SEEING THE VALUE FOR THE TREES

River Red Gum Forestry in the New South Wales Riverina

Final report

Prepared for the National Parks Association of NSW and The Wilderness Society
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economists | at | large |
ADDING VALUE TO SOCIETY

Table of Contents

Tables, Figures and Charts

Economists at Large & Associates
info@ecolarge.com
Phone: +61 3 9562 4472 | Fax: +61 3 9562 4118
PO Box 256, Noble Park, Melbourne, Australia, 3174

Report prepared by Roderick Campbell, Tristan Knowles & Simon O'Connor
with Francis Grey (Principal Economist)

Executive Summary

This report provides an economic analysis of River Red Gum (RRG) Forestry in the Riverina region of NSW specifically with regard to the current economic benefits of the RRG timber industry and the potential benefits of alternative forest management and regional development strategies. This report is primarily concerned with RRG in on Crown Lands and surrounding areas that interact economically and ecologically with the forests.

The analysis shows the current focus of timber supply is economically unjustified and the full economic value of the public forest estate is not being realised. Timber supply as it currently is realised is unsustainable both economically and environmentally. The potential returns from encouraging private production and investment, forest restoration and using public forests for tourism activities could stimulate substantial economic returns and better environmental outcomes.

Changing the management policies regarding RRG on Crown Lands would benefit the local and State economy by; stimulating private industry, supporting farm diversification, providing local jobs and helping to mitigate climate change. Changes to current management policies would ensure the sustainable use of natural capital for the benefit of current and future generations.

Cited values misleading

The analysis shows that cited values for the RRG timber industry are potentially misleading and disguise a more complicated situation. The previously cited industry value of $60m (by the NSW Minister for Primary Industries and by FNSW, 2008) implies that the industry is large and beneficial for the NSW public, and is used to claim that current access arrangements to publicly owned parts of the RRG resource should be maintained.

Our valuation of the RRG forestry in the Riverina indicates that this figure is misleading because of the following:

- Calculations are not published- the alleged $60m is based on values supplied by industry and "standard" economic multipliers - it is not subject to peer review.
- It is considerably higher than the mill-gate gross revenue value we have calculated from timber sourced from *both* private and public land in the Riverina- $41.4m.
- The use of economic activity and a multiplier to inflate the economic value of the industry is misleading and very poor economic policy. It implies that all of the $60m would be lost if public forest logging were to stop, which is not the case as the multiplier component would also be generated by other economic activities in place of RRG forestry.

- Key to this debate is the net value created by the current pattern of timber use compared to alternatives - e.g. logging of Crown Lands versus private forestry versus tourism.
- Since it is only forestry operations within Crown Lands that is being investigated in this report, the estimated value at stake is the net value created by these forestry operations only. We have estimated this under conservative conditions to be only $0.94m in net profit - or value added - from sale of timber at the forest gate (i.e. revenue to government) and $6.4m at the mill gate. Hence the total value we calculate for the RRG forestry industry in the public forests of the Riverina is only $7.3m.
- The relevant agency fails to make available sufficient data for independent, arms length analysis of the true state of the public sector forestry process. We have therefore estimated results from available data and primary research in order to answer some very basic questions of public policy.

Public value of current forests management is very low

The key question in this analysis is what value the public receives for logging of Crown Lands. As stated above, our analysis shows that the public receives a net profit – value added - of $0.94m for the 4757 ha of timber harvested (or estimated 127,145 m^3 of timber sold) annually at the *forest-gate* - the point of sale by the government agency. It is likely that this figure is overly optimistic since it does not cover significant costs that would be incurred by FNSW if it operated under regular commercial arrangements.

Once a true 'shadow' or actual production cost is calculated and factored in, it is our estimate that the public is highly likely to receive a loss on the sale of timber from Crown Lands, at the forest-gate. The reported *cost* of public RRG forest operations in the Riverina is $3.85m. We estimate that $3.16m of this is attributable to timber activities. Using our estimate of private sector production costs per tonne for firewood, we estimate that this cost is understated by approximately 88%. If the full costs were included it is likely that they would be in the order of $5.9m, and hence this would result in a loss on public forestry operations, at the forest gate, in the order of $1.8m.

The mill operators are estimated to make a profit - or net value added - of $6.4m on the public timber they receive from Crown Lands. If the mill operators paid the public the true cost for the timber, it is possible that the combined operation of mills and *public* forest harvesting would be uneconomic.

The need for government agencies to create schemes that 'fix' the price of timber to stimulate the mill industry have gone. Indeed this heavy-handed government intervention is likely to be dragging the industry backwards through determining 'appropriate' profits and undermining private sector supply responses that could ultimately guarantee the industry's future.

Better management would stimulate private sector investment

Public sector forestry, through its uneconomic management, has thoroughly undercut private sector forestry investment that may have provided an alternative product for mills.

Resolving this dilemma provides the opportunity for a win-win solution that sees public forestry replaced by private sector forestry investment on farmland as an alternative resource. If managed appropriately, this could result in negligible ecological impacts.

Tourism offers significant potential benefits

Finally, the replacement of the forestry activities with tourism has the potential to replace a loss-making sector with very profitable and large scale, employment intensive industry. The potential is for tourism to create at least a few million dollars of unequivocal, net value added for the region.

In a regional context, we found that compared to an industry such as tourism, RRG forestry is small both in terms of income and employment generated. RRG harvesting attributable to public land generates around $22.4m in mill-gate gross revenue and supports approximately 136 jobs. Considering that in two of the three local government areas where RRG milling takes place, tourism supports over 1000 jobs and across the region generates $797.5m annually in tourism expenditure, we can see the significant potential of tourism to the region. The important distinction to make here is that RRG industries, in particular the fixed sawmills, are usually important on a local scale for employment. Any changes to current management policies will have to be aware of the importance locally of milling industries and provide appropriate structural adjustment initiatives.

Current environmental loss exceeds logging benefits

On the non-financial side of the public ledger are the environmental costs caused by the logging of ecologically strained RRG resources. Such costs are borne by both current and future generations from all states (and internationally) as a loss to total economic value and the public good. The NSW public is currently uncompensated for this cost as forest-gate prices, and mill prices, are too low. In other words even if forest gate prices were 'efficiently' calculated, the compensation that is required for the NSW public to accept logging is so high as to make the logging option a bad public policy outcome. In short the public don't want their forests logged, and, unless there is some serious public policy rationale, the industry should be closed and replaced with something that the

public can support. Other work on the Snowy river inquiry during the late 1990's, has indicated a public willingness to support (pay) remedial programs to adjust rural industry to a sustainable trajectory.

Using extrapolations on Victorian Choice Modelling data, we have estimated the non-use value of the area of RRG logged annually in the Riverina at $17.7m. With current forest-gate revenues being considerably lower than this, at only a net $0.94m, the NSW public are in effect suffering an uncompensated net loss of $16.8m and subsidising the RRG timber industry to the tune of $13.6m. This $17.7m million figure is the minimum amount the NSW public would need as compensation to accept logging, from stumpage revenue at the forest gate. Based on this analysis, we have calculated that current subsidies per unit are $171 per m^3 for sawlogs and $51 per tonne for residues.

Conclusion: Current management undercuts real economic potential

It is our conclusion that the actual economic benefits of the RRG industry are predominately accruing to the mill operators, with little benefit to the NSW public. This is due to high subsidies supporting cheap access to the timber resource that is leading to perverse incentives to process high quantities of low value product. Perversely, this process is undermining the existence of the very industry itself, which can only be made secure by a diverse and significant privately grown resource base. It is shown in this report that other uses of the forests have the potential to generate more economic activity than is currently generated, with a much lower environmental cost, if not a positive environmental outcome.

The emerging vision of a Riverina region with healthy RRG forests, a strengthening economy, new tourism opportunities and a rapidly expanding private farm forestry sector that results in a sustainable future is within grasp.

Overview of Findings

Regions of Analysis	
Geographic/Ecological/Political Regions	FNSW Riverina Management Region, Riverina Tourism Region, Murray Tourism Region, Riverina Bioregion
Local Government Areas	Balranald, Berrigan, Conargo, Corowa, Deniliquin, Griffith, Hay, Jerilderie, Leeton, Murrumbidgee, Murray, Narrandera, Wakool, Wentworth, Urana
Key RRG Milling Towns in NSW (for RRG sourced from State Forests)	Barham, Deniliquin, Darlington Point
ENVIRONMENT	
Management Areas and State Forests	**Central Murray Management Area** Gulpa, Moira, Millewa, Tuppal, Deniliquin, Werai Koondrook, Perricoota, Campbells Island **Murrumbidgee Management Area** Cuba, Wilbriggie, Benerembah, Yarradda, MIA I, MIA II **Mildura Management Area** Balranald, Mildura, Pooncarrie
Total Area of State Forested lands under management by FNSW	410,742 ha
Total Area of RRG on State Forests in Riverina	103,698 ha
Total Area of RRG on all Crown Lands in Riverina	131,715 ha
Percentage of total RRG available for forestry management activities	98%
Sources of RRG	Crown Land (State Forests & Western Lands Lease), Private Land
Total Area Harvested in 2007	4757
Total Area Harvested in 2007 as Percentage of Total Area of RRG on Crown Lands	3.6%
Total Volume Harvested in 2005/06	127,145 m^3
LOGGING/FOREST GATE	
NOTE: For forest-gate calculations, average of 2005/06 harvest volumes are used	
Primary Industries associated with RRG State Forests	Timber, Grazing and others such as apiculture
Types of operators/processors	Fixed mills, mobile mills, firewood producers
Total *Allocation* Volumes- By Resource Type (2005/06)	34,186 m^3 – HQ / Quota 27,253 m^3 – LQ / Ex-quota 87,631 m^3 - Residue 149,069 m^3 - Total
Total *Harvested* Volumes - By Resource Type (2005/06)	32,430 m^3 – HQ / Quota 27,383 m^3 – LQ / Ex-quota 67,333 m^3 - Residue 127,145 m^3 - Total

Revenues from all FNSW activities in Riverina (2005/06)	$5m
Royalties for sale of RRG Timber from Crown Lands (2005/06)	$3.1m – Sawlog Royalties $1.0m - Residue Royalties $4.1m – Total Royalties
Estimated average royalty rates (2005/06)	Sawlogs – $51 per m^3 Residues - $15 per tonne
Revenues from Land Rental Activities on Crown Lands (2005/06)	$0.18m
Other Revenues (2005/06)	$0.73m
Estimated Revenues from RRG timber activities to FNSW – Riverina	$4.1m
Estimated Costs of RRG activities to FNSW – Riverina (2006/07)	$3.16m
Estimated Value Added at Forest Gate	$0.94m
Estimated True Costs of RRG activities to FNSW – Riverina (2006/07) **With commercial costs factored in.*	$5.9m
Estimated Value Added at Forest Gate **With commercial costs factored in.*	- $1.8m (loss)
Uncompensated Losses and Subsidies	
Estimated Annual Non-Use Value of Current Area Being Logged	$17.7m
Estimated Annual Uncompensated Loss to NSW Public *($17.7m minus estimated value added)*	$16.8m
Estimated Annual Subsidy to RRG Timber Industry *(17.7m minus royalties paid for timber)*	$13.6m
PROCESSING/MILL GATE	
NOTE: For mill-gate calculations, 2006 harvest volumes are used	
Estimated Total Harvested Volumes – by Operator Type (2006) *NSW Based Operators Only*	44,141 m^3 - Fixed Mills 11,365 m^3 - Mobile Mills 55,030 m^3 - Firewood Producers 110,536 m^3 - Total
Estimated Average Recovery Rates for Sawlogs by Product Category *Fixed and Mobile Mills Only*	6% - Appearance 14% - Structural 17% - Residual 35% - Mulch 29% - Firewood
Estimated Product Output as Percentage of Total Harvest	*Sawn Timber – 17%* 3% - Appearance 7% - Structural 7% - Residual *Other Products – 83%* 18% - Mulch 65% - Firewood
Total Estimated Saleable Volumes For Product Categories (2008)	3,139 m^3 - Appearance 8,105 m^3 - Structural 7,803 m^3 - Residual 20,052 m^3 - Mulch

	71,437 tonnes - Firewood
Total Estimated Mill-Gate Output attributable to access to RRG on Crown Lands (2008) **Rounding errors exist in the rows below, resulting in a total of $22.3m, rather than $22.4m*	$22.4m
Total Estimated Output attributable to access to RRG on Crown Lands - by Product Category - (2008) ** 2006 volumes with 2008 prices*	$22.3m - Total $8.5m - Appearance $4.6m - Structural $2.8m - Residual $0.54m - Mulch $5.9m - Firewood
Total Estimated Output attributable to access to RRG on Crown Lands - by Operator Type - (2008) ** 2006 volumes with 2008 prices*	$22.3m - Total $15.6m – Fixed Mills $2.2m – Mobile Mills $4.5m – Firewood Producers
Total Estimated Mill-Gate Output attributable to access to RRG on Private Lands (2008)	$19.1m
Total Estimated Mill-Gate Output (2008)	$41.4m
Estimated Value Added at Mill Gate attributable to RRG on Crown Lands	$6.4
Estimated Value Added at Mill Gate attributable to RRG on Private Lands	$5.2m
Total Estimated Industry Value Added	$11.6m
Total Estimated Industry Value Added Attributable to access to RRG on Crown Lands	$7.3m
Estimated Number of Jobs in NSW Supported by Access to RRG on Crown Lands	136
REGIONAL ECONOMICS/ALTERNATIVE USES	
Conservative Harvest Cycle of RRG	20 years
Estimated Tourism Opportunity Cost (in value added) of Annual Logging **Assuming 4757 ha logged and a 20 year harvest cycle*	$25m
Estimated Economic output of tourism in Riverina	$797.5m
Estimated Value Added of Tourism in Riverina **Assuming same revenue/cost structure as forestry for comparative purposes.*	$215m
Total visitor nights	4.7m
Total visitor days	2m
Estimated Jobs supported by tourism in the region ** For District of Deniliquin and Wakool Shire only.*	1218

Introduction

River Red Gum (*eucalyptus camaldulensis*) forests cover large areas of internationally significant wetlands in NSW, Victoria and SA. The forests are endemic to Australia and make up complex ecological communities that have great significance for both indigenous and non-indigenous Australians. Local and regional economies interact directly with River Red Gum (RRG) forests through forestry, agriculture, apiculture, recreational activities, ecosystem services and the tourism industry.

Due to their size, significance and the many associated industries and values, there are many stakeholders interested in the management of RRG forests – this is particularly relevant to RRG on Crown Lands in the Riverina, which are the predominant focus of this report.

The timber industry and conservation groups tend to be the most vocal stakeholders in the controversies which often surround the management of these forests, having perhaps the most direct and conflicting values associated with forest use. Other stakeholders, such as agriculture/agroforestry industries, recreational users, tourists and tourism operators tend to be murmurs in the background of this louder logging vs conservation debate. The volume at which this debate is conducted tends to drown out its subtleties, and turn into a misleading and simplistic "jobs vs. trees" debate. An indication of the nature of scale of interest generated by RRG management issues is evidenced by the nearly 7000 written submissions made in response to the Victorian Environmental Assessment Council (VEAC) Draft Proposals Paper (2006), (VEAC, 2008).

It is rare that a full and transparent economic assessment is made in relation to forests, let alone RRG forests. Economic values are often confused with economic output – i.e. financial "dollar" values that are easily quantifiable through market interactions, such as timber prices. However, more robust economic analysis will look at the total economic value (TEV) of a resource, in this case RRG forests. It is important to realise that 'value' can and does take on forms other than those purely financial. Non-financial values and financial values of alternative uses are equally important aspects of economic analysis. All values must therefore be considered for accurate economic policy decisions that seek to maximise the value to society of scarce resources.

RRG Forests in the Riverina are not under uniform management and accordingly have different stakeholders. Large areas are on Crown Lands managed by Forests NSW (FNSW), a Public or Government Trading Enterprise (GTE) within the NSW Department of Primary Resources (DPI) that is faced with the difficult, and often competing goals of commercial efficiency, environmental care and forestry management. Significant areas of RRG native forests are also under private ownership and management.

Analysis of the areas of agricultural land and towns surrounding RRG forests are also important for thorough economic analysis. They are affected by activities in RRG forests in terms of agricultural and agroforestry related production as well as their involvement or reliance on industries and ecosystem services associated with the RRG forests.

Industries and values associated with the RRG resource:

This report aims to look at how different industries, users and non-users gain value from the RRG forest resource and consider how these values can be maximised.

Part 1 provides a brief introduction to the economics of resources, providing a framework for the values that are represented by native forests.

Part 2 is concerned with the economics of RRG forestry, specifically looking at the logging and milling of timber sourced from public land. This section aims to look at how the industry is structured and analyse the financial and non-financial benefits and costs of the industry.

Part 3 looks at alternative industries and opportunities for the region, some of which are affected by current management policies concerning access to RRG in State Forests.

Notes on methodology:

This study has been conducted for the National Parks Association of New South Wales (NPANSW) and The Wilderness Society. The research was undertaken through a comprehensive review of available existing data and reports. A field trip was also conducted in the region. This report also draws on Geographic Information System (GIS) data provided under licence by FNSW to the NPANSW. The licensor has not scrutinised or endorsed the analysis or any views, conclusions or recommendations that might arise from that analysis contained in this document.

RRG forests and surrounding areas fall within various physical, political and management boundaries. There are some instances where data sets for this region are based on differing sets of boundaries due to the lack of source data in the region. This has been considered when analysing the data.

There is little reliable, publicly available data for RRG related industries. We used numerous sources all of which are fully referenced. In all cases, the most conservative choice was used, in order that values presented are at the low end of our estimates. A conservative choice of figures for mill-gate output is the reverse, with estimates most likely being at the high end of the range in terms of economic output generated by the industry.

The long-standing nature of these debates and the failure to provide adequate data on many aspects of the issue highlight the need for a thorough public analysis of policy decisions in this area to ensure political accountability regarding public resource decisions. It should be noted that this data deficiency has been apparent for at least three decades, and yet has not been rectified. The beneficiaries of this lack of data are those who presently use the public resource since the lack of data reduces legitimate parliamentary and public scrutiny. In order to maximise returns to society transparent reporting must be implemented, and hence data deficiencies eliminated. The lack of data, of itself, is sufficient to compromise economic performance. We urge stakeholders and government departments to publish more data in a transparent manner in relation to these industries.

Part 1: The Economics of Resources

Economics is concerned with the allocation of scarce resources to maximise the creation of value (ie welfare, utility, happiness) by society. The value of a resource is often measured only by market "dollar" values or 'financial value' as we prefer to call this aspect of economic value. However, considering only financial values fails to acknowledge that 'value' to society, as defined in economic theory and practice, as well as acknowledged in public policy theory and practice, includes more than just financial values.

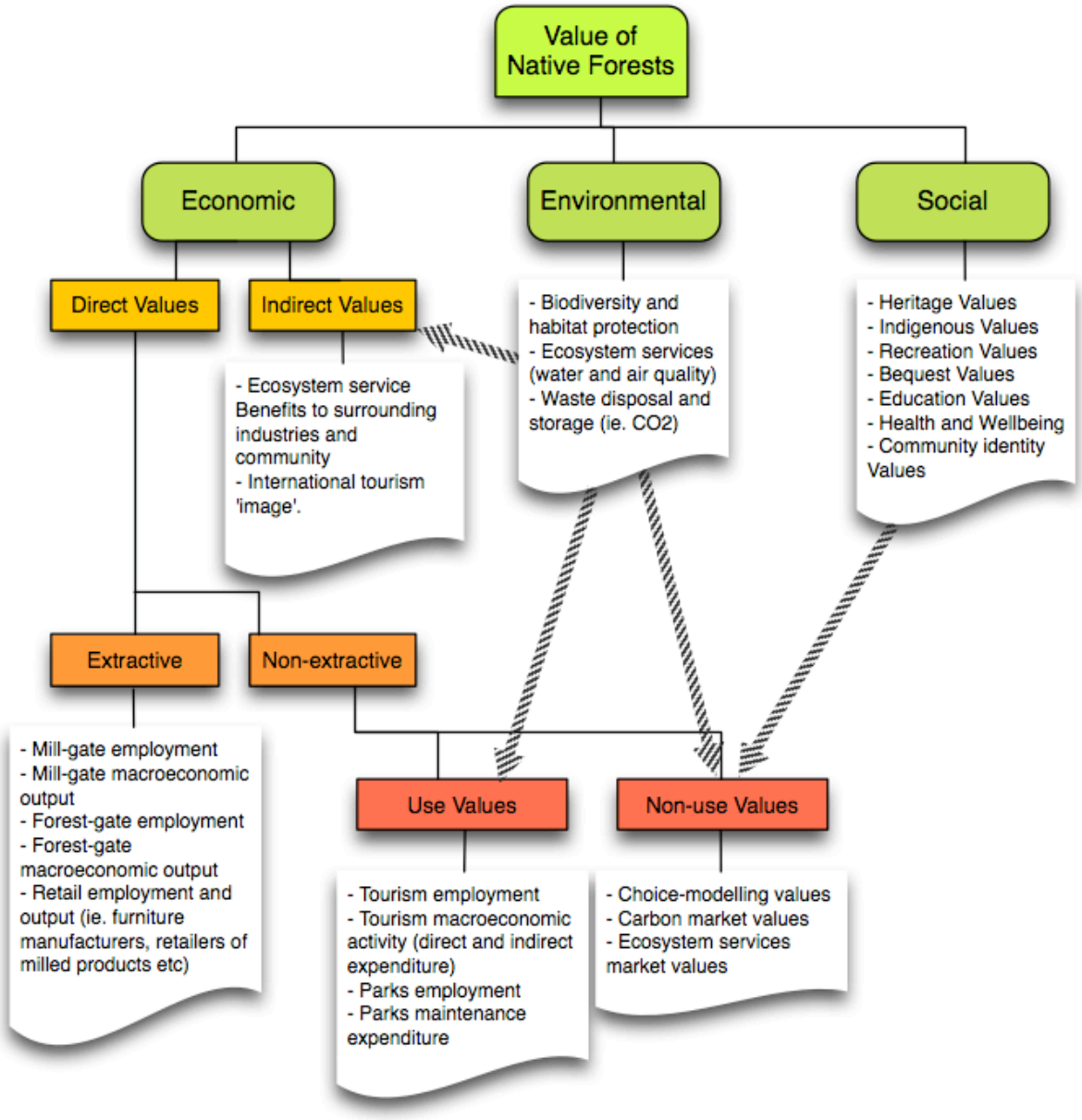
> *economic benefit refers to the entirety of net social benefits derived from a policy, by the community. It has been common, and inaccurate, to refer to economic benefits as if they only included financial benefits. Neo-classical economic analysis has always referred to the total net social benefits of policy choices, of which financial benefit was one amongst many. (Grey, 2000, p.3)*

1.1 The Value of Forests

The goal of good economic policy is to distribute the community's scarce resources in such a manner that maximises the welfare (i.e. happiness) of society. Looking at the direct financial value related to the extraction and processing of a resource does not necessarily capture the full value the resource (such as a forest) may provide.

To better understand the values that native forests represent, Economists at Large have developed the following framework (Figure 1), based on a framework for park values used by Pricewaterhouse Coopers (2003b), and further informed by work undertaken for the IUCN (2000) (see Appendix 13). This framework is similar to many such diagrams used to explain the multi-value choices available to society when we use complex resources like forests.

Figure 1: Total Economic Value of Native Forests



Source: Pricewaterhouse Coopers (2003b), IUCN (2000) and EcoLarge Analysis

The above diagram identifies the three components of the value captured by humans in relation to RRG forests. These three components; economic, social and environmental, although separated are in-fact interdependent as shown in the diagram. The summation of these three values can be called 'Total Economic Value' (TEV) reflecting the total utility experienced by existing and future generations from the RRG forests. PWC focussed their work on assessing the contribution to the economy in terms of economic activity resulting from the selected parks. As such PWC called their work 'Total Economic Value' (total welfare) rather than the more accurate (but somewhat less sexy) 'Total Macroeconomic Value' (economic activity and/or financial value creation). The distinction is important since Total Macroeconomic Value is a subset of total economic value and the two should not be confused when

making policy decisions. Total Macroeconomic Value is the contribution to economic activity (i.e. financial value or economic output) from a particular area, while Total Economic Value (TEV) is often given different meanings, that most often relate to economic, social and environmental factors that make up the total welfare (value, utility or happiness) derived by society from any resource such as a forest. In the context of this report we refer to Total Value as the aggregation of all the values derived by society from a resource. Financial value is a subset of Total Value, and refers to the net economic (i.e. in terms of the economy) financial value added created by a resource such as a forest.

The macroeconomic contribution of a policy option is a subset of the package of 'values' derived from any given policy framework. Forests, for example, can also provide biological value, non-use value and recreational value, amongst many others, as well as macro-economic value. The aggregated value outcome from many different values comprises the Total Value generated by any given policy framework. It is this 'Total Value' that is perceived by society – and which public policy seeks to influence in the interests of all. Private interests seek to influence this policy to maximise their private interest often at the expense of the public good. Public policy is driven by the net impact of differing options on Total Value (i.e. which option maximises the welfare/utility/happiness of society given that society is constrained to be intergenerationally sustainable).

Intergenerational considerations should provide a clear constraint to policy action. Any policy action that endangers a species is economically inappropriate by definition. The clearest metaphor is to consider a fishery. Our society considers it wrong, indeed 'criminal' to exploit a fishery to destruction. This is because a society sees such destruction as inequitable on an intergenerational scale. Similarly for other forms of natural capital, such as species diversity, each generation, is bound to act sustainably or else we are literally stealing from our children and undermining good public and economic policy.

In the RRG forests context we wish to:

- Ensure that the RRG forests are allocated to the mix of uses that maximises the welfare of society;
- Review the existing allocation of RRG resources to establish an accurate measure of their macroeconomic contribution (as a subset of the total value created for society);
- Evaluate the economic potential of shifting the RRG forests to alternative use patterns

Part 2: The Economics of the River Red Gum Forestry in the Riverina

The management of the RRG timber industry has been described in conflicting ways. Its management has been called "professional and well done" (BIS Shrapnel Forestry Group, 2001, p15) by its supporters, but is considered "a marginal, very low value industry by others" (NPA, 2008, p1). NSW Minister for Primary Industries, Ian Macdonald, has stated that the "Redgum timber industry is worth $60 million dollars to NSW" (Macdonald, 2007). This figure appears to be based on a figure for total industry output given in the FNSW ESFM Plan for 2008 (p.37 and p.38). Sources have not been provided for this figure. We have been told only that:

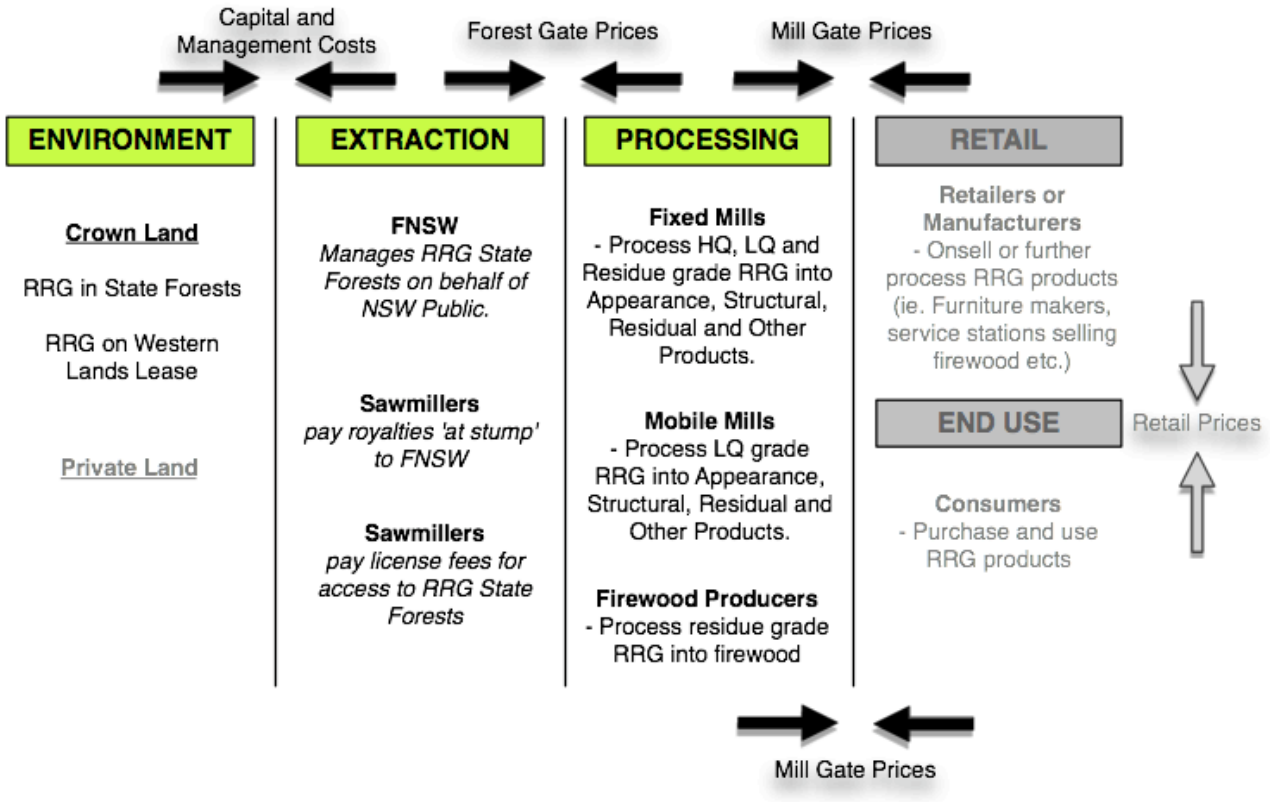
> *This figure is based on reported gross mill product output volumes supplied and indicative market values for each product as supplied by industry. A standard economic multiplier was applied to estimate flow on effects. (Bullen, 2008)*

This section aims to explain how the RRG timber industry is structured and hence provide a range of measures and values that describe the industry in a more considered economic context. We examine how timber is logged and allocated at the "forest-gate", before examining the preparation of timber to a mill-gate stage and its various products.

2.1 RRG Industry Value Chain

In looking at a topic involving any resource, it is important to understand the value chain of the resource. To better understand this and define the scope of this report, Economists at Large have developed the following chart to represent the RRG industry value chain (Figure 2).

Figure 2: RRG Timber Industry Value Chain



Source: EcoLarge Analysis

This report will be focusing primarily on forestry industries associated with current forest management regimes for Crown timbered lands. As such, areas in grey are beyond the scope of this report. This will necessarily include businesses who on-sell RRG products to end consumers. Worth mentioning here are furniture makers who work with RRG. Although not a large industry, these businesses do have economic and social significance to the towns in which they exist. Anecdotal evidence suggests that RRG can produce very highly priced furniture products given the timber's natural qualities, and the difficulty and time taken to work the timber. Economic analysis of this retail side of RRG is beyond the scope of this report since the furniture makers have the ability to substitute RRG timber for alternatives and in-fact usually sell a mix of furniture's made from different timbers. Furthermore, such high value uses of the timber only make up a very small percentage of total output from volumes harvested, by this report at 2%.

Information about the above activities, from license application to harvesting, is often difficult to obtain and is, inappropriately, restricted from public availability by the relevant agencies. NPA and Economists at Large have made numerous Freedom of Information (FOI) requests, phone calls and emails relating to timber license conditions, royalty calculations and other aspects of forest management. While some information has been forthcoming, greater transparency around access conditions is required as it contributes, all other things being

equal, to more efficient management of forests, since public scrutiny can lead to greater public accountability. The present 'opaque' conditions under which the NSW public is selling their timber to private, profit driven companies can only contribute to less than optimal total economic value and total macroeconomic value outcomes.

2.2 RRG Environment

The RRG industry in NSW begins within the forests of the Riverina where RRG trees grow until the resource is harvested. Although RRG is sourced from both private and Crown lands, this report will be focusing on RRG sourced from Crown lands. These areas are managed, primarily, under the Forestry Act, 1916, by Forests NSW (FNSW), a Public Trading Enterprise within the NSW Department of Primary Resources (DPI). FNSW offices are co-located with DPI offices in Deniliquin, Dareton and Yanco (Macdonald, 2008).

Regional Geographic Context

FNSW manages harvesting of RRG from within the Riverina Management Region area as defined by FNSW and shown in appendix 1. The region is further divided into the Murray, Mildura and Narrandera/Murrumbidgee Management Areas. All of these areas fall within various other - sometimes overlapping - political, economic and ecological boundaries including:

- The Riverina Tourism Region
- The Murray Tourism Region
- The Riverina Bioregion

The following Local Government Areas are located within the Riverina Region identified as under management by FNSW:

- Balranald
- Berrigan
- Conargo
- Corowa
- District of Deniliquin
- Griffith
- Hay
- Jerilderie
- Leeton

- Murrumbidgee
- Murray
- Narrandera
- Wakool
- Wentworth
- Urana

Management Zones, State Forests and RRG

Within the Riverina Management Region, FNSW is responsible for managing approximately 400,000ha of State forested, or Crown Lands. Crown lands consist mainly of State Forest and Western Lands Lease areas. RRG volumes assessed throughout this report are based on volumes obtained by FNSW from both State Forests and Other Crown Timber Lands. Figures for the total area of River Red Gum on State Forests under management by FNSW are provided by BIS Shrapnel Forestry Group to be 150,000ha (BIS Shrapnel Forestry Group, 2001, p.11). Approximately two thirds of this, or 100,147ha (Todd & McDonnell, 2003, section 6.1.1) has been calculated to be the area of RRG on State Forests. Using FNSW Geographic Information Systems (GIS) data obtained under FOI in 2008, adding up all RRG vegetation types occurring in State Forests in the Riverina, the NPANSW arrived at a similar figure of 103,698ha for RRG on State Forests.

The total area of RRG resource on all Crown tenures, covering both State Forests and Western Land Leases, was also calculated by NPANSW using the same GIS data, resulting in total figure for RRG on Crown lands in the Riverina of 131,715ha. This is lower than the figure quantified by BIS Shrapnel Forestry Group (2001) as 180,726ha.

Information on the extent of RRG resource on private tenures is harder to obtain and is outside the scope of this report. Crown timber lands in the NSW Riverina, which are not pure RRG, would be comprised of Black Box and Grey Box, with limited areas of Cypress Pine, Bull Oak, Yellow Box and River Oak (Forests NSW, 2008, p.11). Areas of RRG on Crown Land are all managed by FNSW according to a particular Forest Management Zone (FMZ). FNSW data for all Riverina State forested (Crown) lands is shown below, followed by data showing the FMZ allocations for RRG State Forests only.

Table 1: Forest Management Zones and Area Managed – All Crown Lands

Forest Management Zone (FMZ)	Percentage of total managed by FNSW	Area (ha)
FMZ 1 – Special Protection (harvesting excluded)	0.87%	3,607
FMZ 2 – Special Management (harvesting excluded)	0.00%	0
FMZ 3A – Harvesting Excluded	24.03%	98,713
FMZ 3B – Special Prescriptions	2.86%	11,738
FMZ 4 – General Management	71.75%	294,706
FMZ 5 - Hardwood Plantations	0.04%	151
FMZ 6 - Softwood Plantations	0.03%	114
FMZ 7 - Non Forestry Use	0.08%	314
FMZ 8 – Areas for further assessment	0.34%	1,399
Total Area under management in Which Logging Is Permitted (FMZ 3B + FMZ 4)	75%	306,444
Total Area under management in Which Logging, Grazing or Other Management Activities are Permitted (FMZ 3 + FMZ 4)	99%	405,157
TOTAL Area of Crown Lands	100%	410,742
Total Area of RRG on State Forests in Riverina	25%	103,698
Total Area of RRG on all Crown Tenures in Riverina	32%	131,715

Source: Forests NSW (2008, pp.24, 26 and 27) and NPANSW calculations based on GIS data provided by FNSW.

We can see that RRG in the Riverina accounts for approximately 32% of all Crown timbered lands, yet timber royalties from RRG contribute to at least 82% of total revenues for FNSW in the region (as is shown in table 2 below). The table below shows the breakdown of the RRG State Forest resource into it's associated FMZs. This analysis was carried out using the same GIS data used to calculate total areas of RRG in State Forests, applying FMZ data to calculate areas of RRG State Forest being managed under each FMZ.

Table 2: Forest Management Zones and Area Managed – RRG on State Forests

Forest Management Zones (FMZ)	Area (ha)	Percentage of Total Area (%)
FMZ 1	1,771	2%
FMZ 3A	13,668	13%
FMZ 3B	8,303	8%
FMZ 4	79,956	77%
Total	**103,698**	**100%**
FMZ 1	1,771	2%
FMZ 3A	13,668	13%
FMZ 3B and 4	88,259	85%
Total	**103,698**	**100%**

Source: NPANSW calculations using GIS data obtained from FNSW. For these and subsequent calculations, we will use this marginally higher figure of 103,698ha since it is more recent than the 100,147ha provided by Todd & McDonnell (2003).
NOTE: The GIS FMZ layer was only available for RRG on State Forests. Because of this, only the table above showing FMZs for RRG on State Forests has been provided. A similar breakdown for the 28,017 ha of RRG on other Crown Tenures is not currently available.

FMZs applicable to an analysis of current management practices relating to forestry are Special Prescription (FMZ3B) and General Management (FMZ4). Zone 1 areas are set aside for conservation purposes owing to "very high natural and cultural conservation values, (Forests NSW, 2008, p.25). Zone 3 areas are managed for conservation or ecosystem values whilst also allowing for other management and production activities such as forestry. Zone 3A areas are 'harvesting excluded', with other management activities such as grazing permitted. In Zone 3B areas, harvesting is permitted but with lower intensity. Zone 4 areas are for managed for timber production, "utilising the full range of silvicultural options, as appropriate", (Forests NSW, 2008, p.25). These silvicultural options are covered in section 2.3.

As is shown in the table above, 85% RRG State Forest areas, or 88,259ha is available to all management activities including logging. 13% of RRG State Forest areas, or 13,668ha is not available to logging, but is available to other management activities such as grazing. 2% of RRG State Forest areas are set aside purely for conservation.

Sustainable Yields

FNSW uses the Murray, Murrumbidgee/Narrandera and Mildura Management Area Management Plans to calculate timber yields and decide which areas of the State Forest will be logged. The management plans were written in 1985, 1986 and 1982 respectively (Forests NSW, 2008, p35). Yields for high quality sawlogs prescribed in the Murray and Mildura Management Area plans are still in place today. FNSW is currently undergoing a review of long-term yields for State Forests in the Riverina which is scheduled for completion by the end of 2008 (Forests NSW, 2008, p34). An interim review of yields in the Murrumbidgee/Narrandera Management Area has already indicated that yields for high quality sawlogs may be reduced to around 50% of yields calculated in the 1980's. Forests NSW (2008, p.35) states that following this review, long-term annual yields will be reduced to 2000 m^3 by 2009. This is from 4000 m^3 prescribed in the Management Plan For Murrumbidgee Management Area (1986, p.29).

Given the severe and prolonged drought the region has suffered – resulting in Exceptional Circumstances (EC) being declared for the Riverina, (Department of Agriculture, Fisheries and Forestry, 2008) – and the resulting decreased flooding of RRG habitats, this is to be expected. VEAC(2006, p.207), states that "The productivity of river red gum forests has declined substantially, due partly to fewer and shorter winter-spring floods". Drought is not new to the area or RRGs, however, given predictions of increased frequency of droughts across Australia due to climate change, CSIRO (2007), allocated quotas need to be reassessed to ensure the long term sustainability of the forests. Such climatic changes are related to and exacerbated by anthropogenic changes to the riverine ecosystems which RRG forests are a part of. These changes have largely involved water allocation rights for irrigation of agricultural lands in the region. The combined effects of climatic change (be it short term or long term) and river regulation by human activities means that RRG Forests are suffering from severe decreases in flooding vital to healthy growth and regeneration. The impact this will have on sustainable yields is given by VEAC (2008b, p.102)

> *the sustainable harvest level would fall to 4294 cubic metres per year, or 71 percent of its current size, without implementation of any VEAC recommendations as a result of several factors, notably, lower growth rates caused by reduced forest flooding in recent years.*

Based on the findings of the VEAC report and analysis of revisions to yields from the interim review of the Murrumbidgee/Narrandera Management Area, it is highly likely that long-term sustainable yields in the other two management areas will also be decreased.

2.3 RRG Logging [Forest-Gate]

Silviculture Methods

Logging of RRG is currently undertaken or contracted out by sawmillers/processors themselves. Three silviculture approaches for harvesting sawlogs are prescribed by FNSW in the *Native Forest Silviculture Manual*. These are:

- Single Tree Selection (STS)
- Australian Group Selection (AGS), or patch clearfelling *and*
- Thinning

Source: Forests NSW (2008, p.35)

Australian Group Selection (AGS) is the most commonly used of these and usually follows a "three-pass" system as described by BIS Shrapnel Forestry Group (2001, p.21). This involves a quota miller harvesting and transporting quota/HQ sawlogs and any allocation of ex-quota/LQ from the forest. An ex-quota/LQ miller, usually a mobile miller then follows within 6 months, producing end products on-site (usually structural and residual sleeper and garden products). Within 2 years of the mobile miller, a residue operator (firewood producer) will harvest any green and dry residues from the site for firewood and mulch products. In this way, an area selected for forestry is effectively stripped of all grades of resources, HQ, LQ and Residues. The area is then left to naturally regenerate.

Resource Types and Log Grading

For the purpose of royalty calculations and tree selection, RRG is given different resource types and grades. The Red Gum Grading Rule (RRGR) has traditionally been used to grade sawlogs into either quota or ex-quota grades. Residues are also harvested and can include green sawlogs that do not fall into the HQ or LQ categories and green or dry residues occurring as a result of logging or natural causes. State Forests (NSW, 2001, p.5) proposed changes to the grading rule to divide quota log grades into HQ1 and HQ2 grades. Recent data available for sawlogs harvested, Forests NSW (2008, p.41) does not separate HQ1 and HQ2 and so it appears that logs/resource types are currently divided as shown in the table below.

Table 3: RRG Grading types, royalty units and approximate age harvested.

Resource Type / Grade		**Royalties Paid Per**	**Approximate Age Harvested (years)[1]**
HQ/Quota[1]	Sawlogs	m^3	Anywhere from eighty up to several hundred years old
LQ/ex-quota/salvage	Sawlogs	m^3	60
Residues	*Green Sawlogs*	tonne	40
	Green and Dry Residues	tonne	Varies

Source: Adapted from State Forests NSW (2001,pp.4-5) and DPI (2008b)
[1] 40 years is given for "Firewood", which we assume accounts for green sawlogs recovered as residues. The age of other green and dry residues would vary.

Harvest Volumes

In 2005/2006, 60,000 m^3 of sawlogs and 67,000 tonnes of residues were harvested from NSW State Forests. Converting residues to cubic metres, this equates to a total of 127,000 m^3 harvested from State Forests within the three management areas identified above. This is shown in the table below and in appendix 2.

Table 4: Volumes of RRG *Harvested* - by Resource Type - from Crown Lands in the Riverina (2005/06)

2005/06	Volumes	Percentage of Total Harvest
Total Sawlogs (m^3)	59,813	48%
HQ	32,430	26%
LQ	27,383	22%
Residues (tonnes)	67,333	
Conversion rate for tonnes to m^3 [1]	1	
Residues (m^3)	67,333	53%
TOTAL (m^3)	127,145	101%

Source: White (2006), see appendix 2. Rounding Errors exist in percentages.
[1] Bootle (2005) provides a green density of 1130kg/m3 and a dry density of 900 kg/m3. Since we are applying the conversion rate to residues which would have differing moisture contents and are subject to air drying, we assume the average of these two figures of 1015 kg/m3, rounded down to 1000kg/m3 or a conversion rate of 1.

As we can see, 26% of all harvested timber is HQ or quota grade sawlogs, 22% is LQ or ex-quota sawlogs and 53% is residues. The next section will look at the revenues FNSW receives on behalf of the NSW Public for the sale of the RRG resource.

Revenues at the Forest-gate

FNSW received revenue for commercial (or management) activities within RRG forests in the form of royalties and licensing fees. Royalties for RRG sawlogs are paid per m^3 'at stump' according to the grade of the sawlog and per tonne for residues. Information on licenses is harder to obtain but BIS Shrapnel Forestry Group (2001, pp.22-23) indicates that annual allocations for Quota sawlogs to Crown fixed sawmills are based on "historical timber rights". Ex-quota allocations are sometimes included in quota allocations or on a parcel sale/one off basis. BIS Shrapnel (2001, pp.22-23) states that 80% of ex-quota allocation is directly allocated to entities while 20% is sold by way of 'competitive tender'. No information on residue allocations or licensing is available.

The value of RRG timber royalties paid for RRG to FNSW is estimated at $4.1m for the 2005/06 financial year (see appendix 5). Of this, approximately $3.08m can be attributed to sawlog royalties and $1.03m to residue royalties, as shown in the table below. Based on tables in appendix 4 and anecdotal evidence, we assume that all timber revenues in the Riverina are based on RRG forestry management activities. Timber harvesting is the major management activity associated with such forests although other activities such as grazing and apiculture also exist and contribute around $0.18m in revenues, Forests NSW (2008, p.41). This report will be focused on timber industries associated with RRG in State Forests.

Table 5: Revenue profile for FNSW Riverina Region (2005/2006)

	Percentage of Revenue	Value ($)
Revenues from Forestry Management	100%	5,000,000
Revenues attributable to RRG timber sales	82%	4,100,000
Royalties attributable to sawlogs	75%	3,075,000
Royalties attributable to residues	25%	1,025,000
Revenues attributable to other sources	18%	900,000
Land rental revenues (grazing and apiary)[2]	4%	175,000
Other revenues	15%	725,000
Revenues Attributable to RRG Timber Industries	82%	4,100,000

[1] Source: Forests NSW (2008, p.37) and Macdonald (2007a). See tables and calculations in appendix 4, it is assumed that all timber sales in the Riverina are attributable to RRG State Forests since figures available for RRG royalties approximate very closely figures above.
[2] Source: Forests NSW (2008, p.38)
NOTE: BIS Shrapnel (2001, p.23) indicates that 20% of LQ allocations to mobile mills are sold via 'competitive tender'. For 2006, allocations to mobile mills for LQ sawlogs were 10,996 m^3, 20% of this is approximately 2200 m^3. Due to a lack of data, we have assumed that this 2200 m^3 would not contribute significantly to revenues attributable to timber industries.

The revenues from timber sales above are estimated to be generated on the harvested volumes, averaged across 2005/06, from table 4 above.

Based on this, it is possible to calculate the following estimates of current average royalty rates for sawlogs and residues. Table 6 below shows these calculations.

Table 6: Estimation of current royalty rates paid for RRG

	Amount ($)	Royalty Rates Paid Per	Volumes Harvested for 2005/2006	Estimated Average Royalty rates ($)
Revenues from Forestry Management	5,000,000			
Revenues attributable to timber sales	4,100,000			
Timber sales attributable to sawlogs	3,075,000	m^3	59,813	51
Timber sales attributable to residues	1,025,000	tonnes	67,333	15

Source: Forests NSW (2008, p.37) and White(2006), see appendix 5.

Value at the Forest-gate

The annual operating cost of the Forest New South Wales Riverina Management Region for 2006/2007 was $3.85m (Macdonald, 2008). Combining this with calculations from table 5 above, it is possible to create a profit and loss profile for FNSW in the Riverina. This is shown in table 7 below:

Table 7: Estimated Profit & Loss profile for FNSW Riverina Region

	Value ($)
Revenues from all Activities	5,000,000
Costs of Management for all Activities	3,850,000
Estimated Profit from all Activities	1,150,000
Revenues attributable to RRG Timber Activities[1]	4,100,000
Costs of Management attributable RRG Forestry Activities[2]	3,157,000
Estimated Profit from RRG Forestry Activities	943,000

Source: Forests NSW (2008) and Macdonald (2008), Revenues are from 2005/2006 and Costs for 2006/2007.
[1] Includes RRG Sawlog sales and residue sales. Does not include any land rental attributable to RRG State Forests, this is likely to be a small amount, being either $175,000 from table 5, or a portion of this.
[2] Attributes the same proportion of costs as revenues - 82% - to RRG operations.

So we see that at the forest-gate (as opposed to the mill-gate), the value added of the RRG timber industry accruing to the taxpayer of NSW is around $0.94m, if we accept FNSW data as accurate. This is the value the public of NSW gains from current management activities, over 80% of which is attributable to selling 127,000 m^3 of timber to private, profit-driven businesses. It should also be noted that this analysis is based on the FNSW estimate of operating costs, without considering financial costs such as a return on past investments (e.g. roading), other capital assets such as land acquisition and vehicle costs, potential carbon losses, non-payment of rates, government subsidies and the need for future capital investment. The low costs of FNSW are a serious issue for private growers of trees, most of whom would normally be local farmers trying to diversify their income.

Cost Comparison with Private Grower

Estimates made using FNSW data indicate that approximately 127,000 m^3 of RRG from 4757 hectares was harvested in 2007 in the Riverina. The costs to manage these operations were have been estimated as $3.2m, with gross revenue of $4.1m and net profit of $0.94m. In Table 8 we have compared the cost per hectare and the cost per tonne for the private grower versus FNSW in RRG State Forests. The economics of tree growing are complex but it is significant to note the scale of cost difference between a private grower per hectare (the private grower seeks greater density) and the cost per tonne.

Table 8: Comparison of FNSW RRG Costs vs Private Woodlot Production

		Gross Revenue	Operating Costs	Net Profit
FNSW	All RRG Management Activities[1]	$4,100,000	-$3,157,000	$943,000
	Per Hectare (@ 4757 ha / yr)[2]	$862	-$664	$198
	Per Tonne (@ 127,145 tonnes / yr)[3]	$32	-$25	$7
Private	Per Hectare (@ 2000 ha / yr)[4]	$9,800	-$9,141	$659
	Per Tonne (@ 390,000 tonnes / yr)[5]	$50	-$47	$3

Source: Grey(1999), see appendix 4 and EcoLarge Analysis
[1] Revenues, costs and net profit from table 7.
[2] Per hectare revenues, costs and net profit, based on areas harvested, see appendix 3.
[3] Per tonne revenues, costs and net profit, based on total tonnes harvested of 116,477, see appendix 2.
[4] Per hectare revenues, costs and net profit for private grower [Air dried tonnes]
[5] Per tonne revenues, costs and net profit for private grower [Air dried tonnes]
Note: The table above assumes that FNSW has scale advantages over private growers.

If we take the cost per tonne as the effective output of the industry we can see that privately grown, fully costed timber for firewood, grown over a short 15 year cycle is costing about $47 per tonne on our estimates (see appendix 4 – totalling all the costs under the $/tonne column). The figures from table 8 for private growers represents a potential 'shadow cost' and 'shadow price' for timber. That is the price that would be charged to cover costs if the market for timber was governed by an 'efficient' policy structure and hence was an 'efficient' market without subsidies. Ideally the shadow price should equal the actual price for timber. Where the shadow price diverges from the actual price there is normally an 'inefficiency' in the market caused by government policies and intervention. If such policies result in inefficient and distorted economic outcomes, then another, social or environmental justification must exist for maintaining that particular policy. In the case of the RRG timber industry, social and environmental justification for current policy regimes are non-existent in the case of environmental. Social justification for current management policy regimes could be said to exist around support for local industries in the Riverina which are already affected adversely by demographic trends and environmental conditions (i.e. prolonged drought). However, such a policy would be wrong-headed in-light of the ecological and environmental distortions that current policies result in and opportunities for alternative industries discussed in section 3.

Our calculations show that FNSW pays $25 per tonne for operating costs before financial costs, whilst the private grower pays an estimated $47 per tonne for all costs including both operating and financial costs. If FNSW is correct, then prima facie, it is undercutting private sector players without good public policy reasons, and is challenging the Federal Governments policies on competition policy (i.e. a level playing field for all industries, ceteris paribus) as should be enforced by the ACCC and National Competition Policy. In particular, it should be noted that the interest cost is also a significant factor in the cost structure that is, apparently, not borne by the state agency.

FNSW Estimated True Commercial Costs

The above represents a very rough cost comparison between the results of a 'firewood' business plan that Economists at Large had previously compiled for the Victorian National Parks Association (Grey, 1999). On this basis it could be said that private costs are 88% higher on a per tonne basis than those presented by FNSW (calculated by subtracting $25 from $47 and dividing by $25 multiplied by 100). This is shown in the table below:

Table 9: FNSW Profit if Commercial Costs are Included

Per tonne operating costs of FNSW	$25
Per tonne operating costs of Private grower	$47
Per tonne operating advantage of FNSW	$22
Operating advantage of FNSW (%)	88%
Revenues from RRG Forestry Management	$4,100,000
Costs of RRG Forestry Management	$3,157,000
Cost adjustment factor	1.88
Estimated True Commercial Costs of Management for FNSW Riverina Region	$5,935,160
Estimated True Commercial Profit of FNSW Riverina Region	-$1,835,160

Source: Forests NSW(2008), Macdonald(2008) and *Grey(1999)*. Revenues are from 2005/2006 and Costs for 2006/2007.

On this basis we estimate that once commercial costs not born by FNSW are factored in, FNSW in the Riverina would actually operate at a loss of $1.8m. A Productivity Commission report (Productivity Commission, 2008, p.314) indicates that this is likely to be the case:

> *Only two of the six forestry GTEs achieved a return that exceeded the risk-free rate of return on assets — FPCWA and ForestrySA. This suggests that the remaining forestry GTEs are not operating on a commercially sustainable basis.*

This process has a significant impact on the stated value of the RRG forest industry. This report has gathered data to fill in the following table. The numbers in black are actual data that we have been able to obtain either through publicly available sources, or via parliamentary questions and FOI requests. The data in green represents actual business costs to the RRG state owned forestry business (at the forest gate) that are not presently available or included in the net profit figure. When the additional costs are included it is likely that the state owned forestry enterprise is losing money. The table below explores the impact of an economically efficient policy structure in the 'adjusted' column. In simple terms the state owned forest industry sees it business disappear to be replaced by farm-based growers, in close proximity to the relevant mills.

Table 10: Existing versus 'efficient' policy outcomes on RRG forest harvesting

Cost & Revenue category	Forest Gate – published data based on existing policy settings	Forest gate adjusted data based on efficient policy settings	Impact of existing pricing policy
Gross revenue	$4.1m	Revenue would be determined by proximity to milling	Restrains the trade of private growers close to mills by subsidising distant state owned forest supplies
Operating cost	$3.2m	Production costs probably understated when compared with private operations. Timber resource is probably over-exploited.	Increases the transport cost for some mills at the expense of profits for other mills. Transport costs become a bigger proportion of the industry cost base.
Net profit	$0.94m	Probably a net loss to NSW taxpayers – would be closed down.	Makes private forestry uneconomic, permanently binds the mill owners to the 'whims' of the state forest agency
Taxation	Not available – not included, as far as we can tell, in RRG forest production costs	Included	Levels the playing field and increases private sector investment
Land Rates & charges	Not available – not included, as far as we can tell, in RRG forest production costs	Included	Levels the playing field and increases private sector investment
Return on Invested Capital	Not available – not included, as far as we can tell, in RRG forest production costs	Included	Levels the playing field and increases private sector investment
Depreciation	Not available – not included, as far as we can tell, in RRG forest production costs	Included	Levels the playing field and increases private sector investment
Borrowing Costs	Not available – not included, as far as we can tell, in RRG forest production costs	Included	Levels the playing field and increases private sector investment
Carbon Costs	Not available – not included, as far as we can tell, in RRG forest production costs	Included	Levels the playing field and increases private sector investment
Possible impact on Net Profit at the forest gate	No change	State forest profit goes down, but private forest profit goes up and mill resource base gets bigger	Levels the playing field and increases private sector investment

In an efficient policy mills are freed from having their profits determined at State Forests head office. This bizarre commercial practice whereby private business must submit its profit to scrutiny by public servants is a result of a failed attempt at industry development by the State Forest agency. Centralised direction of business failed in the former Soviet Union and it has failed in the RRG State Forests as well. This centralised process, that can only be described as 'kremlinesque', is in fact, also costing the future of the milling industry. This industry can only survive if the farmers begin to invest in long term supplies of timber – and this cant happen until the state agency stops undercutting the market of private growers through bad policy design.

2.4 RRG Royalty Rates and Methods

This low value of $0.94m accruing to the NSW public suggests, as various economists have noted, that the amount paid for timber royalties on public land is far too low (Marsden Jacobs, 2001).

Based on figures for volumes harvested and revenues received from tables 4 and 7, of royalty rates for RRG can be calculated are shown in the table below, for a full summary of calculations, see appendix 5.

Table 11: Royalty Rates for 2001 and 2005/06.

	2001	2005/06[1]
Sawlog average	38	51
HQ ($ / m^3)	41	55
LQ ($ / m^3)	35	47
Residues ($ / tonne)	11	15

Source: BIS Shrapnel Forestry Group (2001, pp115-117), Forests NSW (2008) and White (2006), see appendix 5
[1] Breakdown of HQ vs LQ royalty rates for 2005/06 assumes same weighting as in 2001. Figures for 2001 were calculated using a bottom up approach whilst 2005/06 figures used a top down approach due to lack of other data. See appendices for tables summarising calculations

What the table above does not show is that royalties vary significantly from area to area. Prices closer to milling towns tend can be as high as $50/$m^3$, while more distant quota grade logs have royalties of only $29/$m^3$. For ex-quota logs, we also see a wide range of values dependent on proximity to sawmills ranging from $48/$m^3$ to $22/$m^3$. (BIS Shrapnel Forestry Group, 2001), see appendix 5 for data and calculations.

To put the values calculated for royalty rates in context, it is useful to understand how they are calculated in NSW. These values and methods of calculating royalties are at the very heart of this question mark around the true value of timber on public land.

According to federal government departments, royalty values should:

> *reflect the full cost of [forest] operations, i.e. they should cover a normal return on capital, the forest management costs related to these operations, appropriate resource use payments and the repair of any environmental damage caused by these operations. Resource use returns to the community (as owners of public forests) should be set at levels that reflect the estimated value of the basic resource, i.e. the trees and other forest resources. If the marginal market value of the extracted products is less than the marginal value of the full resource costs of forestry operations, the operations should alter or discontinue.*
> *(Department of Environment, Water, Heritage and the Arts website, Sec. 6.2)*

Royalties are calculated using a method known as the Hardwood Log Value Pricing System, a form of residual valuation (SFNSW 2000 and Marsden Jacobs 2001). Royalties are calculated as "the residual value to a sawlog processing company after deducting all the reasonable costs of manufacturing, distribution and otherwise conducting a business, including a reasonable level of profit, from the value of end-products" (SFNSW, 2000 p2).

Thus calculations for royalties are worked out by:

Market price for end products
less "appropriate" level of profit
less haulage and transport costs
less costs of production
less logging costs
= Royalty rate
Source: Marsden Jacobs (2001, p3.7)

Clearly this method of calculating royalties is flawed. Firstly, because it is based on market prices in an already distorted market. The market is distorted due to avoidance of commercial costs by FNSW, the failure to price in externalities resulting from logging activities and the distorting manner in which transport costs have been handled. To make all areas of forests equally profitable to harvest, timber from areas further from mills is priced more cheaply, as transport costs are greater.

By including transport and other costs of extraction, otherwise uneconomical forests are potentially subsidised. This exploitation of forest areas that are further away and more difficult to access is irrational, as it is in effect paying more for less efficient production. As Marsden Jacob (2001, p3.10) put it:

> *this is equivalent to guaranteeing banana growers in the Antarctic the same profits as banana growers in more suitable natural climates such as Coffs Harbour.*

Secondly, because the pricing process is subjective – what should constitute an "appropriate" rate of profit – and why should public servants decide what it is on behalf of private enterprise?

Thirdly, and most significantly, is that each logging site is prevented from bearing its own costs. Hence a more distant site would have higher costs and hence not be logged, whilst a nearby site maybe logged. The net effect is that the public as Marsden Jacob describe are left holding the bag (Marsden Jacob (2001, p3.17).

The policy approach used by FNSW with respect to timber supply is like a community employment program for the milling industry. The taxpayers of NSW guarantee that millers will profit from the sale of timber, irrespective of the cost to the taxpayer. FNSW has effectively privatised the profits (such as they are) from the sale of timber and 'given' them to the timber industry, whilst the losses and the risks have been socialised and given to the NSW taxpayer.

The process ultimately defeats the objective of FNSW which, we can infer, is to support and grow the RRG industry (often referred to as industry development policy). Since the pricing approach makes it hard for farmers to compete the industry, including the millers, are not free to grow a sustainable timber supply outside the FNSW approach. Hence there is no supply security that would come from a diverse customer base. Meanwhile there appears to be little incentive to grow the RRG resource base, with the same dedication that a farmer might grow some trees for 'superannuation'.

Royalty rates should instead be set to include the full costs, including environmental costs, of logging operations. Royalty calculations should also be transparent and open to the public. Marsden Jacob (2001) recommend that to improve public confidence, and economic efficiency, royalties should be set by bodies "at arms length" from FNSW.

In summary, the current royalty calculation methods have extremely significant and negative connotations for the public owners of the forest. The forest-gate price is *not* set based on the cost of forest production and the demand at the forest-gate. Forest production operations are being conducted without regard for the cost of production. Distant forests would 'sell' timber at less than cost of production, and even nearby forests could be selling at near cost of production. The public forests are being 'thrown' at the industry in the 'desperate hope' that an infant industry will grow into a 'grown up' industry. After 50 years this strategy, like the Soviet Union, can be said to have failed. The public managers of the forest, consequently have difficulty finding out the selling price of 'their forest'. This makes it difficult, if not impossible, for farmers to price timber on their lands, or evaluate investments in timber production. This lack of information reduces the farmer's incentive to plant trees and be involved in timber supply. As a result there has been minimal private investment in hardwood sawn timber supply – ensuring an inadequate supply to the timber industry.

2.5 Calculating Full Economic Costs of RRG Logging

Analysis in the last section incorporated only direct-extractive financial costs in calculating the value of the RRG timber industry at the forest-gate. The analysis did not include the impact logging the forest has on the Total Economic Value (see Figure 1) of RRG forests. These include environmental and social costs that are linked to indirect economic costs and direct economic use and non-use costs. Examples of these are the loss of non-use values and opportunity costs to other users of the RRG resource. While difficult to quantify, these costs are real and significant, this section will discuss and where possible, quantify some of these costs.

Environmental Costs

The Environmental costs of logging RRG forests are significant due to the depletion of natural capital and diminished services rendered by RRG forests. This is particularly the case where patch clearfelling or AGS is used as a method of timber extraction. Indeed, a review conducted of patch-clearfelling in North-Eastern NSW concluded that:

> *Clearfelling of gaps greater than approximately 40m diameter is incompatible with optimal habitat tree protection and recruitment. Any creation of gaps of larger size must be undertaken with the expectation that hollow dependant fauna will decline.*
> *(Attiwill et. al., 1996.)*

In NSW State Forests, patch clearfelling is carried out over large areas, though exact detailed figures are not available. AGS silviculture usually follows the "three-pass" system described in section 2.3 of this report. Environmental costs associated with this include damage to ecosystem services and species diversity as well as reduced recreation values and the loss of non-use values to the public. Clearfelling also reduces the ability of ecosystems to recover leading to (and exacerbated by) the invasion of weeds and feral species.

Loss of Non-use Values

Economic analysis and public debate often focuses only on direct-use values measured using available market prices. However, analysis of the non-use values is important for a proper understanding of the total economic value of a resource. It is total economic value, rather than direct financial value of one use, that should inform public policy decisions. Non-use values have been defined as:

> *the values that people in the community might hold for environmental assets, irrespective of whether they have direct or indirect contact with them... the value that people obtain, for example from knowing that ecosystems will be protected for future generations. (URS, 2007, pg.1)*

Economists measure these values through what are known as non-market or implicit pricing techniques. In 2006, a

study was carried out measuring the full value of RRG forests in Victoria using a method known as "choice modelling".

Commissioned by VEAC and carried out by URS Australia, the study collected data from households in Melbourne and several areas around Victoria. Households were surveyed and asked to choose what price they would be willing to pay annually for an increase in area of healthy RRG forest. The results found that the average price Victorian households were prepared to pay annually for a 1000ha increase in healthy RRG forests was $1.60 (Gillespie et al, 2007 and URS, 2007).

This provides an estimate of the value that the public places on the non-market values of RRG forests. Assuming that a similar figure would be obtained in NSW, it is possible to calculate a value that would compensate the NSW public for the damage that logging operations cause to areas of the forest.

Table 12: Non-use Choice Modelling Value of RRG logged

Estimated total hectares logged (2007)	4757
Average Price each household is prepared to pay to conserve *one thousand hectares of RRG*	$1.60
Average Value each household is prepared to pay to conserve area logged	$7.61
Number of households in NSW	2,328,218
Implicit value of logged areas	$17,720,533

Source: FNSW logging schedules, provided to NPA (See Appendix 3), Gillespie et al (2007), URS (2007) and Australian Bureau of Statistics (2007)

This is the non-market value that the NSW public places on the area of RRG forest logged annually. It is the minimum compensation that should be paid through the collection of revenue for management activities which impact on RRG in State Forests. Current revenues generated by FNSW from RRG timber royalties are considerably lower than this, at only $4.1m. Based on this analysis, if the environmental opportunity costs incurred by the state are internalised in evaluations of the RRG activities of FNSW, then FNSW would operate at a loss of $16.8m. This cost is borne by the NSW public through the un-compensated extraction of their forest resource. From this figure, we can also estimate that the RRG timber industry is currently subsidised to the tune of $13.6m.

Table 13: Estimated Annual Uncompensated Loss and Industry Subsidy

Revenues attributable to RRG Timber Royalties	$4,100,000
Costs of Management attributable RRG Timber Activities	$3,157,000
Estimated Profit from RRG Forestry Activities	$943,000
Loss of Non-use values	$17,720,533
Uncompensated loss to NSW Public	$16,777,533
Effective subsidy to RRG timber industry	$13,620,533

Source: EcoLarge Analysis, Table 7 and Table 12.

This figure of $17.7m is a conservative estimate. The survey measured household's willingness to pay annually for a 20 year period, but this ongoing value is not included here, to reflect that some values are regained as logged areas regenerate. However, the net present value of this figure would be substantially higher, as it would include discounted losses in the future. Factoring in intergenerational equity considerations, the full, uncompensated loss would be even greater still.

The reduction in total economic value that the RRG industry is causing in its logging phase demonstrates that FNSW royalty rates in RRG forests are too low. The industry's loss is effectively being offset by the NSW public through the uncompensated reduction in natural capital and services rendered by publicly owned native forests. These costs should be covered by royalty payments, and not as a public subsidy to the RRG timber industry.

Based on the data and calculations above, it is possible to estimate the royalty rates which would reflect this non-use value and following this, the extent of the subsidies on a m^3/tonne basis which the industry currently receives.

Table 14: Estimated Royalties and Subsidy to RRG Timber Industry in 2005/06

	Percentage of Revenues	Estimated Volumes	Royalties which should be paid on total volumes harvested	Royalties which should be paid per unit harvested	Current Estimated Royalties per unit	Current Estimated Effective Subsidy per unit
Sawlogs (m^3)	75%	59,813	$13,290,400	$222	$51	$171
Residues (*tonnes*)	25%	67,333	$4,430,133	$66	$15	$51

Source: Tables 5, 7 & 11 and appendix 5.

This subsidy distorts the use of RRG resources and does not ensure that the best interests of the NSW public are being considered.

2.6 RRG Processing / Milling [Mill-Gate]

Once the sawlogs or residues are harvested, they are processed or 'milled' into products by fixed mills, mobile mills or firewood producers. RRG is generally processed into green sawn products with further processing sometimes being carried out to produce kiln dried (KD) furniture grade timber, tongue and groove (T&G) flooring, feature panelling or veneer. A significant amount (calculated at 83% by EcoLarge) of all timber processed becomes mulch and firewood.

The table below shows the number of operators which we estimate to be based on NSW for tax purposes. For our analysis of mill-gate output attributable to the NSW economy, we only consider NSW based operators.

Table 15: Estimated Number of Operators in NSW (2006)

	Given Licenses to operate in NSW State Forests	Based in NSW[1]
Fixed Mills	6	4
Mobile Mills	10	10
Firewood Producers[2]	30	30

Source: White(2006)
[1] Since no information to the contrary is available, we have assumed that all mobile mills and firewood producers are located in NSW for tax purposes.
[2] Forests NSW (2008, p.30) states that there are 30 additional operators licensed to harvest residues for 'fuel wood'). This correlates with White (2006) which shows a maximum of 30 residue operators operating, some are likely to be operating across different MAs.

Tables 16, 17 and 18 show the different profiles for each type of operator providing input types and volumes they utilise (harvested volumes) and the range of products they produce.

Table 16: RRG Operator Profile - Mobile Mills (2008)

Quality / Grade	Total Harvested (m^3)[1]	Product Categories	End Product
LQ	11,365	*Sawn Products*	
		Appearance	Green
		Structural	Rail sleepers House stumps and fencing(A Grade)
		Residual	Landscape sleepers (B Grade)
		Other Products	
		Mulch	Chips Mulch Sawdust
		Firewood	Firewood
TOTAL	11,365		

Source: Adapted from BIS(2001, pp.113-114), State Forests NSW(2001, p.20), VEAC(2006, p.226), White(2006).

Table 17: RRG Operator Profile - Firewood Producers (2008)

Quality / Grade	Total Harvested (m^3)[1]	Product Categories[2]	End Product
Residue	55,030	*Other Products*	
		Mulch	Chips Mulch Sawdust
		Firewood	Firewood
TOTAL	55,030		

Source: Adapted from BIS(2001, pp.113-114), State Forests NSW(2001, p.20), VEAC(2006, p.226), White(2006).

Table 18: RRG Operator Profile - Fixed Mills (2008)

Quality / Grade	Total Harvested (m^3)[1]	Product Categories	End Product
HQ	21,755	*Sawn Products*	
		Appearance	KD Furniture grade Veneer leaf T&G blanks KD Green
		Structural	Rail sleepers House stumps and fencing (A Grade)
		Residual	Garden sleepers (B Grade)
		Other Products	
		Mulch	Chips Mulch Sawdust
		Firewood	Firewood
LQ	11,268	*Sawn Products*	
		Appearance	KD Furniture grade Veneer leaf
			T&G blanks KD Green
		Structural	Rail sleepers House stumps and fencing (A Grade)
		Residual	Landscape sleepers (B Grade)
		Other Products	
		Mulch	Chips Mulch Sawdust
		Firewood	Firewood
Residue Sawlogs NOTE: Residue harvested by fixed mills in NSW was calculated at 19,250 m3 (See appendix 8.). Other Residue is obtained from 19,250 - 7,100. For the purposes of our analysis, all residue sawlogs are assumed to be processed by fixed mills.	7,100	*Sawn Products*	
		Appearance	KD Furniture grade Veneer leaf
			T&G blanks KD Green
		Structural	Rail sleepers House stumps and fencing(A Grade)
		Residual	Landscape sleepers (B Grade)
		Other Products	
		Mulch	Chips Mulch Sawdust
		Firewood	Firewood
Other Residue	4017	*Other Products*	
		Mulch	Chips Mulch Sawdust
		Firewood	Firewood
TOTAL	44,141		

Source: Adapted from BIS(2001, pp.113-114), State Forests NSW(2001, p.20), VEAC(2006, p.226), White(2006).

In this section we estimate the potential market value or output of the timber milled by the RRG timber industry in 2008. The industry includes the three operator types listed above and their respective product profiles. Values for

output are calculated by applying recovery rates to the various resource types (quota/HQ, ex-quota/LQ, residue) harvested and multiplying resulting saleable volumes per product category by average market prices per product category. See appendix 6 for a full overview of methodology applied to arrive at estimates. Our calculations used data from reports by BIS Shrapnel Forestry Group, Forests NSW, the Victorian Environmental Assessment Council, information obtained from FNSW by National Parks Association NSW with FOI requests and price information from local mills.

Annual Volumes and Sources of RRG

This report is focusing mainly on RRG sourced from public land, however, it is important to realize that 46% of RRG harvested comes from native forests on private land in NSW. The breakdown of public and private sources of RRG from native forests is shown in the table below.

Table 19: Annual Volumes and Source of RRG Timber (2001)

Tenure	**Sawlogs** (m^3)	**Residues** (m^3)	**Total** (m^3)	**Percentage**
Public[a]	66,400	75,000	141,400	54%
Private	68,500	53,750	122,250	46%
Total	134,900	235,656	263,650	100%

Sources: State Forests NSW (2001, p.2)
[a] Our calculations, using White (2006), see appendix 2, come in at 148,168m^3 for 2001. We use our figures for all other areas, but used State Forests NSW figures here for consistency in comparison of the amounts harvested from the different tenures.

Assuming a similar profile for resources harvested and products produced as for RRG from State Forests, we assume that RRG from private land accounts for 46% of the total mill-gate output. Due to a lack of data, we assume that this 54% / 46% split has remained unchanged since 2001.

The tables beneath will only cover data for RRG sourced from State Forests, although this assumed split between public and private sources is used in other areas such as calculating costs to operators and total industry mill-gate output.

Recovery Rates

Before calculating the mill-gate value of the industry, it is necessary to consider the recovery rates for RRG. The recovery rate refers to the amount of sawlog "roundwood" that is converted to milled, marketable timber. Recovery rates for RRG vary depending on the grade of the sawlog being processed. The table below shows the recovery rates for the various grades of log, for calculations and data, see appendix 7.

Table 20: Recovery Rates by Log Grade

	Appearance Recovery	Structural Recovery	Residual Recovery	Mulch Recovery	Firewood Recovery
HQ/Quota	10%	18%	11%	33%	28%
LQ/Ex-Quota/Salvage	3%	16%	17%	35%	29%
Residues	4%	8%	22%	36%	30%
Average	6%	14%	17%	35%	29%

Source: State Forests NSW(2001, p.20, Table 20), BIS Shrapnel Forestry Group (2001, p.113, table 15) and White (2006). See appendix 7 for original data and calculations
Note: The figures above assume that all waste materials resulting from harvesting and processing RRG are recovered and sold as 'Other Products' (Mulch and Firewood).

Table 21: Estimate of Saleable Products by Product Category, at Mill-gate

Product Category	Total Saleable Volumes[1]	Saleable Volumes as Percentage of Total Inputs
Appearance	3,139	3%
Structural	8,105	7%
Residual	7,803	7%
Mulch	20,052	18%
Firewood	71,437	65%

Source: See appendix 7 and 8.
[1] Based on m^3 volumes for all product categories including firewood.

To calculate mill-gate output on these volumes, prices from various sources have been used and are calculated as shown in the table below.

Table 22: Prices for Different Product Categories (2008)

Product Category	End Product	Average Price ($)	Average Price for Product Category ($)
Sawn Products			
Appearance	KD Furniture *(800mm-wide slabs for table or bench tops.*	4,000	2,716.7
	KD select and feature grade	2,400	
	General furniture and flooring	1,750	
Structural	Structural timbers	750	700.0
	Railway timbers	650	
Residual	Low grade timbers	360	360.0
Other Products			
Mulch[1]	Chips	27	27.0
	Sawdust		
Firewood[2]		83	82.5

Source: VEAC(2006, p.227) and BIS Shrapnel Forestry Group (2001, p. 114, table 16) and prices obtained directly from mills in 2008 [for Mulch and Firewood]
[1] Average prices are used, ignoring sawdust, which has a low value and is likely to make up a very small percentage of sales
[2] Prices for firewood given in tonnes, all others are m^3.
[3] Structural Prices for Mobile mills are priced at $108 per m3 in light of recent contract prices for railway sleepers for a Victorian Government contract.

Estimated *Gross* Mill-gate Revenue

Multiplying the prices from table 21 above through the mill-gate product categories, we estimate RRG timber sourced from public land to generate gross mill-gate revenue of $22.2m. Assuming that this represents 54% of total input and that the other 46% (private sources) has a similar processing profile - that is, the same proportion of inputs are processed into the same proportion of saleable outputs - gross mill-gate revenue value for all tenures in the NSW Riverina is estimated at $43.3m.

Table 23: Estimated Gross Mill-gate Revenues for RRG fro Crown Lands (2008)

Total Inputs (m^3)	110,536			
Total Revenues ($)	22,367,430			
Product Category	**Total Saleable Volumes[1]**	**Estimated Average Prices per Product Category ($)**	**Estimated Revenues per Product Category ($)**	**Revenues Per Category as Percentage of Total Revenues**
Appearance	3,139	2,716.7	8,526,307	38%
Structural	8,105	700.0	4,597,208	21%
Residual	7,803	360.0	2,808,964	13%
Mulch	20,052	27.0	541,411	2%
Firewood	71,437	82.5	5,893,541	26%

[1] Based on m^3 volumes for all product categories including firewood. For calculating revenues per product category, firewood is converted back to tonnes.

It should be noted that calculations above are based on prices given at mill-gate to an individual, in a retail-like situation. They represent the maximum possible mill-gate value of the industry. In a recent contract for provision of railway sleepers(structural) with the Victorian Government, products were considerably cheaper than our estimates. Contracts for approximately 300,000 railway sleepers (approximately 75,000m^3) were priced at $8,098,995, giving a price of $108/$m^3$. As large customers receive considerable discounts, the real mill-gate value of the industry is potentially far lower than the estimate provided here.

Our calculations also assume that all potential sawn products (after applying recovery rates to log grades) product category are utilised. The figures for saleable volumes are therefore likely to be highest estimates of potential revenues realisable. This is shown in the table below, in which we compare our estimates to those from other sources.

Table 24: Recovery Rates for Total Output and Sawn Output.

	EcoLarge	*BIS*	*VEAC*
Total Input (m^3)	110,536	Aggregate Data Not Available	
Total Sawn Output (m^3)	19,046		
Total Other Output (m^3)	91,489		

	Recovery Rates for Total Output	Recovery Rates for Sawn Output	Recovery Rates for Total Output[1]	Recovery Rates for Sawn Output[1]
Sawn Timber Recovery Rates by Product Categories				
Appearance	3%	16%	7%	4%
Structural	7%	43%	18%	58%
Residual	7%	41%	14%	38%
SUB-TOTAL	17%	100%	39%	100%
Other Products Recovery Rates by Product Categories				
Mulch	18%		34%	
Firewood	65%		28%	
SUB-TOTAL	83%		61%	
TOTAL	100%		100%	

[1] Recovery rates for total output are provided by BIS Shrapnel Forestry Group (2001, p.113, Table 15) and for recovery of sawn output by VEAC (2006, p.227, table 14.5). We suspect that differences in recovery rates (being higher than our estimates in both cases - except for residual as a percentage of sawn output - are due to the use of mainly fixed mill data for modelling. In the case of VEAC, the figures were based on a single fixed mill, for BIS, it is unclear but is likely that modelling was carried out for fixed mills only. Appearance recovery as sawn output is high under our model. We assume this is due to the use of highest estimates of potential for appearance grade products based on estimated appearance recovery rates. This may have resulted in our estimates of mill-gate output being overly high.

Estimated *Net* Mill-gate Revenue

When considering estimates above, it is important to remember that they are gross values. They assume that all timber is sawn based on it's full potential for appearance, structural and residual categories and sold at the market price appropriate to its quality. In this section, an attempt has been made by Economists at Large to calculate the net revenue or value added attributable at the mill-gate. This is calculated as the gross revenues minus costs.

There is no publicly available information on costs faced by the industry, as is to be expected of most private industries, however BIS Shrapnel Forestry Group (2001) estimated costs to mill-gate as $25m per year in 2001 (p.47). This estimate represented "mean delivered cost of saw logs to the mill yard and … weighted total cost of processing all products from log to mill-gate" (p.47). No calculations are shown to support this figure but as it is the only data available on this, we have used it in our own calculations. Since we are looking at 2008 mill-gate value added, we have adjusted the figure of $25m for inflation since 2001, resulting in estimated costs in 2008 of $29.8m (see appendix 10).

The following should be considered optimistic estimates of the industry's net revenue.

Table 25: Estimated Net Mill-gate Revenue - 2008

	Private Land	Crown Lands	All Tenures
Percentage of total RRG Sourced from Tenure[1]	46%	54%	100%
Estimated Revenues for Tenure	19,053,737	22,367,430	41,421,167
Estimated costs for tenure	13,840,638	16,008,722	29,849,360
Estimated Value Added for Tenure	5,213,099	6,358,709	11,571,807

Source: White (2006), State Forests NSW (2001, p.2) and table 2.6.1 above.
[1] As costs were provided in 2001, we assume that the percentage of resource harvested by tenure flows through to equal the same percentage of gross revenue and attribute the same proportion of costs to this revenue. That is, costs are assumed to be 54% of total costs for RRG Harvested from Crown Lands and 46% of total costs for RRG harvested from private land. This is a crude method but is provided as a rough estimate at total industry revenue from all tenures.

2.7 RRG Forestry – Total Value Added

Taking figures from tables 7 and 25, we can see that the total value added of the RRG industry attributable to access to RRG on Crown Lands is $7.3m. This combines the value added figures for mill-gate and forest-gate. It represents the profit FNSW and RRG Operators achieve through the harvesting and processing of around 127,000 m^3 of RRG from approximately 4757ha of State Forests.

Table 26: RRG Timber Industry Value Added - 2008[1]

Forest-Gate Value Added – Crown Lands	$943,000
Mill-Gate Value Added - All Tenures	$11,571,807
Mill-Gate Value Added - Crown Lands	$6,358,709
Total Value Added - All Tenures	$12,514,807
Total Value Added - Crown Lands	$7,301,709

Note: Forest-Gate value added for private land is not included as it is beyond the scope of this report. As 54% of RRG is sourced from public lands, we could assume that forest-gate value added for private lands would be similar to the figure for state forests of $0.95m

The industry's profitability seems marginal under the existing arrangements, which, as we have seen in earlier sections, are already slanted heavily in its favour. For the RRG industry to continue using public forests the profit margin at the mill gate on state owned timber needs to absorb the losses incurred at an efficient market price at the forest gate, and still provide mill owners with a suitable return. The mill profit at the mill gate is estimated to be $6.36m. The profit at the forest gate is estimated at $0.94m. Both of these can be combined to give a net value created by the public RRG forests of $7.3m. This net value is then reduced by any additional costs not included anywhere else. These costs begin with the costs in green on Table 10. These reduce the value at the forest gate. The correction of FNSW harvesting costs to reflect more likely commercial costs would see forest gate value reduced to a loss of $1.8m and so overall value added to $4.6m. Further reductions would be required to include other costs highlighted in table 10.

For the moment let us assume that the value of the combined profit of forest and mill-gate activities settles at the higher figure of $7.3m, after all costs are accurately included, and assuming that transport and other costs are adjusted to eliminate the distortion resulting from residual value pricing. The true worth of this 'investment' will be determined by the return on capital – value added divided by the value of capital assets of both forest and mills. The mill owners are presumably satisfied with their return but the inclusion of 'forest assets' even if only limited to roads is likely to swing the return on investment to the low end of scale. This would make the combined enterprise 'uneconomic' i.e. it cannot compete with other likely uses of capital, for the same risk.

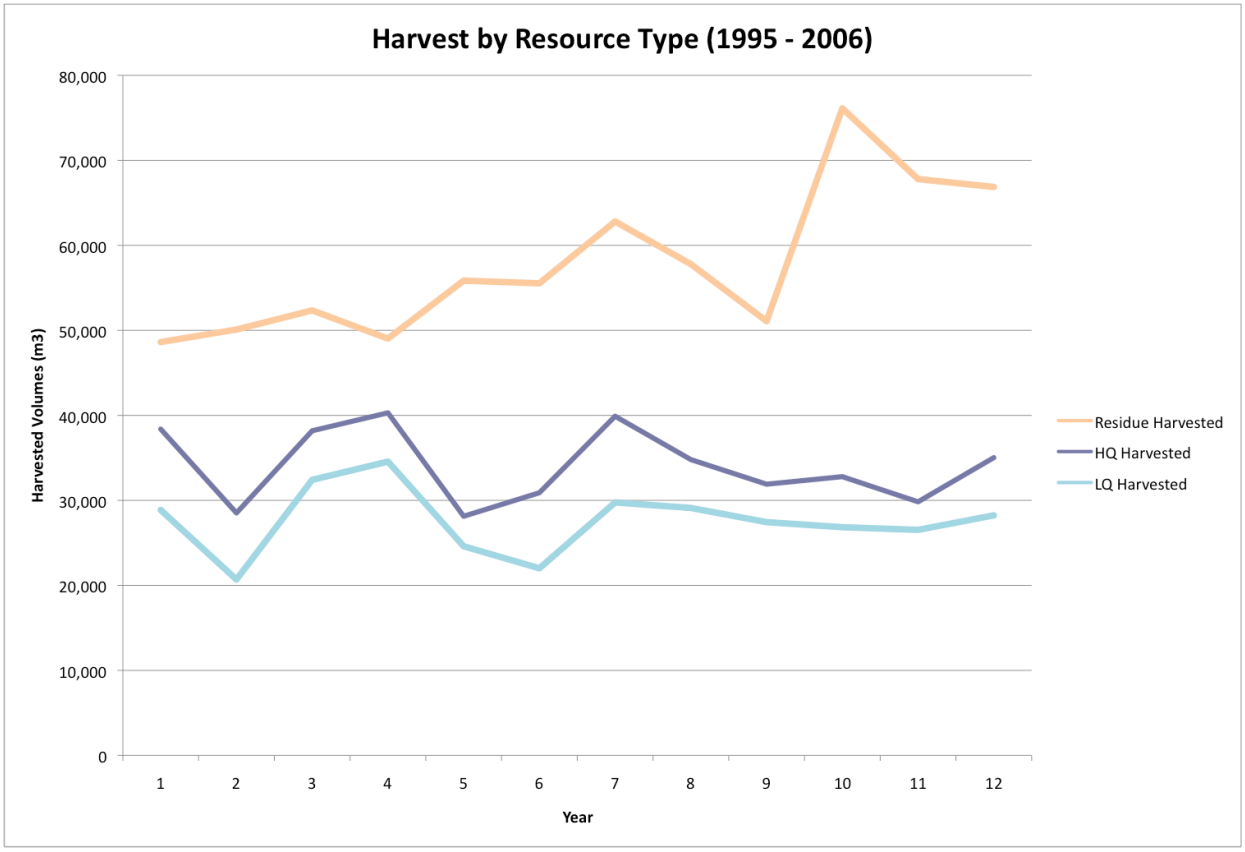
This suggests that the combined forest harvesting and mill based processing of state owned timber is potentially a net drain on the regional, state and national economy. State controlled forestry and timber production is destroying value, rather than creating value. It is exactly this practice of Kremlin style economics that sent the former Soviet Union in to bankruptcy – diverting valuable and scarce capital into projects that cannot produce a good return on investment. Finally this leaves no profit to compensate the NSW public for the destruction of their forests. It is a bit like allowing oil drilling on the Great Barrier Reef but without any prospect of making money beyond costs and no prospect of compensation for damage caused.

2.8 Changes in RRG Production

In an earlier section, we saw that the RRG industry is subsidised in the form of flawed royalty calculation methods and uncompensated losses to non-use values of the RRG resource. Economists at Large have estimated the total subsidy represented by this uncompensated loss of non-use values at $13.4m. Continued subsidies sustain the current structure of the industry and prevent it from changing. It needs to change in light of market realities – cheap substitutes exist for many of its products such as structural and landscape timbers and sleepers.

A concerning trend is displayed in the following graph. We see that residues, mainly firewood, in orange, have increased absolutely and as a proportion of the total RRG harvest. Lower quality ex-quota timber appears to becoming, slowly, larger proportion of the timber supply relative to the higher quality quota timbers.

Chart 1: Changes in RRG Production (1995 - 2006)



Source: White (2006)

As shown in the table above, residues harvested have changed from around 50,000m^3 in 1995, to almost 70,000m^3 for 2006. HQ sawlogs volumes have fluctuated between about 30,000 and 40,000 m^3 and LQ sawlogs between 20,000 and 30,000 m^3 over the same period. Three factors, amongst others, could be pushing this trend towards a higher quantity of low value resource being harvested:

1. Private producers will tend to focus production on areas with the greatest return on capital, not areas that make the most revenue or even those that make the highest absolute profit. Currently the RRG timber industry is dominated by fixed mills and firewood producers in terms of harvested volumes. For the fixed mills especially, gaining a return on this capital requires the large volumes of subsidised timber that the industry is accustomed to. As substitutes for structural timbers and other high-grade uses enter the market, a greater return on capital is obtained from lower value uses, i.e. firewood, which has the advantage of minimal capital expenditure.

2. Due to the royalty calculation methods being 'at stump', there is significant incentive and opportunity for sawmillers to incorrectly allocate harvested timbers to the residue category. That is, the increase in residues harvested over this time could well be reflecting actual increases in HQ and LQ harvests, which are being reported as residues due to much lower royalty rates being applied to residues (FNSW provides no independent auditing that we are aware of). Delivered sales, or log merchandising is one way around this and involves Forests NSW arranging for the harvesting and delivery of timber to the sawmillers, rather than the sawmillers themselves. FNSW says that it will "pursue the introduction of delivered sales…where appropriate." and highlights several benefits of this approach (Forests NSW, 2008, p.38).

3. As subsidised logging continues, quality timber is becoming increasingly difficult to source, with an overall

decrease in quality. Anecdotes from landscape gardeners in Melbourne suggest that red gum sleeper quality have declined, as supplies of suitable logs are lower than in the past.

Various reviews of the industry have urged it towards value-adding and investing in more capital (URS 2001, BIS Shrapnel 2001). Several, though not all, mills have invested in plant such as kiln drying facilities and a veneer plant. These investments, however, are reliant on a sustainable supply of high volume, subsidised timber. A recent order of works for the RRG forestry area states "High quality, large sawlogs, suitable for veneer, are scattered unevenly throughout the estate. If scheduled compartments don't produce suitable quantities, we will need to shift." (Rodda, 2006)

Thus, we see that, due to current management policies surrounding RRG on Crown Lands, subsidised logging is skewing investment in the milling/processing industry. The subsidised timber supply encourages investment in plant that is reliant on high volumes and low prices for its return on capital, reinforcing the current industry structure. This forces the industry to consume its own future, trying to increase volumes and moving towards lower value.

A good example of this is the move towards mechanised harvesting and patch-clearfelling. Large investment in machinery is required (at the expense of labour) to process large volumes of timber, producing larger volumes of residue. This process also affects the forests ability to regenerate, as RRG tends to "coppice" – sprout out again from stumps - producing growth that is only suitable for firewood. (Tuck, 2008)

Private forestry group, Australian Forest Growers, have also noted that "a long standing pre-occupation with large, high quality and/or large diameter sawlogs has contributed to a lack of capacity in most regions for processing lower grade or smaller diameter products." The AFG note that investment in capital that utilises a wider range of products is needed, but it is the subsidised use of large logs from public forests that entrenches this trend by skewing investment in large scale milling equipment. (AFG, 2008)

If the RRG industry were to pay prices for timber in line with the real costs of production, the industry could move towards smaller volume, higher value operations. This would also encourage the emergence of a farm based RRG industry in the region to provide firewood and other timber products.

2.9 Employment Supported by the RRG Timber Industry.

The issue of employment is a common theme in the debate around the RRG industry. However, information about employment in the industry is limited. The most recent official estimate suggests that there are 300 jobs (Forests NSW, 2008) although no methodology for this calculation is displayed. Earlier studies commissioned by FNSW arrived at a range between 314-364 (URS, 2001 and BIS Shrapnel Forestry Group, 2001) however both these estimates included seasonal, part-time and casual jobs.

As discussed in earlier sections, it is important to remember that almost half the RRG timber industry is based on timber sourced from private land. The employment impact of the logging of public forests must take this into account. The following calculations approximate the number of jobs in NSW that are derived from timber industry access to State Forests.

Table 27: Estimates of Employment Support by RRG Forestry – Top Down

FNSW estimate of RRG timber industry jobs[1]	300
46% of RRG is sourced from private land[2], accounting for 142 jobs	- 138
Total Number of timber jobs supported by access to RRG on Crown Lands	162
Fixed mills account for around 130 jobs[3] with 20% of allocation to fixed mills going to fixed mills in Victoria[4]	-26
Total NSW based jobs supported by access to RRG on Crown Lands	136

[1]Source: Forests NSW, 2008.
[2] See table 18
[3]URS (2001) and BIS Shrapnel Forestry Group(2001)
[4]White (2006)

This figure is approximated by bottom up calculations using estimates of operator numbers and average employees per operator. These calculations are shown in the table 28 below.

Table 28: Estimates of Employment Support by RRG Forestry – Bottom Up

Operator Type	Estimated Average Number of Employees, including owner operators[1]	Estimated number of operators (NSW only)	Total Estimated Jobs Supported
Fixed Mills	21	4	84
Mobile Mills	3	10	30
Firewood Producers	1	30	30
Total		44	144

Source: appendix 11
[1] Estimates for number of employees come from State Forests NSW (2001)

These figures should be examined bearing in mind that they seem to include casual, part-time and seasonal positions. They also include administration, accounting and trades staff with easily transferable skills. Some of these jobs will also be attributable to timber sourced from private and public land in Victoria, that would be unaffected by changing industry access to NSW State Forests.

As we will see in Part 3, there is also potential for expansion of timber supply from plantation and farm sources as well as other industries that can create jobs requiring similar skill sets and knowledge.

Finally, it should be noted that for the purposes of sound economic analysis such data is irrelevant. Economic policy should focus on the maximisation of total economic value within the context of the optimal balance between financial and non-financial values. When such wealth is appropriately distributed, more employment will be created, and those who lose from economic change can be compensated. To follow the opposite path is to condemn society to declining prosperity and ultimate failure. A sustainable society is based on compassion and equity and hence the production and distribution of wealth should always be delivered with regard to both present and intergenerational needs. Any policy which fails to do this is failing to maximise the total economic value to both current and future Australians.

Part 3: Alternative Industries and Opportunities in the Riverina

This section puts the RRG industry into context, examining industries and parts of the Riverina economy that are affected by or exist alongside the RRG timber industry. We begin by discussing closely related industries also based on trees and forests – plantation and farm forestry, firewood woodlots, national parks and carbon sequestration. We then compare the RRG forestry industry to broader regional tourism data.

3.1 The Economics of the Region

It is sometimes assumed that without continued government financial support to the timber industry, regional economies will be at risk. In this section, we will look at industries that benefit from the RRG resource in a non-extractive way or which are not dependent on subsidised access to publicly owned resources. These industries are established (tourism) or show potential for growth and diversification (plantations, carbon sequestration, national parks) which can support the Riverina economy without adverse impacts to the environment and other industries.

3.2 Plantation Forestry/Farm Forestry

Both plantation and farm forestry refer to the growing of trees for commercial purposes on private or privately managed land. Plantations tend to focus exclusively on forestry, while farm forestry incorporates timber growing into a more diverse agricultural system. In this section we use the term farm forestry to refer to farmers growing stands of trees for timber harvesting rather than broader benefits including firewood, shelter, tree crops etc, which we will refer to as agroforestry. Agroforestry, plantation forestry and farm forestry are directly and adversely affected by the current structure of the RRG timber industry.

Plantation timber is a large and growing industry, mostly growing trees for timber or pulp. Increasing the area of commercial plantations is a stated goal of government and governments invest heavily in its promotion and development (e.g. managed investment schemes).

Plantations are not without drawbacks. Concerns have been raised about their ecological impacts, potential to displace other industries and government taxation incentives. However, if managed and implemented carefully, plantations have potential to contribute environmental benefits such as salinity mitigation, soil improvement, carbon sequestration and habitat provision (Plantations 2020, 2008b). Economically it is clearly desirable to source timber from private suppliers who shoulder the risk on their investment and provide a renewable resource with

environmental benefits while reducing extraction from high-value conservation areas of public lands.

In 1997 Commonwealth, state and territory governments and industry formed a partnership called Plantations 2020. The stated aim of Plantations 2020 is to "enhance regional wealth creation and international competitiveness through a sustainable increase in Australia's plantation resources, based on a notional target of trebling the area of commercial tree crops by 2020." (Plantations 2020, 2008)

Money from the sale of Telstra was directed by the government through Plantations 2020 and National Heritage Trust towards investment in farm forestry promotion and extension programs, including in the Riverina region. Murray Riverina Farm Forestry (MRFF) was a "Private Forestry Development Committee" established to "enhance the economic development potential of their region through increasing the commercial plantation estate" (Plantations 2020, 2008a). It ran from 1997 – 2003 with four staff in different offices around the Riverina, and during this time helped establish over 2000ha of plantation forestry on private land (Scott, 2008).

Despite this government support, private forest plantations and farm forestry face considerable obstacles. Growers must pay costs for land, pay to prepare soil, plant trees, costs of establishment and management of plantations and consider the opportunity cost of other land uses. None of these costs are considered to be incurred by timber operations in State Forests, as discussed in Part 2. It is a considerable barrier to the expansion of this industry in the Riverina region that it is forced to compete against a supplier that pays none of these costs.

Murray Riverina Farm Forestry had interaction with FNSW and timber mill managers. While mills expressed some willingness to pay a premium for plantation-grown timber, it was on a condition that timber was straighter and logs were of higher quality than those available to them in the State Forests. With cheap, public timber available to them, there is little incentive for mills to encourage the plantation industry. (Scott, 2008).

Such subsidies to forestry operations are not uncommon and have been the subject of studies such as Forestry and Competition Policy (Marsden Jacob, 2001), who noted that in all States of Australia, timber from State-owned established native forests competes with timber from plantations – but not on a level playing field. In all States, the playing field is tilted against plantations and farm forestry in favour of exploitation of native forests. The report outlined the key impacts of the lack of competitive neutrality between State-managed forestry in established forests and private forestry activities as it makes private investment in farm forestry and plantations less attractive:

-distorts the allocation of wood sources within the forest sector;

-encourages greater exploitation of public native forests in each State;
-undercuts competing uses of public native forests; and
-worsens the state of the environment and resource base.
(Marsden Jacob Associates, 2001)

Plantation forestry in Australia is expanding rapidly (Plantations Northeast, 2008) and despite the presence of the subsidised state forestry sector, has been meeting with successes in the Riverina region (Tilbury, et al, 2003). While Tilbury et al, noted successes with a range of different species, MRFF planted almost exclusively hardwood varieties for timber production. This is in contrast with plantations Australia-wide, where softwood species and hardwoods for pulp are more common. One reason for MRFF's focus on hardwood timber species was the presence of sawmills. Being too far from ports and processing to make pulp production viable, they chose timber species because of the established milling facilities. The presence of the mills gives the Riverina region an advantage in establishing a more sustainable plantation timber industry.

3.3 Firewood

Like the plantation/farm forestry industry, there are considerable environmental benefits derived from firewood plantations. They can provide on-farm benefits through sheltering stock and crops, help to reduce salinity and water table problems, and importantly they can provide an alternative, sustainable income stream for landholders.

An earlier study by Economists at Large (Grey, 1999) found that growing trees for firewood can be profitable on private land in Victoria. A compound return rate of 11% per hectare per year was calculated as the return to potential investors, depending on various assumptions.

As discussed in an earlier section, large and increasing amounts of firewood are produced in the Riverina and largely exported to the Melbourne market (URS, 2001). As much of this firewood is sourced from State Forests or residue from timber operations in State Forests, it also enjoys the public subsidy that the timber industry does. In effect, Melbourne consumers are enjoying artificially cheap firewood prices at the expense of the natural capital of the Riverina.

Indeed it could be argued that the firewood industry is potentially consuming some of the timber that would otherwise flow through to the timber industry. This re-allocation is driven by the more attractive cash flow opportunities of the firewood market compared with the timber market. None of this changes the underlying trend to the public resource being exhausted at some time in the not too distant future. This exhaustion event will extinguish this industry for timber and eventually firewood harvesting on public land. Any decision to stop this

trend to exhaustion, in the public present and future interest, is in the best interests of the industry and local communities for them to ensure intergenerational equity.

Removing the subsidy to timber from the RRG timber harvesting need not reduce the existing firewood industry, or the jobs it creates, but would allow a more realistic price to be paid for firewood. This would encourage private landholders to plant woodlots for firewood production. The short term process of planting more trees could provide the industry assistance for those affected by lost harvesting opportunities until the new resource is on stream. With the appropriate government adjustment program the industry could recover strongly from this adjustment and build a sustainable future in this carbon constrained world – free of its dependence on the public purse and public assets.

3.4 National Parks Values

As shown in Figure 1, RRG forests have a range of economic use and non-use values. Some of these can be measured with market prices, while others require different approaches to estimate their value. Converting State Forests to national parks would have an impact on extractive industries such as timber, since, State Forests account for 54% of RRG harvested (see Table 18) and 54% of gross revenue (see Table 24) to the industry. Non-use values and use values can and should be managed so as to deliver an optimal combination from any mixed-use resource. In some cases this may require the creation of a national park, whilst in other cases different management regimes maybe appropriate.

What is inappropriate is for a resource to be managed in such a manner that a subset of values are privileged over the other values, where that is not economically justified by the best interests of the society. For example logging should not dominate over tourism or vice versa. The 'value' production of an area should be determined by long-term sustainability requirements to protect intergenerational equity and short-term 'value' requirements of the existing society (logging versus tourism versus ecosystem services). In this case we examine the financial benefits flowing from national parks in order to place in context the financial benefits that presently flow from logging the RRG forests.

A number of studies have indicated the role national parks can play in generating economic activity in regional economies, through both upfront establishment expenditure and ongoing tourism and park maintenance expenditure. A study by the NSW National Parks and Wildlife Service (NSW NPWS, 1998) found that the establishment of the Coolah Tops National Park in Central NSW had a $2.7 million effect on the local economy. The work establishing the National Park, which had formerly been a state park, employed 17 people in 1996-97 and 10

in 1997-98. These benefits accrued due to NPWS investment in new structures, roads, facilities and staff. While these benefits are largely focused on the initial years of the national parks establishment, National Parks status can bring benefits in terms of increased visitation in comparison to State Parks. Forests NSW (2008, p.39) states that RRG forests in the Riverina currently receive around 500,000 visitor days per annum. The issue with regard to any change in management policies for RRG is to what extent this figure will increase after declaration of Nation Park status. This figure should be interpreted with some caution however as it is not sourced and it is unclear whether it applies to all tenures, or only visitation to State Forests.

NSW NPWS (1998, Part 2-15) observed in the case of the Coolah Tops National Park that:

> *In 1994-95 State Forests of NSW estimated there were 2,000 visitors to the park before it was reclassified as a national park. The NPWS estimated that there were 4,000 visitors to the Park in 1997-98*

The study also found that since being reclassified as a national park, Coolah Tops was attracting a different mix of visitors. Previously most visitors had been from local areas visiting for the day or camping overnight, contributing only small amounts to the Coolah economy. This changed to include 5% of visitors staying in commercial accommodation, spending considerably more per visitor day. The study forecast that this would further increase to 30% day visitors, 50% campers and 20% staying in commercial accommodation.

Similar results were shown from studies of tourism growth in the Grampians, Victoria. Since becoming a national park in 1984, tourist numbers have greatly increased, particularly among international visitors (Wescott 1992 and Wartook 2008). Wescott (1992) highlights that tourism growth was:

> *more rapid after than before the creation of the Grampians National Park. This improvement was built on an already solid base and so it is tempting to suggest that the declaration of a national park accelerates the rate of increase.*
> (Wescott, 1992)

Both Coolah Tops and the Grampians have common traits with a potential national park in the Riverina. Both are inland and a considerable distance from major cities, with high conservation values. Like NSW Riverina State Forests, the Grampians had a history of tourism and other uses, including grazing, mining and timber. The Grampians National Park, at 167,000ha (Wartook, 2008) is a similar size to NSW RRG State Forests that cover around 150,000ha (DPI, 2008b).

The Opportunity Cost of Logging: Potential Tourism Values

A PriceWaterhouse Coopers study carried out in 2003 found that the Grampians National Park (GNP), through direct tourism expenditure, contributes an estimated annual $186.6 million to the regional economy and supports around 2307 tourism related jobs (PWC, 2003a). This figure was calculated using regional visitation data multiplied through average tourism expenditure data to arrive at an average yearly contribution to the regional economy of $231.3m. This figure was then adjusted with 80% of overnight trips and 100% of day trips being attributed to this expenditure figure, resulting in a direct expenditure estimate of $186.6m. Given the similar respective land size of the Grampians National Park to RRG forests in NSW and the importance of tourism to the region (discussed below), similarities can be drawn from the potential promotion of the tourism benefits of RRG Native Forests.

Using the PWC study as comparative example to the potential for RRG National Parks in the Riverina, we can provide an indicative estimate of the potential value of the current logging area, if it were converted to National Park.

The GNP study by PriceWaterhouse Coopers estimated that the park generated $186.6m in direct expenditure for the local economy using 167,000 hectares, (PWC, 2003a). This equates to $1116 per hectare in direct expenditure. On the basis that this benefit 'transfers' to the RRG forests this equates to approximately $101m in economic activity for the local Riverina economy. The GNP costs $11 per hectare per year to administer – we will assume a higher figure of $34 based on other sources given in footnotes to table 29. Our estimations of the profile of the RRG timber industry based on access to RRG in State Forests suggest that milling businesses earn approximately $22.2m in revenue and have costs of approximately $16m (2008 prices from Table 25). This provides the milling industry with a profit margin (or value added) of about $6.2m per annum. Applying a similar revenue/cost ratio to the estimated $101m in tourism revenue generated in the region yields a margin of $28m in profit for the local tourism industry. Once management costs for the area are factored in, we can see a net value added from tourism of $25m

The table below provides an estimate of the size of the potential foregone tourism opportunity caused by a logging operation equivalent to an average 4757 hectares per year, as discussed above.

Table 29: Estimated National Park Opportunity Cost of RRG Areas Logged

	Areas Still Recovering from Logging
Attributable tourism benefit per hectare	$1,116
Attributable park maintenance per hectare[1]	$34
RRG area logged	95140 ha
Average Harvest cycle[2]	20 years
Total area of RRG 'recovering' from logging and thus unavailable to tourism	90,383 ha
Attributable tourism expenditure	$100,858,562
Cost of park maintenance	$3,234,760
Net value added by Tourism Operators[3]	$28,240,397
Net value added by tourism operators less the cost of park administration	$25,005,637

[1] PriceWaterhouse Coopers (2005, p. 51) results in a figure per hectare of $11. RACAC (2002, p.5) has a higher figure per hectare, the highest being $30. Recent anecdotal evidence suggests that the average cost per hectare for NSW is $34.
[2] Based on cycles of between 15 and 30 years given in VEAC(2006, p.221)
[3] Assuming same profit margin as RRG operators in Table 24 - 2008 Prices (28%)
Source: PriceWaterhouse Coopers (PWC, 2003a), EcoLarge analysis
NOTE: Park maintenance is attributed to the area of hectares being harvested only, not to any total areas of potential newly created National Parks.

The table above shows that, in any one year, for every 4757 hectares of harvested RRG forest, assuming a 20 year harvest cycle, there is at least another 90,000 hectares (19 times 4757 hectares of forest) that is recovering from previous harvesting. Actual harvesting cycles are longer but the 'recovery' implies a recovery in effective tourism values – the 20 year period is a crude estimate – we suspect that actual recovery in tourism value would take much longer. However, for illustration, the point can be made with an assumed 20 year cycle in loss and recovery of tourism values. This reflects the fact that, allowing for harvest cycles and tree re-growth, any area harvested will not be available for tourism 'value' production for at least 20 years. As a result of this cycle, each year, across, 95,140 hectares, National Park administration would have cost $3.2m and delivered $101m in gross tourism expenditure resulting in $25m in total net value added.

We can see that the potential annual tourism value of the area currently being logged is $101m in terms of economic activity and $25m in terms of total net value added. Park management attributable to this area would incur a cost or financial loss to NSW of $3.2m per annum. Given total economic value considerations and values discussed throughout this report, this would represent a small annual cost to the NSW public with a huge net benefit in value creation at both the financial and non-financial levels. While the actual success of any National Park depends on the ecological and cultural traits of a particular forest, RRG forests have traits that indicate significant potential for National Park status. Transport linkages, other infrastructure and accommodation availability are also important to the success of national parks and tourism but efforts to improve these would represent an opportunity for renewal and diversity of activities in the region. The figures above need to be considered in public policy decisions as they represent one of the opportunity costs of current forestry management practices for RRG resources, where forestry practices conflict with potential tourism values.

3.5 Carbon Markets

Markets for carbon sequestration in Australia look set to increase following Australia's ratification of the Kyoto Protocol and the growth in the voluntary offset market. More recent developments include the release of Ross Garnaut's draft Climate Change review and the release of the Federal Government's Carbon Pollution Reduction Scheme Green Paper indicate that forestry will be part of a nation emissions trading scheme (ETS) eventually. These developments are an opportunity for the Riverina's economy to take advantage of its forests and agricultural areas in a sustainable way. At present the harvesting of forests could be assumed to be a net carbon emissions source. This represents yet another unaccounted for cost of forestry. Eventually forest harvesting will have to pay its full costs including carbon emissions from deforestation.

Carbon markets work by allowing emitters of carbon to pay a provider of carbon sequestration services to offset the carbon that they emit. For example, a factory in Sydney that emits carbon might pay a farmer in the Riverina to grow trees on their behalf sufficient to offset an amount of carbon the factory emits. These carbon offsets could be created through both plantations or native forest restoration. Currently, in Australia, there exist several companies offering voluntary offsetting. A study of these companies conducted by RMIT in 2007 showed an average price per tonne of carbon sequestered of $16 (Ribon and Scott, 2007). A likely price per tonne for carbon under a national ETS is as yet unclear and would depend on any caps set and permits allocated.

Plantations and Farm Forestry

Companies such as CO2 Group Limited are paying landholders for long-term leases of land, on which they plant trees to store carbon. CO2 Group plant Mallee trees on cleared land, in areas with an average annual rainfall of over 275mm (CO2 Group, 2008). Large areas of the Riverina are suitable - Deniliquin's average annual rainfall is over 400mm - and with abundant cleared agricultural land. Anecdotal evidence also suggests that farmers in the region are looking at salt bush for on farm plantations, which can have other benefits when grazing is allowed including better tasting lamb. In such examples, carbon sequestration will not replace traditional production processes, but does supplement them and allows diversification of incomes for landholders in the region (DPI, 2008).

Native Forest Restoration

Native Forests such as the RRG forests of NSW present an opportunity to take part in such schemes and use the regeneration of land cleared before 1990 to generate and sell carbon credits. As highlighted by Hall (2001), although plantation forests can rapidly sequester carbon, native forests have a greater ability to retain biomass,

which may be more important. Associated ecosystem services which reforestation offers, although hard to quantify, would also be significant in terms of habitat and restoration of natural assets. To accurately value reforestation of RRG habitats looking at the potential to sell carbon credits, more rigorous ecological and economic analysis is required. Work by Hassall & Associates (1998) provides a good start, but further work is needed.

Although forestry may only be included initially in an ETS on an opt-in basis, forests will continue to have value as "carbon sinks" in voluntary markets for carbon and will eventually be covered by a National ETS. The lessons learnt from voluntary markets should be applied to the eventual inclusion of forestry in a national ETS to ensure optimal economic and ecological outcomes.

3.6 Tourism in the Riverina

Tourism – Economic Activity

Tourism is a major contributor to economic activity in the NSW Riverina. According to Tourism NSW, the total annual tourism expenditure for the region is $797.5m.

Table 30: Tourism Expenditure in NSW Riverina[1], (2007)

	Visitors	Total Number of days/nights	Avg. Spend per night	Total Tourist Spend
RIVERINA				
Domestic Overnight	787,000	2,259,000	$104.00	$234,936,000
International Overnight	Unreliable Data			
Domestic Day Trip	1,230,000	1,230,000	$126.00	$154,980,000
MURRAY				
Domestic Overnight	867,000	2,490,000	$126.00	$313,740,000
International Overnight	Unreliable Data			
Domestic Day Trip	802,000	802,000	$117.00	$93,834,000
			TOTAL	$797,490,000

Source: Tourism NSW (2007 and 2007a)
[1] Data for both the Riverina and Murray regions - as defined by Tourism NSW – is included because these regions include key RRG Forestry areas covered in this report.

This table illustrates the magnitude of economic activity the tourism industry in the region generates and provides a good comparison with the values the RRG timber industry generates as calculated in part 2. As our analysis showed (table 24), the economic activity generated by RRG forestry is approximately 5% of the total tourism expenditure in the region. This indicates that RRG Forestry activities contributes a small proportion to the regional gross output, particularly in comparison to tourism. A report for the Victorian Environmental Assessment Council, found that the entire RRG timber industry in Victoria represented only 0.56% of gross regional output (Gillespie et al, 2007 p20). However, these figures should be understood in the context of geographical boundaries. For RRG industries, the focus is usually around a few key milling towns, whereas, data for tourism was across the broader Riverina area. That is, while the regional affects of RRG industries may be minor, they are often key industries in the towns in which they exist.

Tourism – Supported Employment

Looking at the District of Deniliquin and the Wakool Shire, we can see that tourism is also a considerable local employer. Surrounding districts where mill processing exists including the Murrumbidgee LGA have not been included due to lack of data.

Table 31: Summary of Tourism Businesses in Deniliquin LGA

Tourism Businesses	Number of Businesses	Estimated Number of employees
Owner Operated	129	129
Micro (1-4 employees)	75	150
Small (5 – 19 employees)	45	270
Medium and Large (20 or more employees)	15	315
TOTAL	264	864

Source: Tourism Research Australia, 2008a.
Note: Low range figures for each size business were used so the real number of employees is likely to be higher.

Table 32: Summary of Tourism Businesses in Deniliquin LGA

Tourism Businesses	Number of Businesses	Estimated Number of employees
Owner Operated	33	33
Micro (1-4 employees)	48	96
Small (5 – 19 employees)	6	36
Medium and Large (20 or more employees)	9	189
TOTAL	96	354

Source: Tourism Research Australia, 2008b.
Note: Low range figures for each size business were used so the real number of employees is likely to be higher.

We can see that, between these two Local Government Areas, employment directly related to tourism equals 1218 jobs and greatly exceeds that of employment directly related to access to state sources of RRG, calculated in this report as 136 jobs.

Conclusions

The premise of this report

The claim has been made that timber and other primary industries associated with RRG forests contribute $60m to the regional economy. Our findings suggest that this claim appears to be numerically incorrect and economically misleading. This figure fails to note is that if the industry did not exist, the net economic outcome for the RRG region might be even larger than $60m – i.e. the RRG industry as presently structured, could be preventing better economic outcomes for the local community. Evidence of profit is not proof that the most profitable path has been taken. Obvious revenue/profit does not mean the highest revenue/most profitable option is obvious.

In short, the report has endeavoured to investigate whether the alleged $60m generated by public forests is real and whether there is another allocation of the public resource (forests, money, public servants) that creates greater value for the NSW public

Value of Private vs Public Forests

Our analysis reveals that the RRG industry comprises both a private and a public forest resource. The publicly owned component comprises approximately half of the industry output at mill-gate ($22.4m) and forest-gate ($4.1m). The government's own $60m economic figure includes the contribution of both private and public forests. For the purposes of this report, we are interested in the economic values of the public forests.

RRG Native Forests on private lands present a different economic problem. Each landholder will operate their land according to their own incentive structure. Recent years have seen private land owners value native trees on their land for their non-use benefits and a growing recognition of the cross-boundary impacts of tree clearance. This has begun to provide a revised incentive framework for private owners to protect the value of their properties and their neighbourhoods by voluntarily protecting their trees.

In the public sector, the forest agency has enacted a forest management system which is seeing the public forest estate hollowed out to an extent that it is probably only good to produce firewood, and even that is under threat from over extraction.

This report dissects the alleged $60m economic value of the RRG forest industry. The $60m figure reportedly includes the mill-gate value and the economic multiplier effect. The NSW public have a choice to continue with the forest logging operations or to allocate the forest to non-logging activity. In the context of that choice the $60m, to the extent that it includes multipliers, is a gross over-estimate if not a distortion of the argument. If the annual government expenditure that supports the forest industry were diverted to an alternative program it would still create multiplier effects. The economic multiplier effect is therefore an illegitimate economic tool in this circumstance. It could therefore be stated that FNSW is obstructing public policy by not providing a transparent

data breakdown on the split between mill gate value and multiplier.

What matters is that forests are deployed to the use of highest value within a multi-generational framework (sustainability).

The choice for NSW policy makers

In simple terms the NSW public faces a choice over its use of RRG forests. The appropriate choice is to choose the option that creates the greatest value for the community. Value, as we have explained is both a financial and non-financial concept. The financial value generated by RRG forests is in two components. The first component – known as the forest-gate – is the process of growing and harvesting trees and delivering them to the forest-gate. At this point, allowing for transport costs that are part of the *mill*'s cost structure, harvested timber is passed over to the mill where it processed until it too is passed out the mill-gate to the next stage of processing. The alleged $60m (net of the multiplier) is generated, according to FNSW, at the mill-gate. In other words this so called economic value is a combination of forest harvesting and mill processing.

The choice facing NSW decision-makers is over the use and allocation of the forest – which ends at the forest-gate. The use of the $60m number conflates the value at the forest gate and at the mill gate. Critical here to NSW citizens is the value created at the forest-gate from timber production. The value at the mill stage is not relevant if the production process at the forest-gate is uneconomic. Once again FNSW is unwilling to provide a breakdown of the alleged $60m (net of multipliers) into forest and mill components. Once again this is a significant and severe hindrance to public policy that serves the interests of FNSW by preventing scrutiny of their performance.

Public Forest Values

In our analysis we have provided estimates of the value of *public* forest output at the forest-gate and timber output at the mill-gate. These estimates suggest that forest gate output is $4.1m whilst mill-gate output is, at its most optimistic, about $22.4m in gross sales revenue. This can be disaggregated, after industry costs, into a value added (or profit margin) at the mill gate of approximately $6.4m and, $0.94m at the forest gate. These are generous and conservative estimates that suggest the actual contribution of the industry (mill-gate + forest-gate) is less than the combined $26.5m or $7.3m value added.

This $7.3m is value added accrued at the mill-gate (including forest gate net value). If the value added at the forest-gate cannot compensate for the values lost in forest logging then the NSW community is better off if RRG forest logging ceases. The net value added at the RRG forest-gate is estimated to be $0.94m. This figure is based on operational expenses of $3.16m and does not include capital depreciation and other items that are not available from the agency.

Using costs of a private sector agroforestry operation we were able to calculate that, on a per tonne of wood basis,

the costs of the agency may have been understated by up to 88%. On this basis FNSW forestry operations in the Riverina would actually be operating at a loss of $1.8m. This finding is corroborated by a Productivity Commission report that found Forestry Government Trading Enterprises are not operating on a commercially sustainable basis. Put simply, forestry operations in NSW as a whole, and for the Riverina, result in net value losses to regional and state economic welfare.

The Un-level Playing Field

Economic theory and practice indicate that optimal outcomes are met when businesses compete on a fair and level playing field. Anything else leads to poor economic outcomes. Private forest growers have to meet all the requirements of a commercial market place – pay for land, taxes and rates, market rates for capital etc. The FNSW RRG forest operations do not appear to pay any of these imposts and yet still only manage very small and questionable profit. At the very least, a level playing field needs to be established which would, based on the analysis provided in this report, probably result in RRG timber operations having a negative profit – revealing that they are unsustainable and represent a poor policy decision both environmentally and financially.

The logical corollary of low prices in the public forest sector is that investment in private farm forestry, mainly in its most efficient form as integrated tree production on existing cleared agricultural land, is suppressed. Removing the competitive deadweight of a state subsidised near monopoly would do a lot to create a positive environment for private sector investment on regional farms. The existence of the state sector has, all other things being equal, negatively impacted on private investment in tree production and hence undercut the resource security of the mill operators.

It is feasible to design a government investment program targeting private landholders to develop woodlots and small agroforestry operations, whilst also restoring holdings of RRG native forests. Such a government investment program on private land would provide net additional benefits to the wider community through environmental protection, possible improved carbon sink functionality, added tourism from improved visual and environmental amenity, improved agricultural outcomes through careful integration with farm operations and eventually provide farmers with an additional supply of trees for the mill industry.

The closure of the loss-making, under-priced RRG forest will result in a price increase for RRG timber as underpriced timber is removed from the market decreasing overall supply. This will allow private growers to invest with greater certainty of higher prices. All other things being equal, the closure of RRG public forestry would, ironically, be likely to lead to an expansion of private investment in timber production in the Riverina region. This investment would provide the mill industry with a permanent sustainable base and guarantee its future in a carbon constrained world where efficient tree production will be required.

The land presently available for the RRG logging would then also become available for other uses. The net result is that NSW society, would be better off to the tune of $17.7m simply because they know that their forests are finally

now being protected.

Other Forest Uses Can Provide Greater Economic Benefits

Under an efficient economic framework that seeks to maximise the value received by NSW society, the RRG forests would appear to be uneconomic for logging purposes. The forests, however, do serve a range of other purposes. Altering the management regime such that it pursues utility maximisation in a sustainable manner would allow other uses of the forests to be considered on a level playing field. One of these uses, tourism, generates direct cashflow for the region. An appropriate management regime could stimulate this cashflow even further.

In this paper, we have demonstrated that other regions have increased tourism numbers through a 'branding recognition' of national park status. This is a possibility for the RRG forests. The value of this tourism process is likely to grow over the years as the forest recovers and the demand for tourism (positively correlated with rising incomes) grows ever stronger.

The RRG forests already receive visitors who are making an economic contribution to the region. The loss of the forest results in this income being reduced. The cessation of logging would interrupt that pattern and likely increase the number of visitors. Furthermore, the declaration of national park status is also likely to increase visitation and with it, income to the region.

It should also be noted that tourism and logging are not mutually exclusive. They currently co-exist – the key policy question should be what is the change in value if the logging is reduced and the tourism potential increased? If this was to lead to a positive value gain from the present position, then such an outcome is likely to be the preferred public policy position, all things being equal, of any government looking after the interests of society.

Extrapolating from the experience of other national parks, the area of Riverina RRG in State Forests which are currently used for timber extraction could be expected to generate direct tourism expenditure in the region of $101m. Assuming a profit margin of 28% and adjusting for park management costs, this results in a net value added of approximately $25m per annum. This compares with the current annual value added at the forest gate of $0.94m and the total, approximate, value added of the forest-gate plus mill-gate sectors of $7.3m per annum.

Conclusion

The report has demonstrated that through an analysis of the best available data, RRG logging on public land in the Riverina is not the optimal economic outcome for the region and that there are other options that are likely to create better economic and social outcomes for the region, whilst protecting the ecological integrity of the forests.

We would encourage a greatly improved level of transparency by the forestry agency in order that a full and open discussion can be had around the options for forest management in the Riverina.

We conclude that the weight of economic prosperity, social and environmental well being is against a continuation of logging as it presently stands in the Riverina region.

References

Australian Bureau of Statistics, 2007. 2006 Census QuickStats : New South Wales. Available online at: http://www.censusdata.abs.gov.au/ABSNavigation/prenav/ViewData?method=Place%20of%20Usual%20Residence&subaction=-1&producttype=QuickStats&areacode=1&action=401&collection=Census&textversion=false&breadcrumb=PL&period=2006&javascript=true&navmapdisplayed=true& [Accessed May 21, 2008].

Australian Forest Growers, 2008, viewed 20th March, 2008, www.afg.asn.au

Attiwill, P., Burgman, M., and Smith, A., 1996, `Gaps and Clusters silviculture: How well does it balance wood production and biodiversity conservation?´ A report by the Review Panel to the Ministerial Committee established to review the Principles and Application of the Gaps and Clusters Technique. Unpublished report to the NSW Government.

BIS Shrapnel Forestry Group, 2001, 'Red Gum Industry Development Strategy', prepared for State Forests NSW and the Department of State Regional Development.

Bootle, Keith, 2005, 'Wood in Australia', Second Edition, McGraw-Hill Australia Pty Ltd, NSW.

Bullen, Mike, 2008, email received on 21st April 2008 from Mike Bullen, Director, Commercial Services, State Forests NSW.

Chester, Sarah, 2003, 'Passion, Paddlesteamers and Red Gum', Forests NSW website, viewed on 15th Feb, 2008, http://www.forest.nsw.gov.au/bush/nov02/stories/25.asp

CO2 Group Limited, 2008, viewed on 19th March 2008, http://www.co2australia.com.au/Landholders/WhatCO2AustraliaIsLookingFor.aspx

CSIRO, 2007, 'Climate change in Australia', Technical report.

Department of Agriculture, Fisheries and Forestry, 2008, viewed on 5th July 2008, http://www.daff.gov.au/agriculture-food/drought/ec/nsw_act/riverina

Department of the Environment, Water, Heritage and the Arts, 1996, viewed on 9th February, 2008, http://www.environment.gov.au/about/publications/economics/subsidies/subs11.html

Department of Primary Industries, 2008a, viewed 19th March, 2008, http://www.dpi.nsw.gov.au/research/centres/deniliquin/climate

Department of Primary Industries, 2008b, viewed 24th April, 2008, http://www.dpi.nsw.gov.au/archive/archive-good-news/managing-murrays-mighty-river

Economists at Large and Associates, 1999, 'The Business of Growing Firewood for Profit in Victoria', prepared for Victorian National Parks Association.

Forests NSW, 2006, unpublished data obtained by National Parks Association NSW through Freedom of Information Request. Information recieved on 5th April 2006.

Forests NSW, 2007, 'Annual Report 2006-2007', viewed on 3rd March, 2008

http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0011/103160/Annual-Report-2006-07.pdf

Forests NSW, 2008, 'ESFM Plan: Ecologically Sustainable Forest Management, Riverina Region NSW'

Forests NSW, 2008a, 'Environmental Services: Carbon Credits', viewed on 9th April, 2008, http://www.forest.nsw.gov.au/env_services/carbon/credits/default.asp

Gillespie Economics, DCA Economics and Environmental &Resource Economics, 2007, 'River Red Gum Forests Investigation - Socio-Economic Assessment', Prepared for Victorian Environmental Assessment Council, accessed through www.veac.vic.gov.au

Gillespie Economics, DCA Economics and Environmental &Resource Economics, 2008, 'River Red Gum Forests Investigation - Socio-Economic Assessment', Prepared for Victorian Environmental Assessment Council, Final Report. Accessed through www.veac.vic.gov.au.

Grey, F, 1999, 'The Business of Growing Firewood for Profit in Victoria: A Business Plan', Draft, February, 1999.

Grey, F, 2000, Estimating Value: A report on the evaluation of public and private externalities and public goods, alongside financial values, in the context of Australia's native forests. Part 1. Prepared for the Department of Environment, Sport and Territories, Canberra, January, 1994. DRAFT VERSION

Hall, Graeme. M. J, 2001, 'Mitigating an Organisation's Future Net Carbon Emissions by Native Forest Restoration'. Ecological Applications, Vol. 11, No. 6, pp.1622 – 1633.

Hassall & Associates, 1998, 'Carbon sequestration in low rainfall areas:
the measurement of plantations of trees in Victoria'. Environment Australia, Canberra.

Macdonald, Ian, 2007, 'Koondrook-Perricoota State Forest Toorangaby Logging', speech to NSW Parliament 5th June, accessed through http://www.parliament.nsw.gov.au/prod/parlment/hansart.nsf/V3Key/LC20070605025
Macdonald, Ian, 2007a, 'Legislative Council Questions and Answers paper number 23', 24th October 2007, accessed through
http://www.parliament.nsw.gov.au/prod/lc/qalc.nsf/6b9957d2cbad5bd8ca25700b00232203/fe986066fba6eda3ca25737e00244abc!OpenDocument

Macdonald, Ian, 2008, in 'Legislative Council Questions and Answers Paper No. 42, 1st April 2008, accessed through
http://www.parliament.nsw.gov.au/prod/lc/qalc.nsf/18101dc36b638302ca257146007ee41a/a79d2415d6bf60f8ca2574030007ceae!OpenDocument

Marsden Jacob Associates, 2001, 'Forestry & National Competition Policy', Prepared for the Australian Conservation Foundation, accessed through http://www.acfonline.org.au/default.asp?section_id=4

New South Wales National Parks and Wildlife Service, 1998, 'The Contribution of Coolah Tops National Park to Regional Economic Development', published October 1998 by NSW NPWS.

Plantations 2020, 2008, viewed 19th Mar, 2008, http://www.plantations2020.com.au/vision/index.html

Plantations 2020, 2008a, viewed 19th Mar, 2008, http://www.plantations2020.com.au/private/index.html

Plantations 2020, 2008b, viewed 19th Mar, 2008,
http://www.plantations2020.com.au/environment/index.html.

Plantations Northeast, 2008, viewed 17th March, 2008,
http://www.plantationsnortheast.com.au/promotion.htm#Australias_Forests_-_A_future_of_change

PriceWaterhouse Coopers, 2003a, 'Economic Contributions of Victoria's Parks Case Studies Part I', prepared for Parks Victoria

PriceWaterhouse Coopers, 2003b, 'Economic Contributions of Victoria's Parks Case Studies Part II', prepared for Parks Victoria

Productivity Commission, 2008, 'Financial Performance of Government Trading Enterprises: 2004-05 to 2006-07', Productivity Commission Research Paper, July, 2008.

RACAC (2002), Brigalow Belt South Region Assessment by RACAC: Economic Opportunities Assessment, prepared by Syneca Consulting for Western Conservation Alliance.

RBA, 2008, 'Analytical Measures of Consumer Price Inflation', Last updated 29 April 2008, accessed 11th July 2008, http://www.rba.gov.au/Statistics/ExcelFiles/analytical_cpi_series.xls

Ribon, L & Scott, H, 2007, 'Carbon Offset Providers in Australia 2007', Global Sustainability at RMIT University.

Robinson, J, 2001, 'A review of techniques to value environmental resources in coastal zones', University of Queensland.

Rodda, Gary, 2006, email to Mike Bullen, director Native Forest Operations with State Forests NSW. Gary Rodda is the Area Planning Manager, Riverina region Forests NSW. Email sent on 25th May, 2006. Mike Bullen forwarded this mail to Carmel Flint of National Parks Association NSW on 26th May, 2006.

Rodda, Gary, 2007, email to Carmel Flint of National Parks Association NSW. Gary Rodda is the Area Planning Manager, Riverina region Forests NSW. Email sent on 17th October, 2007

Scott, John 2008, former manager of Murray Riverina Farm Forestry, personal communication, by phone 25th March, 2008.

State Forests of NSW, 2001, 'A Review of the NSW Red Gum Industry: Part B: A detailed Resource Analysis State forest and Western Lands Lease', published by State Forests NSW

State Forests of NSW, 2000, 'The Price System'

Tilbury, Owen; Cowan, Malcolm and Leech, Mark, 2003, 'Evaluation of the One Stop ShopFarm Forestry Program', accessed through: http://www.daff.gov.au/__data/assets/pdf_file/0004/37588/fffprojecteval.pdf

Todd, M.K. & McDonnell, R., 2003, '*Riverina Biodiversity Assessment Project*.' Unpublished report produced by the NSW National Parks and Wildlife Service, Riverina as part of the NSW Biodiversity Strategy

Tourism NSW, 2007, 'Murray Tourism Region – Facts and Figures', viewed on 28th Feb, 2008, http://corporate.tourism.nsw.gov.au/The_Murray_p915.aspx

Tourism NSW, 2007a, 'Riverina Tourism Region – Facts and Figures', viewed on 28th Feb, 2008, http://corporate.tourism.nsw.gov.au/Riverina_p920.aspx

Tourism Research Australia, 2007, 'Travel by Australians: Quarterly Results of the National Visitor Survey', December, 2007.

Tourism Research Australia, 2008a, 'Tourism Profiles For Local Government Areas in Regional Australia, New South Wales: District of Deniliquin', 2008.

Tourism Research Australia, 2008b, 'Tourism Profiles For Local Government Areas in Regional Australia, New

South Wales: Wakool Shire', 2008.

Tuck, Murray, 2008, former logging industry worker, personal communication, by phone 19th February, 2008.

URS, 2001, 'NSW Red Gum Timber Industry and State Forests Options', prepared for State Forests NSW.

URS, 2007, 'Non-Use Values of Victorian Public Land: Case Studies of River Red Gum and East Gippsland Forests', prepared for Victorian Environmental Assessment Council, accessed through www.veac.vic.gov.au

VEAC, 2006, 'River Red Gum Forests Investigation', Discussion Paper. October 2006.

VEAC, 2007, 'River Red Gum Forests Investigation', Draft Proposals Paper for Public Comment, July 2007.

VEAC, 2008a, 'River Red Gum Forests Investigation – Submissions', viewed on 5th July, 2008, http://www.veac.vic.gov.au/riverredgumsubmissions.htm

VEAC, 2008b, 'River Red Gum Forests Investigation', Final Report, July 2008.

Wartook Gardens, 2008, viewed on 15th March, 2008, http://www.grampiansnationalpark.com/grampians/national/park/history.asp

Wescott, Geoff, 1992, 'The economic impact of national parks in Victoria, Australia'

White, Bob, 2006, email to Andrew Cox of National Parks Association of NSW. Bob White is the FOI Co-ordinator, Forests New South Wales. Email sent on 5th April, 2006.

World Agroforestry Centre, 2008, Accessed 26th June 2008, http://www.worldagroforestrycentre.org/Sea/Products/AFDbases/AF/asp/SpeciesInfo.asp?SpID=760