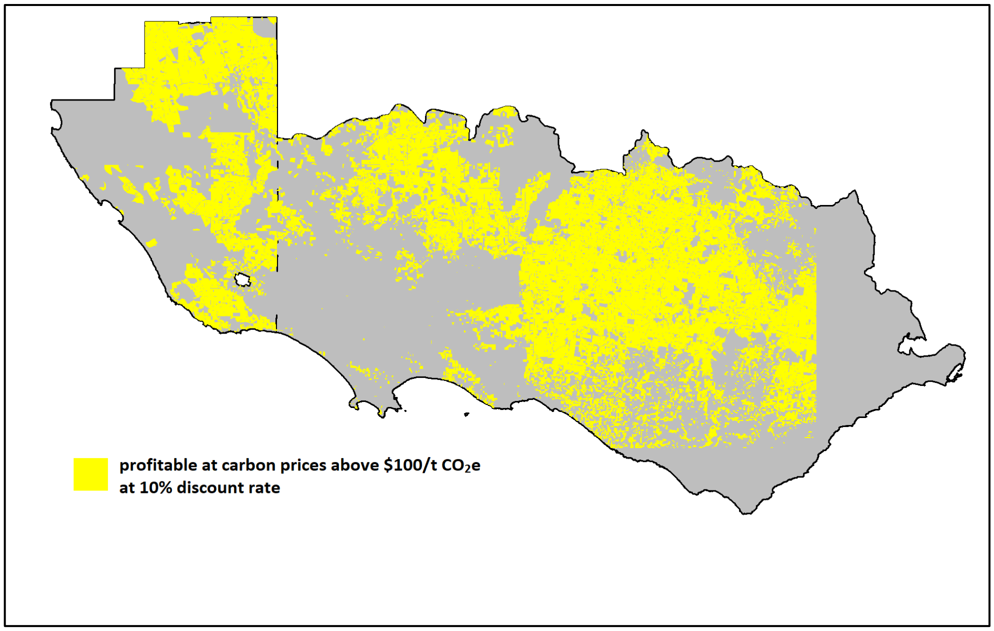
A


Profitable at price above $100/t CO₂e
at 5% discount rate

A1


Carbon Price ($/t CO2e)
10 to 20
20 to 30
30 to 40
40 to 50
50 to 60
60 to 70
70 to 80
80 to 90
90 to 100

B



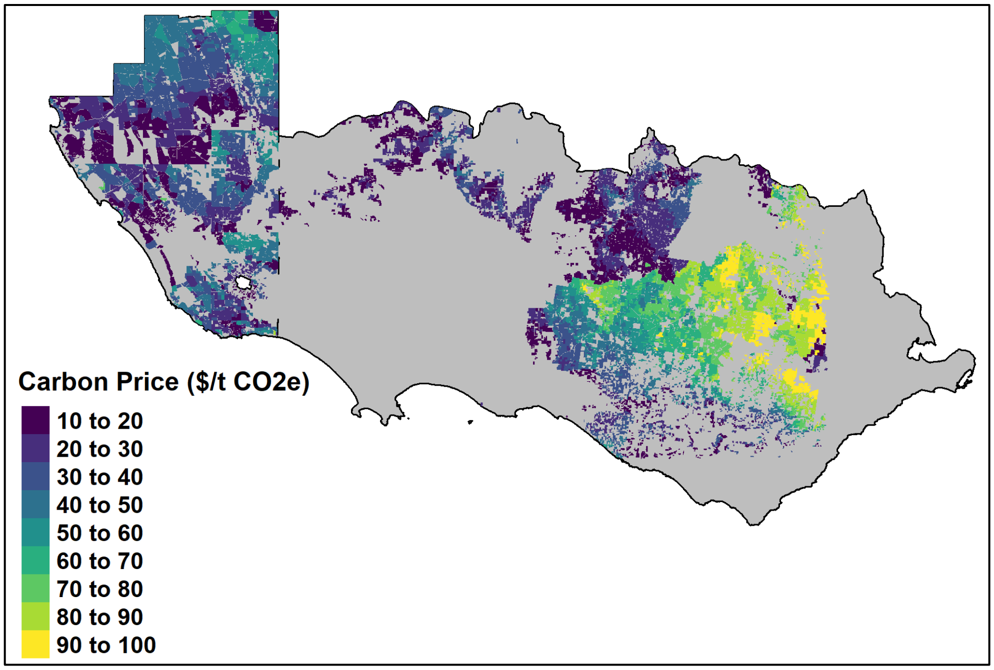
B1

Figure 2: The spatial distribution of the threshold carbon prices ($/t CO_2e) required for new *P. radiata* plantation to be economically profitable at **A:** 5% discount rate**, B:** 10% discount rate**. Figure A1** shows the areas economically viable at prices greater than $100/t CO_2e assuming a 5% discount rate. **Figure B1** shows the areas economically viable at prices greater than $100/t CO_2e assuming a 10% discount rate.

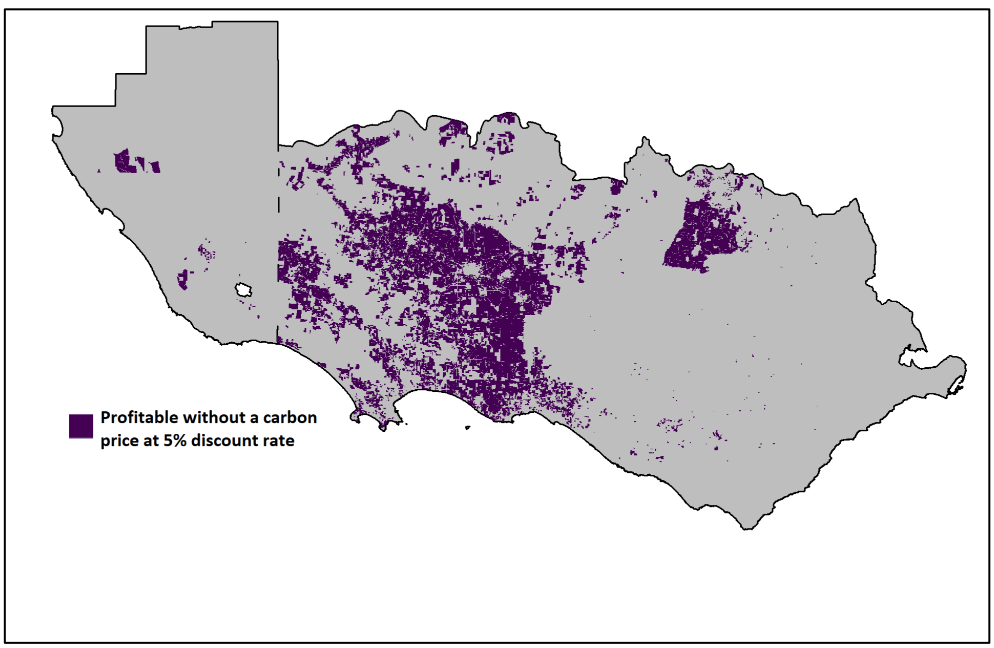
Hardwood

Table 9: Estimate of ACCUs generated from establishing new *E. globulus* plantations at 5%, 7.5% and 10% discount rates at carbon prices o $30/t CO_2e - $60/t CO_2e.

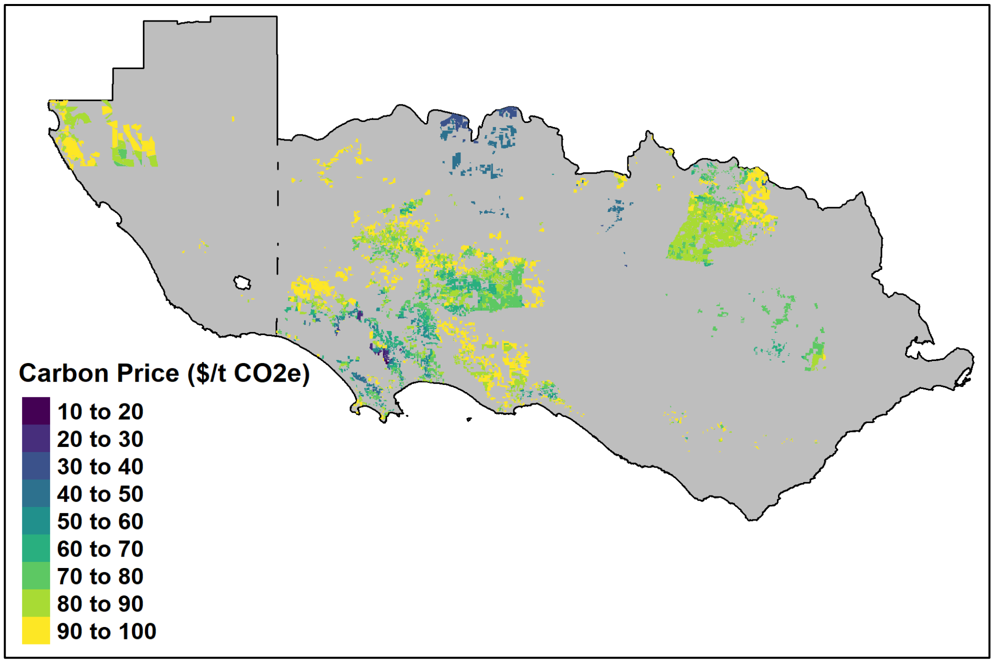
Discount rate	**$30/t**	**$40/t**	**$50/t**	**$60/t**
5%	361.8 million	419.2 million	453.3 million	477.2 million
7.5%	44.1 million	83.1 million	138.1 million	195.5 million
10%	734,705	4.3 million	10.7 million	14.4 million


Carbon Price ($/t CO2e)
10 to 20
20 to 30
30 to 40
40 to 50
50 to 60
60 to 70
70 to 80
80 to 90
90 to 100

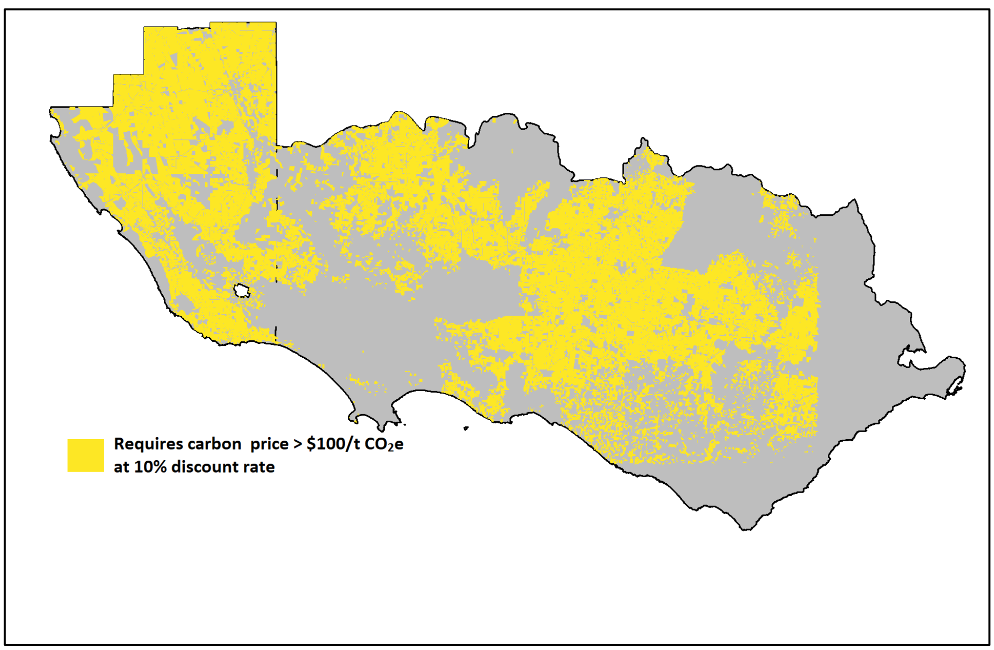
A


Profitable without a carbon price at 5% discount rate

A1



B



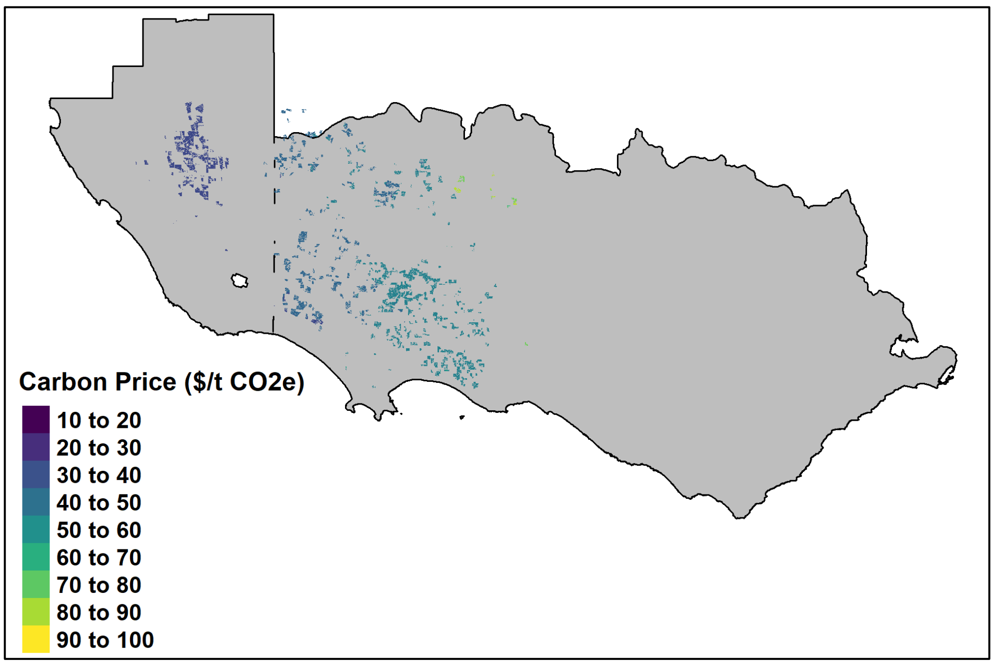
B1

Figure 3: The spatial distribution of the threshold carbon prices ($/t CO_2e) required for new *E. globulus* plantations to be economically profitable at **A:** 5% discount rate**, B:** 10% discount rate**. Figure A1** shows the areas economically viable without a carbon price assuming a 5% discount rate. **Figure B1** shows the areas economically viable at prices greater than $100/t CO_2e assuming a 10% discount rate.

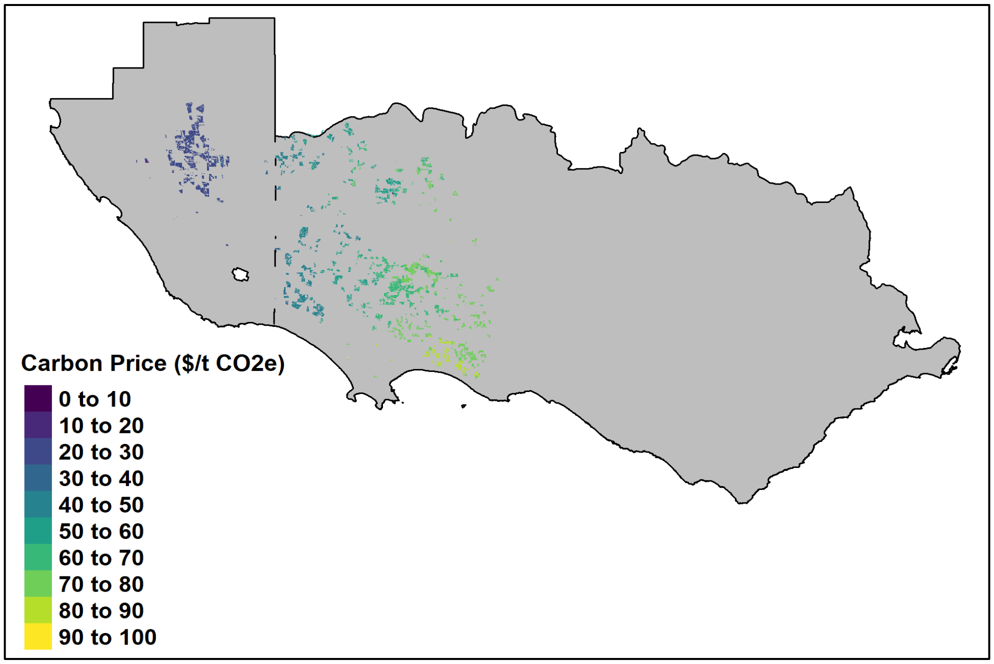
Schedule 2 - Converting an existing plantation from a short rotation to a long rotation

Table 10: Estimate of ACCUs generated from short rotation plantations to long rotation plantations at 5%, 7.5% and 10% discount rates at carbon prices o \$30/t CO_2e - \$60/t CO_2e.

Discount rate	\$30/t	\$40/t	\$50/t	\$60/t
5%	4.3 million	10.4 million	19.5 million	19.5 million
7.5%	3.7 million	6.1 million	10.3 million	18.5 million
10%	3.5 million	4.3 million	7.4 million	9.9 million



A



B

Figure 4: The spatial distribution of the threshold carbon prices ($/t CO_2e) required for the conversion of existing short rotation plantations to long rotation plantations to be economically profitable at **A:** 5% discount rate**, B:** 10% discount rate**.**

Caveats and limitations

This research was conducted to support the Green Triangle Forest Industries Hub's (GTFIH) strategic planning for unlocking opportunities for plantation forestry expansion in the Green Triangle (GT). The focus of this work was to estimate the role of Emissions Reduction Fund's (ERF) and emerging carbon markets in enhancing the economic basis plantation forestry expansion in the Green Triangle region. The research considered two plantation forestry ERF methods a) establishing planation forestry on land previously not used for forestry (Schedule 1) and b) the replacement of existing short rotation forestry with long rotation forestry (Schedule 2). The headline results of the research with regards to these ERF methods were:

A. At carbon prices in line with current voluntary market prices of \$30/t CO_2e approximately 1,000 hectares of currently unforested land could be available for purchase and development for softwood plantations and 178,000 hectares may be economically viable for purchase and development for hardwood plantations.
B. At \$30/t CO_2e approximately 23,500 hectares of hardwood plantation could economically be converted to softwood. This would take place primarily in South Australia.

The scale of the potential for plantation forestry may initially arouse concern for other land users in the region. However, the results need to be viewed in the context of several important limitations such as the modelling framework employed, the limitations of the data used at the time and the spatial scale the work was conducted at.

The report should be seen as a broad 'helicopter' view of the potential for carbon to be beneficial in facilitating plantation development. Due to the spatial scale of the study several simplifying assumptions needed to be made that inevitably introduce error into the estimates. These results should therefore be viewed as absolute maximum upper estimate of land available for plantation development. For example:

1. While the estimation of carbon sequestration potential across the landscape is based on rigorous biophysical modelling, the economic quantification of the opportunity is less specific and relies on several simplifying assumptions. The analysis includes 'representative' estimates of costs and benefits associated with plantation forestry. For example, establishment costs and the harvest proportions expected at each thinning operation are the same across the study area. In reality, harvest proportion and development costs may be site specific and vary spatially. Development costs are likely to include additional site-specific factors not included in this analysis and may affect the economics of any site's potential development.
2. The property prices included in the economic analysis assume the median prices (\$/ha) for the local government areas included in the study. The scope and extent of the research did not allow for the range of observed property prices to be tested. Future growth in property prices which has been substantial in recent years were also not tested. The result is that many parcels seen to be economically viable for forestry development in the results, assuming a median property price, may not be viable if assigned true market value.
3. The analysis was conducted on an individual land parcel basis which did not account for the likelihood each parcel is likely part of a broader landholding and integrated into a broader

farming business. The potential result being that this would no doubt affect the probability of any land parcel being able to be purchased forestry development, even if economically viable to do so.

4. While the modelling excluded large areas native vegetation, national parks, townships and urban areas, major water courses and other natural features from the analysis, smaller features such as small patches of remnant native vegetation, farm buildings and small water storages may not have been subtracted from the analysis. These issues are often unavoidable over large spatial extents, but do add error to the estimates, likely adding to an overestimate of the opportunity
5. The analysis assumes that every location in the study area is equally suitable for plantation forestry development and potential forest productivity modelled using 3-PG forest growth model, the model that underpins FullCAM. Estimates of a tree growth are based on a biophysical inputs such as broad soil type, climate, aspect, typography etc. However, plantation forestry developments are constrained to areas with specific physical characteristics, and these may not be fully represented by the 3-PG model. Unfortunately, there exist no datasets that describe the suitability of land specifically for forestry development in the region. Site suitability is still largely determined by fine scale soil testing and fine scale site evaluation. It is is likely some of the sites that were selected by the economic valuation algorithm would not be suitable for development after site quality assessment by foresters.
6. The modelling did not account for any restrictions that current and future water plans might impose on future plantation development.
7. The results certainly do no account for the social and cultural dimension of land use and land use change. Nor do they account for any forestry company's or broader industry development strategy.

The authors are confident that the carbon prices calculated are fair approximations of those that would be required to make forestry development in any location in the study area economically viable. However, as points 1-7 attest, the estimates surrounding the potential scale of new plantation development driven by emerging carbon markets is more uncertain. Finer scale analysis will likely find the scale of plantation development possible through participation in emerging carbon markets to be far smaller than those estimated at this broad regional extent.

References

CER, 2022a. Aggregated carbon estimation area data. Clean Energy Regulator, Canberra. https://www.cleanenergyregulator.gov.au/ERF/Pages/Choosing%20a%20project%20type/Opportunities%20for%20the%20land%20sector/Vegetation%20and%20sequestration%20methods/Human-Induced-Regeneration-(HIR)-aggregated-project-data.aspx

CER, 2022b. FullCAM Guidelines Requirements for use of the Full Carbon Accounting Model (FullCAM) with the Emissions Reduction Fund (ERF) methodology determination: Carbon Credits (Carbon Farming Initiative—Plantation Forestry) Methodology Determination 2022. The Clean Energy Regulator, Canberra. http://www.cleanenergyregulator.gov.au/ERF/Choosing-a-project-type/Opportunities-for-the-land-sector/Vegetation-methods/plantation-forestry-method#Project%20activities%20and%20eligibility%20requirements

Cockfield, G., Shrestha, U., Waters, C., 2019. Evaluating the potential financial contributions of carbon farming to grazing enterprises in Western NSW. The Rangeland Journal 41, 211-223.

Faustmann, M., 1995. Calculation of the value which forest land and immature stands possess for forestry. Journal of Forest Economics

KPMG. 2020. Australian pine log price index (stumpage). KPMG, https://fridayoffcuts.com/pix/APLPI_Dec_18_-_Stumpage_(Public)_Final.pdf

Lewis, N.B., Keeves, A., Leech, J., 1976. Yield regulation in South Australian Pinus radiata plantations. Yield regulation in South Australian Pinus radiata plantations.