

RIVER RED GUM ASSESSMENT

SOCIO-ECONOMIC IMPACT ASSESSMENT FINAL REPORT

Prepared For:



Prepared By:

Arche Consulting Pty Ltd
In association with
Gillespie Economics

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Arche Consulting
T + 61 0421 274076
Phillips Street
Sydney NSW 2000
www.arche.com.au

ABN 35 131 934 337

NSW Natural Resources Commission

River Red Gum Assessment Socio-economic Impact Assessment

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Company	Arche Consulting Pty Ltd ABN 35 131 934 337
Address	GPO Box 1320 Sydney NSW 2001
Web	www.arche.com.au
Contact Person	John Madden 0421 274 076 jmadden@arche.com.au Jack Knowles jknowles@arche.com.au

Further information about Arche Consulting can be found at www.arche.com.au

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Acronyms and abbreviations

ABS	Australian Bureau of Statistics
ANZSIC	Australia and New Zealand Standard Industrial Classification
CBA	Cost Benefit Analysis
DR	Discount rate - a rate used to compare the value of a dollar received in the future to a dollar received today i.e. used to adjust future values to present values.
EIS	Environmental Impact Study
ha	Hectares
IO	Input-Output Analysis
LGA	Local Government Area
km	Kilometres
MA	Management Area
NRC	Natural Resources Commission
PV	Present Value - the current value of expected future cash flows.
VEAC	Victorian Environmental Assessment Council

EXECUTIVE SUMMARY

STUDY OVERVIEW

Arche Consulting Pty Ltd was commissioned by the NSW Natural Resources Commission to prepare an independent socio-economic impact assessment to inform the Commission's regional assessment of the red gum forests and woodland forests of the Riverina bioregion.

The focus of the study was the businesses that rely on timber resources sourced from public land (including State Forests, Western Land Leases and other Crown Timber lands) and the local communities in which these businesses are based.

The local communities identified as towns of interest for this study were:

- Barham-Koondrook;
- Deniliquin;
- Mathoura
- Darlington Point;
- Balranald; and
- Merbein (Victoria).

The project involved three streams of work.

1. Socio-economic profiling;
2. Industry survey and impact assessment;
3. Cost Benefit Analysis.

SUMMARY OF SOCIO-ECONOMIC PROFILING

Over the last decade, the Bioregion has seen a plateau in employment and population growth, suggesting a static or declining level of economic and social robustness and prosperity. Closer examination reveals that growth has lagged behind performance for NSW as a whole. Of particular note is the differing performance within the region. Towns of interest within the Bioregion, which are not based around a large regional service centre, have seen a decline in both population and persons employed. These Local Government Areas (LGAs) include Balranald and Deniliquin.

The economy of the region is reliant on agriculture, especially irrigated cropping. Irrigated agriculture in the region, particularly in the Murray and Wakool Local Government Areas, has declined in recent years due to low general security water allocations. Compared to state-wide figures, towns of interest in the Bioregion:

- have lower median weekly individual, household and family wages;

- in the main, have a considerably lower age dependency ratio¹; and
- in the main, have a higher proportion of Indigenous persons in the population.

Compared to non-urban NSW figures, towns of interest in the study region:

- in the main have lower median weekly individual, household and family wages;
- in the main, have a considerably lower age dependency ratio²; and
- in the main, have a lower proportion of Indigenous persons in the population.

Compared to region-wide figures, towns of interest in the Bioregion:

- in the main, have a lower median individual wage;
- in the main, have a considerably lower age dependency ratio; and
- in the main, have a lower proportion of dwellings occupied.

Table 1 provides a summary of the population trends from the 2001 and 2006 ABS Census for each town of interest. Over this period, the populations of Merbein, Barham-Koondrook, and Darlington Point have increased. Population has declined in Deniliquin and Balranald, and the population of Mathoura has been stable.

Table 1 Summary of population trends in towns of interest (Forests NSW, 2009)

Town of interest	Population trends 2001 & 2006 census
Barham-Koondrook	Population growth of 1.1% in 2001 census Population growth of 4.4% in 2006 census
Deniliquin	Population decline of 0.5% in 2001 census Population decline of 4.5% in 2006 census
Mathoura	Population decline of 1.5% in 2001 census Population growth of 1.6% in 2006 census
Darlington Point	Population growth of 12.7% in 2001 census Population growth of 3.3% in 2006 census
Balranald	Population decline of 9.5% in 2001 census Population decline of 5.3% in 2006 census
Merbein	Population growth of 4.8% in 2001 census Population growth of 8.3% in 2006 census

¹ The age dependency ratio is calculated as the percentage of the estimated resident population below 14 years of age and above 65 years of age to the percentage aged between 15 and 64 years. The average ration across NSW is 51%.

² The age dependency ratio is calculated as the percentage of the estimated resident population below 14 years of age and above 65 years of age to the percentage aged between 15 and 64 years. The NSW State average is 51%.

THE RIVER RED GUM TIMBER INDUSTRY

INDUSTRY LOCATION

Table 2 provides a summary of the timber industry operations that source river red gum timber from public land (including Western Land Leases) by towns of interest and zone.

The river red gum timber industry in the Central Zone reliant on public land comprises of four quota mills, eight ex-quota mills and seven residue operations. The towns of interest in the Central Zone are Barham-Koondrook, Deniliquin and Mathoura.

The river red gum timber industry in the Northern Zone comprises of one quota mill and two residue operations. Darlington Point is the only town of interest in the Northern Zone.

The river red gum timber industry in the Western Zone comprises of one quota mill and nine residue operations. Balranald and Merbein are the towns of interest in the Western Zone.

Table 2 Summary of number of operations by town of interest zone

	Town of interest	Quota mills	Ex-quota mills	Residue Operations Only ²	Total
Central Zone	Barham-Koondrook	3	2		5
	Deniliquin	1		2	3
	Mathoura		5	2	7
	Other Central ¹		1	3	4
Sub-total		4	8	7	19
Northern Zone	Darlington Point	1			1
	Other Northern			2	2
Sub-total		1	0	2	3
Western Zone	Balranald			5	5
	Merbein	1			1
	Other Western			4	4
Sub-total		1	0	9	10
Total		6	8	18	32

1. Other Central includes Leitchville, Mulwala, Moama, Romsey, Other Northern includes Murrumbidgee and Leeton. Other Western includes Broken Hill and Pomona.

2. Some residue activities are included in quota and ex-quota mills as businesses have holdings across the three allocation types.

Table 3 shows the location of each of the quota mills.

Table 3 Location of quota mills

	Town of interest	Quota mill
Central Zone	Barham-Koondrook	Arbuthnot Sawmill O'Brien's Sawmill Bonum Sawmill (Rowes Timber Industries)
	Deniliquin	Gulpa Sawmill
	Mathoura	-
Northern Zone	Darlington Point	Darlington Point Sawmill
Western Zone	Balranald	-
	Merbein	Merbein Sawmill

INDUSTRY SURVEY

Two surveys of industry participants were conducted: a detailed face to face interview with quota holders; and a less detailed telephone interview with ex-quota and residue holders. In total, there are 32 businesses that are licensed by Forests NSW. Of these, 19 (59 per cent) were respondents to the survey.

Table 4 provides a summary of industry participation in the survey, measured as a proportion of total volume allocated.

Table 4 Summary of industry participation in survey

	Quota	Ex-quota	Residue
% total volume completed	100	92	70
% total volume contacted, not completed	-	6	21
% total volume completed / contacted	100	98	91
% volume not contacted	-	2	9
TOTAL	100	100	100

The quota businesses surveyed:

- utilise a range of resources from public land including quota and ex-quota saw logs, residues and thinnings;
- produce a range of timber products including high grade furniture and veneers, railway sleepers and construction materials, landscaping materials, and firewood;
- employ 154 people (149 Full Time Equivalents);
- have combined reported revenue of approximately \$30 million;
- have average reported revenue of \$5 million;
- have reliance of 95 per cent (median) of their total combined through put from public land (State Forests and Western Lands Leases); and

- have an estimated asset value of approximately \$44 million excluding any valuation placed on quota held by the business.

The ex-quota and residue businesses surveyed:

- utilise a range of resources from public land including ex-quota saw logs, residues and thinning;
- produce a range of timber products including railway sleepers and construction materials, landscaping materials, and firewood;
- employ 74 FTE (note that this is not the entire workforce of holders as not all businesses surveyed); and
- have a high reliance on public land (State Forests and Western Lands Leases) with over 90 per cent of their throughput sourced from these areas.

AGGREGATED SURVEY FINDINGS

Table 5 shows the breakdown of the estimated river red gum timber industry employment in businesses that hold licences for each of the towns of interest.

Table 5 River red gum employment in businesses that hold licences in towns of interest

Town of interest	Employment in affected red gum businesses (FTE, survey)	Total employment in urban localities (Positions, ABS 2006)	% total jobs in 2006
Barham	70	407	17%
Koondrook (Vic)	49	318	15%
Deniliquin	28	3,219	1%
Mathoura	31	225	14%
Darlington Point	20	435	5%
Balranald	24	516	5%
Merbein (Vic)	25	743	3%
Other	27		
Total	274		

Table 6 shows the breakdown of employment in businesses that source timber from public land by focus of business operations. The reliance on public lands varies by mill and also between the sections of the industry (i.e. quota, ex-quota and residue).

Table 6 Confirmed total employment in the river red gum timber industry in business that rely on timber sourced from public land (FTE) by business types

Employment category	Quota mills	Ex-quota mills	Residue operators	Total
Businesses with timber licences				
Direct employees				
Surveyed businesses	149	26	48	223
Estimate for businesses not able to be surveyed ¹	0	17	34	51
Subtotal direct employees	149	43	82	274
Contractors	15			15
Trading	17			17
Total for businesses that rely on public land				306
Forests NSW employees				30

1. This result is derived by adding the survey results with an estimate of employment for non-surveyed businesses using average FTE per unit of allocation.

Table 7 provides a summary of the breakup of positions based on location of business, allowing for 5 residue operators located in Victoria.

Table 7 Confirmed total employment in the river red gum timber industry in businesses that rely on timber sourced from public land (FTE) by State

Employment category	FTE employed in NSW based businesses	FTE employed in Victorian based businesses	All FTE employed in NSW and Victoria
Businesses with timber licences			
Direct employees			
Surveyed businesses	166	57	223
Estimate for businesses not able to be surveyed ¹	46	5	51
Subtotal direct employees	212	62	274
Contractors	15		15
Trading	17		17
Total for businesses that rely on public land	232	57	306
Forests NSW employees	30		30

1. This result is derived by adding the survey results with an estimate of employment for non-surveyed businesses using average FTE per unit of allocation.

The current private employment that is significantly reliant on river red gums sourced from public lands is estimated to be in the order of 300-310 FTE.

REGIONAL ECONOMIC IMPACT ASSESSMENT

Regional economic impact assessment is primarily concerned with the effect of an activity on an economy in terms of a number of specific indicators, such as gross regional output, value-added, income and employment. The timber industry based on the NSW river red gum timber resource on public land provides a stimulus to the regional economy from the purchase of inputs to the production process and the purchases of the employees of the industry. An input output model was developed to analyse the impact of the river red gum timber industry reliant on public land on the economy of the surrounding region.

The region defined for this area of the study was the ABS statistical local areas of Wentworth (NSW); Balranald (NSW); Wakool (NSW); Murray (NSW); Deniliquin (NSW); Conargo (NSW); Murrumbidgee (NSW); Griffith (NSW); Berrigan (NSW); Mildura Rural City Part A - SSD (VIC); Gannawarra SLA (VIC).

The regional economic impact assessment found that:

- Gross regional product for the regional economy (as defined in the paragraph above) is estimated at \$4,845 million, comprising \$2,383 million to households as wages and salaries (including payments to self employed persons and employers) and \$2,462 million in other value add which includes gross operating surplus and depreciation and net indirect taxes and subsidies.
- The employment total working in the region was 47,511 people.

The regional economic impact assessment found that the timber industry reliant on the NSW river red gum resource from public land contributes the following to the regional (as defined for this part of the study) economy:

- \$86 million in annual direct and indirect regional output or business turnover;
- \$39 million in annual direct and indirect regional value added;
- \$21 million in annual household income; and
- 450 direct and indirect jobs.

BENEFIT COST ANALYSIS

Where consideration is being given to the economic desirability of policy alternatives, the key economic consideration is the estimation of the incremental change in values. That is, it is relevant to identify and measure how each component of total economic value, and the associated drivers, would change over time between the "with" and "without" alternative policy outcomes.

In a benefit cost analysis framework, the costs and benefits of any NRC conservation scenarios would have a range of potential costs and benefits. These are summarised in Table 8.

Table 8 Potential costs and benefits of NRC conservation scenarios

Costs	Benefits
Foregone producer surplus from timber production, grazing and apiary	Tourism consumer surplus benefits
Reductions in rural populations	Conservation benefits
Opportunity cost of water	

Costs would be associated with foregone producer surplus from current uses of the river red gum forests on public land including timber production, grazing and apiary.

There may also be non-market costs associated with any reduction in the population of rural communities. For instance, Bennett et al (2004) found that the Australian tax-paying public would be willing to pay to avoid losses of people from rural and regional areas as a result of environmental protection measures.

If conservation outcomes are reliant on additional environmental flows, then there would also be an opportunity cost of water.

Conservation scenarios may also have a number of benefits to the community. If protection of river red gum forests leads to increases in visitation to these areas there would be consumer surplus benefits associated with this increased visitation.

Increases in environmental outcomes as a result of conservation scenarios would also have non-market benefits to the community as indicated by the Victorian Environmental Assessment Council (VEAC) choice modelling study. This study found that the Victorian community were willing to pay for an increase in the area of healthy river red gum forest, an increase in the number of breeding pairs of threatened parrots and an increase in the populations of Murray Cod and other threatened native fish species.

Choice modelling is complex and lengthy research, and as such there was not sufficient time for the NRC to conduct such modelling specific to this assessment in the timeframe available. There are a number of issues associated with using these results in the current assessment of river red gums in NSW. The most pertinent is the context of the choice modelling survey. The survey was carried out in Victoria using Victorian respondents and maps that referred to the Victorian forests.

This benefit cost analysis framework requires specification of alternative resource use scenarios for the river red gum forests and identification of the implications of these scenarios for current resource uses and implications for biophysical outcomes. The NRC has not provided finalised scenario information and as such a more exhaustive quantification of costs and benefits has not been conducted.

1 INTRODUCTION

1.1 PURPOSE OF THIS STUDY & STUDY OVERVIEW

Arche Consulting Pty Ltd was commissioned by the NSW Natural Resources Commission to prepare an independent socio-economic impact assessment to inform the Commission's regional assessment of the red gum forests and woodland forests of the Riverina Bioregion.

The focus of the study was the businesses that rely on timber resources sourced from public land (including State Forests, Western Land Leases and other Crown Timber lands) and the local communities in which these businesses are based.

The project involved three streams of work.

1. Socio-economic profiling;
2. Impact Assessment;
3. Cost Benefit Analysis.

Profiling examines the socio-economic context of the region and the role of the river red gum industry within the region and the community.

Impact assessment involves the development of industry models and a regional input output model to assess the effects of various scenarios.

Thirdly, values are placed within a wider cost benefit framework.

1.2 STRUCTURE OF THIS REPORT

This report presents the methodology and results this study. A detailed description of the methodology used is provided in Section 2. The results of the socio-economic profiling conducted at a state, regional and local scale are provided in Section 3, with more detailed analysis of census information provided in Appendix E.

To provide context for the results of the industry survey, a description of the structure and regulation of the river red gum timber industry is provided in Section 4.

The results of the industry survey are presented in Section 5. Regional economic impact analysis is presented in Section 6, and frameworks for conducting business financial impact and benefit cost analysis are presented in Sections 7 and 8 respectively.

2.1 SOCIO-ECONOMIC PROFILING

The assessment of socio-economic values has been conducted on a state, regional and local scale. Previous studies have shown that in the state and regional context, the timber industry has a relatively minor contribution to employment and the overall economy. However, the industry has very localised impacts, particularly on small rural towns. For this reason, efforts have been focused on local scale assessments on towns where the timber industry relies on resources from public lands.

2.1.1 DEFINITION OF THE REGION

There are a range of definitions for the region which vary due to study purpose, data availability and focus of the analysis. For example, the input output modelling requires specification of a region based on location of jobs and business expenditures.

The NRC has specified that the study area for the purpose of analysis of Australian Bureau of Statistics (ABS) data, as being the Local Government Areas (LGA) of Balranald, Berrigan, Conargo, Deniliquin, Griffith, Murray, Murrumbidgee, Wakool and Wentworth³.

To assess the local level socio-economic values of the industry, towns of interest were identified on which to focus analysis. The criterion for selecting towns of interest was towns where employment in the timber industry was greater than one per cent of total employment in the town. This analysis identified seven towns. Cross checking with timber industry representatives indicated that the industry in one of these towns (Narrandera) was predominantly based on white cypress, and as such this town was excluded from the analysis. On the basis of this methodology, the towns of interest included in the study were:

- Central Area:
 - Barham-Koondrook;
 - Deniliquin;
 - Mathoura;
- Northern Area:
 - Darlington Point;
- Western Area:

³ It should be noted that Forests NSW Environmental Impact Statement (Forests NSW 2009a), defined their study region as being the statistical subdivisions (SSD) of Murray Darling, Central Murray, Lower Murrumbidgee, Lachlan, Central Murrumbidgee (excluding Wagga Wagga), and the Upper Murray (excluding Albury). As this extends beyond the boundaries of the Riverina Bioregion, the NRC has adopted a more refined definition.

- o Balranald; and
- o Merbein (Victoria).

The profiling was focused on analysis of ABS Census Data for 2001 and 2006. Additional data relating to local tourism activities was sourced from Tourism Research Australia and Tourism NSW.

2.2 INDUSTRY SURVEY

To inform the assessment and the development of the industry impact models, Arche Consulting conducted an industry survey. The survey population was identified with the assistance of Forests NSW. Forests NSW provided a contact list of all businesses that hold base licence allocations (quota, ex quota, residue) to access timber resources on public land (including Western Lands Leases). Table 9 provides a summary of industry participation in the survey.

Table 9 Summary of industry participation in survey

	Quota	Ex-quota	Residue
Number of businesses	6	8	23
Number completed	6	6	12
Number contacted, not completed	-	1	5
Number not contacted		1 ¹	6
% total volume completed	100	92	70
% total volume contacted, not completed	-	6	21
% total volume completed / contacted	100	98	91
% volume not contacted	-	2	9

1. Contact details provided not current.

Some businesses hold licences for more than one type of base allocation (e.g. quota and ex-quota), more than one licence of the same allocation type, or both. Therefore the total number of businesses in the population is less than the sum of the number of businesses in each category. In total, there are 32 businesses that are licensed by Forests NSW. Of the total number of businesses 25 (78%) were contacted to participate in the survey. Of the total number of businesses, 19 (59%) were respondents to the survey. Table 10 provides a breakdown of the number of businesses by allocation held.

Table 10 Summary of businesses and survey responses for each allocation type

	All	Respondents
Number of businesses with only quota and ex-quota	4	4
Number of businesses with quota, ex-quota & residue	2	2
Number of businesses with only ex-quota	5	3
Number of businesses with only ex-quota & residue	3	2
Number of businesses with only residue	18	8
TOTAL	32	19

Two surveys were designed:

- a detailed face to face survey for quota holders; and
- a less detailed telephone survey for ex-quota and residue holders.

Both surveys collected the following information:

- business background and history;
- timber sources and harvest activity;
- products and markets;
- revenue; and
- employment.

In addition to this data, the detailed survey of quota holders collected information relating to:

- employee age and tenure
- expenditure; and
- assets.

Copies of the survey questionnaires are provided in Appendix A.

3 SOCIO-ECONOMIC PROFILE

3.1 INTRODUCTION

The purpose of socio-economic profiling is to familiarise decision-makers with the social and economic context, and to provide a baseline of information against which future changes can be measured. Of course this baseline needs to examine possible social and economic scenarios. Ideally, a profile would provide information from which indicators can be derived to assist in measuring change directly attributable to any changes in policy and associated plans.

Resilience in a socio-economic context can be considered as the ability to absorb changes or manage changes successfully, in terms of:

- economic viability - the versatility of an area's economy, avoiding reliance on any single crop, secondary industry or employer. In an agricultural region, the more viable economies would in theory be those with several primary products, and include primary, secondary and tertiary economic tiers. Thus, when a single primary product suffers a downturn or shock, the economy as a whole can be buffered;
- social vitality - this focuses on social bonds, reflecting people's ability to support one another and manage crises collectively. As this study is a desk top study, we can consider the social resources to manage change. Possible publicly available indicators could be related to age structures (age dependency) and rates of volunteerism.

In practice, it is difficult to find adequate indicators among publicly available statistics (e.g. population census) that measure the particular changes under study, and that reflect the most important impacts. However, qualitative impacts such as changes in the nature of community social interactions and quality of life may be highly important impacts. It is important to recognise the limitations of a profile, and assess the relevance of particular descriptors.

The profile presented in this section provides an indication of the relative economic and social health of the region against the rest of the State of NSW, and regional (non-urban) NSW⁴, using selected indicators. It can also be used to examine if there are areas within the region that face different socio-economic contexts.

3.2 SUMMARY OF PROFILE FINDINGS

Over the last decade, the study region has seen a plateau in employment and population growth, suggesting a static or declining level of economic and social robustness and prosperity. Closer examination reveals that growth has lagged behind performance for NSW as a whole. Of particular note is the differing performance within the region. Local government areas (LGAs) within the region, which are not based around a large regional service centre, have seen a decline in

⁴ Statistical Subdivisions that exclude major urban centres.

both population and persons employed. These LGAs include Balranald and Deniliquin.

The economy of the region is reliant on agriculture, especially irrigated cropping. Irrigated agriculture in the region, particularly in the Murray and Wakool LGAs, has declined in recent years due to low general security water allocations.

Compared to state-wide figures, towns of interest in the study region:

- have lower median weekly individual, household and family wages;
- in the main, have a considerably lower age dependency ratio⁵; and
- in the main, have a higher proportion of Indigenous persons in the population.

Compared to non-urban NSW figures, towns of interest in the study region:

- in the main have lower median weekly individual, household and family wages;
- in the main, have a considerably lower age dependency ratio; and
- in the main, have a lower proportion of Indigenous persons in the population.

Compared to region-wide figures, towns of interest in the Bioregion:

- in the main, have a lower median individual wage;
- in the main, have a considerably lower age dependency ratio; and
- in the main, have a lower proportion of dwellings occupied.

⁵ The age dependency ratio is calculated as the percentage of the estimated resident population below 14 years of age and above 65 years of age to the percentage aged between 15 and 64 years. The NSW State average is 51%

3.3 NSW CONTEXT

To enable comparison with the region and towns of interests, ABS Census data for 2001 and 2006 was analysed to develop key socio-economic indicators and an employment profile. Data was analysed for the whole of NSW, as well as non-urban NSW⁶. For the purpose of this study, the non-urban areas of NSW are defined as being the Statistical Subdivisions that exclude major urban centres⁷.

Table 11 shows selected socio-economic indicators for NSW and non-urban NSW.

Table 11 Selected NSW socio-economic indicators (ABS, 2006)

Socio-economic indicators	Whole of NSW		NSW non-urban
	2001	2006	2006
Population (number)	6,311,168	6,549,177	1,065,248
Population growth (%)	-	3.8	0.3 ¹
Indigenous population (%)	1.9	2.1	5.0
Age dependency ratio	51	51	61
Sex ratio (number of males per 100 females)	97.57	97.22	99.66
Unemployment rate (%)	7.2	5.9	7.2
Labour force participation rate (%)	46.9	47.2	55
Occupied dwellings (%)	91.1	90.5	85
Median individual income (\$/week)	-	461	380
Median family income (\$/week)	-	1,181	743
Median household income (\$/week)	-	1,036	944

Note: - not calculated for the purpose of this study.

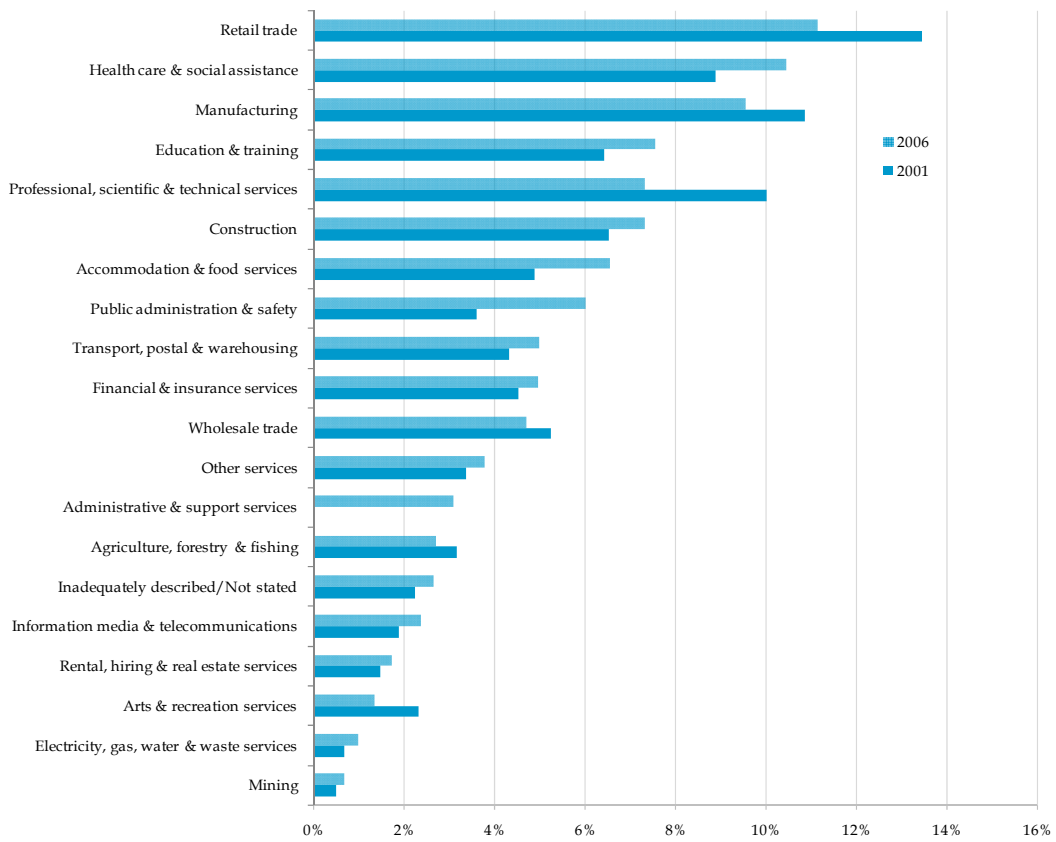
1. This figure is affected by a change in boundary between 2001 and 2006. If removed the population growth is -1.5 %.

Figure 1 shows that employment in NSW is dominated by the retail trade, health care and social assistance and manufacturing sectors.

⁶ To avoid confusion, the term non-urban NSW is used in this study instead of "regional NSW".

⁷ Hunter SD Bal; Richmond-Tweed SD Bal; Clarence (excl. Coffs Harbour); Hastings (excl. Port Macquarie); Northern Slopes (excl. Tamworth); Northern Tablelands, North Central Plain; Central Macquarie (excl. Dubbo); Macquarie-Barwon; Upper Darling; Central Tablelands (excl. Bathurst-Orange); Lachlan; Southern Tablelands (excl. Queanbeyan); Lower South Coast; Snowy; Central Murrumbidgee (excl. Wagga Wagga); Lower Murrumbidgee; Upper Murray (excl. Albury); Central Murray; Murray-Darling; Far West.

Figure 1 Employment by industry within NSW, 2006 Census (ABS, 2006)



However, employment in non-urban NSW (Figure 2) is dominated by agriculture / forestry and fisheries and then the tertiary sectors of retail trade and health care and social assistance.

Figure 2 Employment by industry within non-urban NSW, 2006 Census (ABS, 2006)

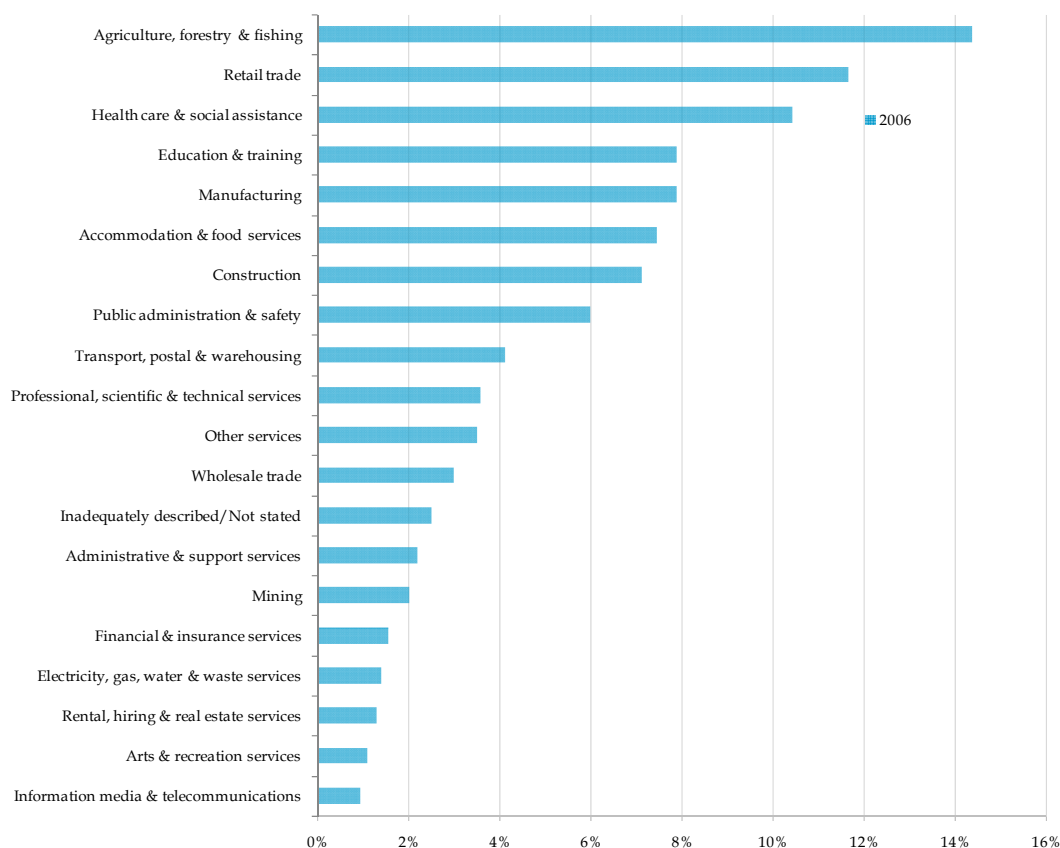


Table 12 shows a concise summary of the local, state and regional socio-economic population context for this assessment. In the state context, the region accounts for 1.0 per cent of the NSW population, and the towns of interest accounts for 0.2 per cent of the population.

Table 12 Summary of state, region and local population context (ABS, 2006)

Socio-economic indicators	2006
Proportion of NSW population in the region (%)	1.0
Proportion of NSW population in the towns of interest (%)	0.2
Proportion of non-urban NSW population in the region (%)	6.0
Proportion of non-urban NSW population in the towns of interest (%)	1.3
Proportion of region population in towns of interest (%) ⁸	22.5

⁸ Note that Merbien and Koondrook are outside the region as defined for the ABS statistics analysis.

ABS statistics from the 2006 census indicates that 7,875 persons are employed in the forest and timber industries state wide. Employment in the region (as defined by this study) in the forest and timber industries accounts for approximately 2% of the total employment in these industries across NSW (Table 13).

Table 13 Summary of key employment indicators of the timber industry (ABS, 2006)

Key indicator	Estimated employment (number of persons)
Number employed in timber & forest industry (NSW)	7,875
Number employed in timber & forest industry (EIS region) ¹	1,008
Number employed in timber industry (Region defined by this study) ²	122

1. The Forests NSW EIS defined the region as being the statistical subdivisions (SSD) of Murray Darling, Central Murray, Lower Murrumbidgee, Lachlan, Central Murrumbidgee (excluding Wagga Wagga), and the Upper Murray (excluding Albury).

2. This study defines the region as being the LGAs of Balranald, Berrigan, Conargo Deniliquin, Griffith, Murray, Murrumbidgee, Wakool and Wentworth. Note this excludes two towns with mills affected by the potential changes.

These figures (Table 13) include all employment in the forest and timber industry, including those jobs that rely on timber sources other than the river red gum and woodland forests of the Riverina Bioregion. A detailed industry survey has been conducted to estimate the level of employment that is reliant on the red gum and woodland forests of the Riverina Bioregion that are on public land. The results of this survey are presented in Chapter 5.

3.4 REGIONAL CONTEXT

For the purpose of this profiling, the region has been defined as being the LGAs of Balranald, Berrigan, Conargo Deniliquin, Griffith, Murray, Murrumbidgee, Wakool and Wentworth.

Table 14 shows selected socio-economic indicators for the region. Since 2001, the region has shown a decline in population and a decline in the proportion of dwellings occupied. Compared to non-urban NSW, the region has a lower proportion of indigenous persons in the population, a lower age dependence ratio, higher labour force participation rate and higher individual, family and household incomes.

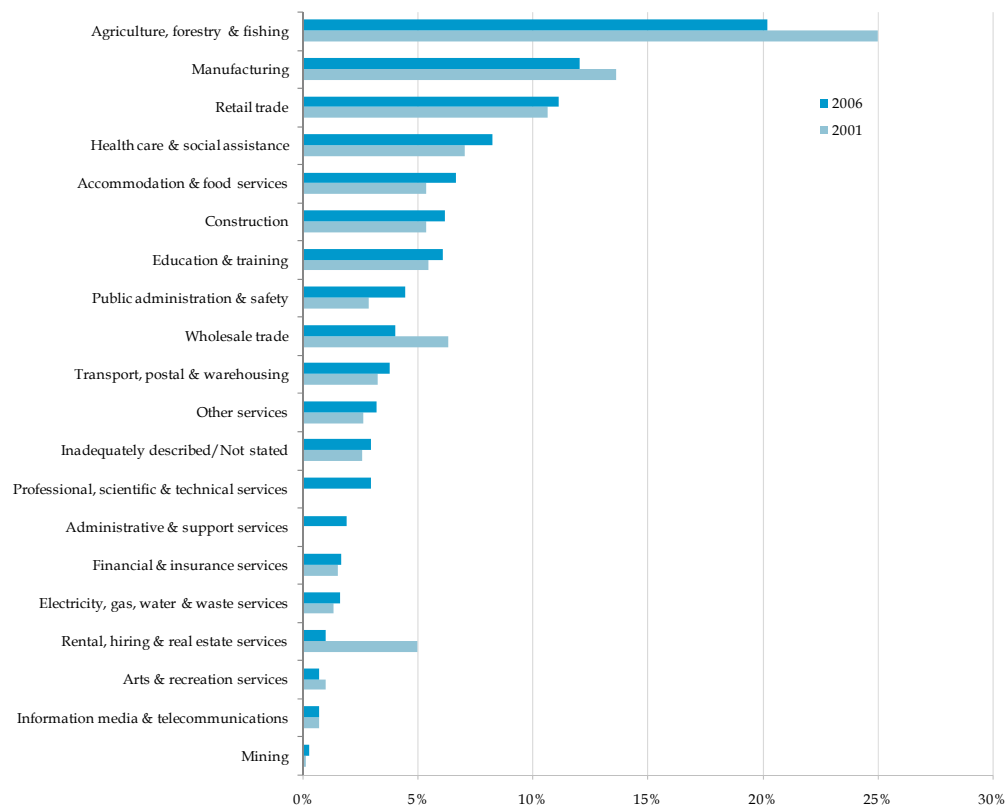
Table 14 Selected socio-economic indicators for the region (ABS, 2006)

Socio-economic indicators	Region 2001	Region 2006	Non-urban NSW 2006
Population (number)	63,524	63,402	1,065,248
Population Growth (%)	-	-0.2	0.3
Indigenous population (%)	3.6	4.0	5.0
Age dependency ratio	59	60	61
Sex ratio (number of males per 100 females)	104.8	101.9	99.7
Unemployment rate (%)	5.0	4.2	7.2
Labour force participation rate (%)	62	61	55
Occupied dwellings (%)	89	87	85
Median individual income (\$/week)	-	409	380
Median family income (\$/week)	-	800	743
Median household income (\$/week)	-	1,016	944

Note: - not calculated for the purpose of this study.

The employment profile for the region is shown in Figure 3. Employment is dominated by the agriculture, fisheries and forestry, education and training and retail sectors.

Figure 3 Employment by industry within the region, 2006 Census (ABS, 2006)



Total employment in all forestry and timber industries in the region is estimated by ABS to be 122. It should be noted that this does not include Merbein and Koondrook industry employment figures. This ABS estimate represents approximately 0.4 per cent of total employment in the region and 2.0 per cent of jobs in the combined agriculture, fishing and forestry sectors.

A detailed breakdown of this figure for each relevant ANZSIC classification is provided in Table 15. It should be noted that these ABS figures are based on census participants indicating that they are linked to the industry. There are jobs in managerial, services and administration that are directly linked to the industry that would not be included in these figures. Similar analysis conducted by Forests NSW (2009a) at a broader scale⁹ identified a total of 1008 persons employed in the same ANZSIC classifications. The issues with spatial definition of the region and ability to gauge dependency highlight the need for the direct survey of river red gum jobs. These job estimates have been superseded by the survey numbers.

Table 15 Number of persons employed in the forestry and timber industries in the region (ABS, 2006)

	Males	Females	Persons
Forestry Support Services	3	6	9
Forestry and Logging, nfd	0	0	0
Forestry	11	5	16
Log Sawmilling and Timber Dressing, nfd	3	0	3
Log Sawmilling	52	9	61
Logging	17	0	17
Other Wood Product Manufacturing, nec	4	0	4
Other Wood Product Manufacturing, nfd	9	0	9
Timber Resawing and Dressing	3	0	3
Wood Chipping	0	0	0
Wood Product Manufacturing, nfd	0	0	0
Sub-total	102	20	122

Note: nfd = not further defined.

⁹ The Forests NSW EIS defined the region as being the statistical subdivisions (SSD) of Murray Darling, Central Murray, Lower Murrumbidgee, Lachlan, Central Murrumbidgee (excluding Wagga Wagga), and the Upper Murray (excluding Albury).

Tourism data collected at a regional scale aligns with defined tourism regions. The relevant tourism regions for this assessment are the Murray¹⁰, Riverina¹¹ and Outback¹² regions. It should be noted that these tourism regions do not align with the study region and that visitors numbers and expenditure includes those travelling for business purposes.

The tourism expenditure by domestic day and overnight visitors for the year ending March 2009 for the NSW Murray, Riverina and Outback regions is estimated to be \$1.165 billion (Tourism NSW 2009 Regional Tourism Statistics). Tourism data provides an indicator of the importance of tourism at a regional level. Available data sources describe tourism activity as a whole, and not specifically tourism that is connected to river red gum forests.

3.5 SOCIO-ECONOMIC PROFILE OF TOWNS OF INTEREST

The towns of interest included in the study were:

- Barham-Koondrook;
- Deniliquin;
- Mathoura;
- Darlington Point;
- Balranald; and
- Merbein (Victoria).

3.5.1 BARHAM-KOONDROOK

Barham (NSW) and Koondrook (VIC) are twin towns in the Murray River, with a combined population of approximately 2000. Barham is the largest town in the Wakool Local Government Area, with other towns in the shire including Moulamein, Tooleybuc and Wakool. Koondrook is located in the Ganawarra Shire (Victoria), which includes the larger centres of Kerang and Cohuna. Swan Hill (75 kilometres), Deniliquin (98 kilometres) and Moama/Echuca (90 kilometres) are the nearest larger towns to Barham-Koondrook.

The towns have a number of local services include a hospital, medical centres, schools, banks, post office and police station, as well as retail and dining businesses. Key local tourism attractions include river based activities such as

¹⁰ The Murray region comprises the local government areas of Albury; Berrigan; Corowa Shire; Greater Hume Shire; Jerilderie; Murray; Urana; and Wakool.

¹¹ The Riverina tourism region covers the local government areas of Bland; Carrathool; Conargo; Coolamon; Cootamundra; Deniliquin; Griffith; Gundagai; Hay; Junee; Leeton; Lockhart; Murrumbidgee; Narrandera Temora; and Wagga Wagga.

¹² The Outback Region covers the local government areas of Balranald; Bogan; Bourke; Brewarrina; Broken Hill; Central Darling; Cobar; Unincorporated Far West; Walgett; and Wentworth.

fishing, camping and river cruises, sports and recreation (e.g. golf). The red gum industry is also a key tourist attraction.

A summary of the recent trends in key socio-economic indicators for Barham-Koondrook is provided in Table 16. Barham-Koondrook has lower unemployment and a higher labour participation rate than NSW. However, its employment participation rate is lower than non-urban NSW. Barham-Koondrook has experienced population growth since 2001, though the region has seen overall population decline.

Table 16 Summary of key socio-economic indicators for Barham-Koondrook (Forests NSW, 2009a, ABS 2006)

Socio-economic indicators	2001	2006	2006 Region	Non-urban NSW 2006
Population (number)	1,852	1,934	63,402	1,065,248
Population Growth (%)	1.1	4.4	-0.2	0.3
Indigenous population (%)	1.1	1.4	4.0	5.0
Age dependency ratio	37.3	55.2	60	61
Sex ratio (number of males per 100 females)	98.7	99.8	101.9	99.7
Unemployment rate (%)	4.2	3.2	4.2	7.2
Labour force participation rate (%)	50.0	50.3	61.2	55.0
Occupied dwellings (%)	87.0	83.8	87.0	84.8

The employment profile of Barham for 2006 (see Appendix E) shows that employment was greatest in the accommodation and food services sector and in the agriculture, fisheries and forestry sector. Since 2001, there has been a decline in the proportion of employment in the retail and manufacturing sectors. In Koondrook retail, manufacturing and agriculture, fisheries and forestry were the three largest employment sectors. Since 2001, there has been a decline in retail, manufacturing and construction and an increase in the proportion of employment in manufacturing, agriculture, fisheries and forestry and accommodation and food services.

Table 17 shows that the median individual, household and family income of the Barham-Koondrook population is lower than the NSW, non-urban NSW and region medians.

Table 17 Comparison of Barham-Koondrook incomes with those of NSW and the region (ABS 2006)

Income	Barham-Koondrook	Region	Non-urban NSW 2006
Median individual income (\$/week)	348.5	409	380
Median household income (\$/week)	617	800	743
Median family income (\$/week)	840	1,016	944

The timber industry in Barham-Koondrook is focused on two fixed sawmills (Bonum and Arbuthnot) and three large mobile operations (O'Brien's Redgum Sawmills, Hills and Colturi). There is also a large residue operation that supplies firewood to predominately the Victorian market.

The town also has two river red gum furniture businesses. The twin towns host the annual Red Gum Showcase - an event that highlights the importance of the industry to the local community.

Tourism Research Australia (2008d) estimates a total of 80,000 people visit the broader Wakool Shire area annually, and spend a total of \$26 million. For the Ganawarra Shire (Victoria), which also includes the larger centres of Kerang and Cohuna, Tourism Research Australia (2008e) estimates a total of 62,000 visitors with a total spend of \$14 million.

It is estimated that the level of volunteering¹³ in Barham-Koondrook is approximately 26 per cent (Forests NSW, 2009a).

3.5.2 DENILIQVIN

Deniliquin, a town of approximately 7,400 people located on the banks of the Edward River, is the centre of the Deniliquin LGA. The Deniliquin LGA is small in area (approximately 140 square kilometres) and encompasses the town and its outskirts. Deniliquin is a service town for a number of smaller towns in the region including Wakool, Conargo, Berrigan, Finely and Jerilderie.

Key community services in Deniliquin include health, education (including primary and secondary schools, a community college and campus of the TAFE Riverina Institute), commercial, government and social services. Deniliquin is the administrative centre of Murray Irrigation Limited, which provides irrigation infrastructure services to an estimated 1200 farmers in the Murray Irrigation Area, and the town has an active chamber of commerce.

Tourism in Deniliquin is focused on the region's natural attractions. State Forests are destinations for camping, biking and bird watching, and the Edward River attracts visitors for river-based recreation such as kayaking, swimming, fishing, and water-skiing. The town is host to the Deni Ute Muster, a major annual event that attracts an estimated 5000 visitors each October. Tourism Research Australia (2008c) estimates a total of 97,000 people visit the Deniliquin Shire annually, and they spend approximately \$25 million.

A summary of the recent trends in key socio-economic indicators for Deniliquin is provided in Table 18. Deniliquin has experienced a faster rate of population decline than NSW overall, non-urban NSW and the region. Compared to the region, Deniliquin has a lower age dependence ratio and a slightly higher rate of unemployment and a higher proportion of dwellings occupied.

¹³ Per cent of people aged over 15 years

Table 18 Summary of key socio-economic indicators for Deniliquin (Forests NSW, 2009a)

Socio-economic indicators	2001	2006	Region 2006	Non-urban NSW 2006
Population (number)	7,781	7,431	63,402	1,065,248
Population Growth (%)	-0.5	-4.5	-0.2	0.3
Indigenous population (%)	2.6	2.8	4.0	5.0
Age dependency ratio	26.8	32.2	60	61
Sex ratio (number of males per 100 females)	97.9	99.4	101.9	99.7
Unemployment rate (%)	6.5	5.1	4.2	7.2
Labour force participation rate (%)	61.8	60.7	61.2	55.0
Occupied dwellings (%)	91.8	88.5	87.0	84.8

Sectors with the largest proportion of employment in 2006 were the retail and health care and social assistance (see Appendix E). There was a decline in the proportion of the population employed in the agriculture, fisheries and forestry between 2001 and 2006.

Table 19 shows that the median individual, household and family income of the Deniliquin population is higher than both the NSW and non-urban NSW medians. Deniliquin has lower individual and household median incomes than the region, but a higher median family income.

Table 19 Comparison of Deniliquin incomes with those of NSW and the region (2006)

Income	Deniliquin	Region 2006	Non-urban NSW 2006
Median individual income (\$/week)	404	409	380
Median household income (\$/week)	755	800	743
Median family income (\$/week)	1,023	1,016	944

The Deniliquin economy has historically relied on the irrigation sector (predominantly rice and dairy), though the drought has seen significant decline in these industries. The town's rice mill and abattoir have closed in the past three years and there has been a reduction in employment in the irrigation sector. An estimated 20 FTE positions were lost from Murray Irrigation Limited (Murray Irrigation Limited, 2009) and in 2007, Sunrice made an estimated 180 jobs redundant in the towns of Deniliquin and Coleambally with the closure of rice mills (ABC, 2007).

The timber industry in Deniliquin is focused on the Gulpa Saw Mill. The operation has recently invested in new buildings and has established a dedicated enterprise that is focused on providing high quality building timbers.

It is estimated that approximately 25 per cent of Deniliquin's population in 2006 was involved in volunteer work (Forests NSW, 2009a).

3.5.3 MATHOURA

Mathoura, with a population of approximately 650 is located in the Murray LGA. The major town in the Murray LGA is Moama (and its twin town Echuca located in Victoria), which is approximately 42 kilometres away. Moama-Echuca is a major service centre for Mathoura.

A multipurpose Visitor and Business Information Centre is the focal point for the delivery of services in the town. This centre houses a sub-branch of Bendigo Bank, access points for Centrelink and Medicare, tourism information and various business services. Other services in Mathoura include a primary school, post office and police station. There are two hotels and one club. Mathoura has an active Chamber of Commerce and a local newspaper.

The Murray River and its forests are the focus of tourism in Murray Shire. Mathoura hosts several annual events that attract visitors, including the Mathoura Fishing Classic and the Cadell Country Fair.

A summary of the recent trends in key socio-economic indicators for Mathoura is provided in Table 20. Compared to NSW, non-urban NSW and the region, Mathoura has a lower age dependence ratio and a much higher rate of unemployment.

Table 20 Summary of key socio-economic indicators for Mathoura (Forests NSW, 2009a)

Socio-economic indicators	2001	2006	Region 2006	Non-urban NSW 2006
Population (number)	643	653	63,402	1,065,248
Population Growth (%)	-1.53	1.56	-0.2	0.3
Indigenous population (%)	1.1	2.1	4.0	5.0
Age dependency ratio	35.4	41.5	60	61
Sex ratio (number of males per 100 females)	110.8	112.7	101.9	99.7
Unemployment rate (%)	13.5	9.8	4.2	7.2
Labour force participation rate (%)	50.9	47.8	61.2	55.0
Occupied dwellings (%)	78.0	85.8	87.0	84.8

In 2006, the sectors with the largest proportion of employment were manufacturing and retail trade, followed by construction, public administration and agriculture, fisheries and forestry.

Table 21 shows that the median individual, household and family income of the Mathoura population is lower than the NSW, non-urban NSW and regional medians. Mathoura has the lowest median individual, household and family incomes of all towns included in this study.

Table 21 Comparison of Mathoura incomes with those of NSW and the region (2006)

Income	Mathoura 2006	Region 2006	Non-urban NSW 2006
Median individual income (\$/week)	311	409	380
Median household income (\$/week)	552	800	743
Median family income (\$/week)	626	1,016	944

There is a strong local connection to the nearby State Forests including the Barmah and Millewa State Forests.

Approximately 25 per cent of the Mathoura population (older than 15 years) was involved in volunteering (Forests NSW, 2009a).

Tourism statistics are not available for the town of Mathoura. For the whole of the Murray Shire, which includes the larger centre of Moama, Tourism Research Australia (2008b) estimates approximately 78,000 people visit the region annually, and they spend at total of \$33 million.

3.5.4 DARLINGTON POINT

Darlington Point is a small town of approximately 1,000 people located on the banks of the Murrumbidgee River in the north of the Murrumbidgee LGA. Coleambally, the other main town within the LGA, is approximately 30 kilometres away, and Griffith (38 kilometres) in the adjoining shire is a major service centre for Darlington Point.

Key services in Darlington Point include police station, post office, and the town supports a primary school, community health service and swimming pool.

A summary of the recent trends in key socio-economic indicators for Darlington Point is provided in Table 22. When compared to both NSW and non-urban NSW, Darlington Point has a much higher proportion of Indigenous persons in the population, a very low age dependency ratio and lower unemployment. When compared to the region, Darlington Point has a higher proportion of Indigenous persons in the population, lower age dependency and slightly higher unemployment.

Table 22 Summary of key socio-economic indicators for Darlington Point (Forests NSW, 2009a)

Socio-economic indicators	2001	2006	Region 2006	Non-urban NSW 2006
Population (number)	993	1,026	63,402	1,065,248
Population Growth (%)	12.7	3.3	-0.2	0.3
Indigenous population (%)	14.8	17.2	4.0	5.0
Age dependency ratio	16.4	19.6	60	61
Sex ratio (number of males per 100 females)	114.5	111.1	101.9	99.7
Unemployment rate (%)	5.5	4.4	4.2	7.2
Labour force participation rate (%)	62.4	62.1	61.2	55.0
Occupied dwellings (%)	92.5	90.7	87.0	84.8

Manufacturing and agriculture, fisheries and forestry are the two largest employment sectors (see Appendix E). Since 2001, there has been an overall decline in the proportion of agriculture, fisheries and forestry sectors and wholesale trade.

Table 23 shows that the median individual, household and family income of the Darlington Point population is higher than the NSW metropolitan median. Darlington Point has the highest median household income of the towns of interest in this study. Compared to the region, Darlington Point has a higher individual median, but lower median household and family incomes.

Table 23 Comparison of Darlington Point incomes with those of NSW and the region (2006)

Income	Darlington Point	Region 2006	Non-urban NSW 2006
Median individual income (\$/week)	448	409	380
Median household income (\$/week)	758	800	743
Median family income (\$/week)	993	1,016	944

Historically, irrigated agriculture and the processing of agricultural products especially rice have been key industries in Murrumbidgee Shire. The recent drought and low water allocations have resulted in a decline in production and income based on irrigated agriculture.

Walking, camping, fishing and other water based activities on the Murrumbidgee River is the focus of tourism activities in the district. Tourism data for Darlington Point and the broader Murrumbidgee Shire is not available.

The timber industry in Darlington Point is focused on a major fixed mill (Darlington Point Sawmill). The mill is the only significant holder of quota within the Narrandera and Murrumbidgee Management Area. The business has diversified in recent years as they have adjusted to lower timber supply volumes and quality by adding a firewood enterprise to its operations. The mill is one of the few

secondary industries in a town dominated by service industries. It is noted that many people who reside in the town are employed in Griffith.

Darlington Point has sporting, charity and community groups, and has a volunteering rate of 16.5 % (Forests NSW, 2009a).

3.5.5 BALRANALD

Balranald, located on the Sturt Highway and on the banks of the Murrumbidgee River is the main town in Balranald Shire Council. The total shire area is approximately 21,400 square kilometres, with a total population of 2,440 (ABS, 2006). Other towns and localities in the shire include Euston and Kyalite.

Key services in Balranald include retail (supermarkets, clothing); accommodation (motels, caravan park), registered clubs, hotels, restaurants & food outlets; health and emergency services (medical centre, pharmacy, hospital, ambulance, fire brigade and rescue service); and education (primary school). The regional centres of Swan Hill (a distance of 92 kilometres) and Mildura (158 kilometres) provide services not available in Balranald.

A summary of the recent trends in key socio-economic indicators for Balranald is provided in Table 24. When compared to NSW and the region, Balranald has experienced a greater rate of population decline, has a higher proportion of indigenous persons in the population and a higher rate of unemployment. When compared to non-urban NSW, Balranald has a greater rate of population decline, has a higher proportion of indigenous persons in the population and a lower rate of unemployment.

Table 24: Summary of key socio-economic indicators for Balranald (Forests NSW, 2009)

Socio-economic indicators	2001	2006	Region 2006	Non-urban NSW 2006
Population (number)	1,284	1,216	63,402	1,065,248
Population Growth (%)	-9.51	-5.3	-0.2	0.3
Indigenous population (%)	8.9	8.1	4.0	5.0
Age dependency ratio	25.2	31.5	60	61
Sex ratio (number of males per 100 females)	109.6	98.4	101.9	99.7
Unemployment rate (%)	4.6	6.7	4.2	7.2
Labour force participation rate (%)	59.6	61.6	61.2	55.0
Occupied dwellings (%)	85.3	86.1	87.0	84.8

The three largest employment sectors are retail, education and agriculture, fisheries and forestry. Since 2001, there has been a decline in employment in the retail sector. Since 2006, there has also been a reduction in an estimated 24 jobs in education as a result of the relocation of distance education services (Forests NSW, 2009a).

Table 25 shows that the median individual, household and family income of the Balranald population is lower than those of the region and non-urban NSW.

Table 25 Comparison of Balranald incomes with those of NSW and the region (2006)

Income	Balranald	Region 2006	Non-urban NSW 2006
Median individual income (\$/week)	381	409	380
Median household income (\$/week)	696	800	743
Median family income (\$/week)	957	1,016	944

The timber industry in Balranald comprises of a major wholesale timber company - Campbell's Sawmills, and smaller operations that supply Campbell's with sleepers and firewood, or source firewood to on-sell direct to other wholesalers or consumers.

The industry is generally reliant on timber resources sourced from private land. However, Campbell's Saw Mill sources timber products (predominantly sleepers) from a total of thirteen operations and from Redgum Timber Producers Pty Ltd (a company owned by quota holding businesses) that source products from both public and private land.

Recent investigations by Balranald Shire Council estimate that 105 people rely on the timber industry for their primary source of income, while an additional 49 have a secondary reliance. The Council's investigations also included additional employment numbers in local businesses that supply inputs such as fuel and tyres and services such as auto-electric and engineering to timber industry businesses and local landholders that receive income through royalty payments (unpublished data, Balranald Shire Council, 2009)

Balranald is the closest service centre to Yanga and Mungo National Parks. Camping and fishing on the Murrumbidgee River is the focus of tourism activities in the district. Tourism data for Balranald Local Government Area estimates that the shire receives 38,000 visitors, who spend a total of \$7 million annually (Tourism Research Australia, 2008a).

Compared to other towns of interest in this study, Balranald has high levels of community volunteering, with almost 34 per cent of the population involved in community organisations or other activities.

3.5.6 MERBEIN (VICTORIA)

Merbein, located in Victoria is a satellite town of the large regional centre of Mildura, which is approximately 12 kilometres away. The Mildura Rural City LGA has a total population in excess of 60,000. Mildura is the primary service centre for residents and businesses in Merbein.

Located within the Sunraysia region, Merbein is a centre of irrigated horticulture production including wine grapes, dried fruits and citrus. There has been some decline in horticulture in recent years with periods of low commodity prices and reduced water allocations. Two large processors, McGuigan's Wines and SDS Beverages are major employers in the Merbein district.

A summary of the recent trends in key socio-economic indicators for Merbein is provided in Table 26. Compared to NSW, non-urban NSW and the broader regional population, Merbein has experienced a greater rate of population growth, has a lower age dependence ratio and a higher unemployment rate.

Table 26 Summary of key socio-economic indicators for Merbein (Forests NSW, 2009a)

Socio-economic indicators	2001	2006	Region 2006	Non-urban NSW 2006
Population (number)	1,820	1,974	63,402	1,065,248
Population Growth (%)	4.8	8.3	-0.2	0.3
Indigenous population (%)	4.2	4.9	4.0	5.0
Age dependency ratio	31.0	29.6	60	61
Sex ratio (number of males per 100 females)	95.7	99.6	101.9	99.7
Unemployment rate (%)	9.9	8.1	4.2	7.2
Labour force participation rate (%)	53.9	52.2	61.2	55.0
Occupied dwellings (%)	94.2	93.9	87.0	84.8

Retail trade and manufacturing are the two largest sectors of employment, although there has been a decline in the importance of retail since 2001 (See Appendix E). Table 27 shows that the median individual, household and family income of the Merbein population is lower than the NSW non-urban and the region medians.

Table 27 Comparison of Merbein incomes with those of NSW and the region

Income	Merbein	Region 2006	Non-urban NSW 2006
Median individual income (\$/week)	332	409	380
Median household income (\$/week)	596	800	743
Median family income (\$/week)	764	1,016	944

The timber industry in Merbein is centred on the Merbein Saw Mill. Merbein Saw Mill relies on timber resources from NSW, with logs and residue sourced from State Forests, Western Lands Leases and private land.

Tourism data is not available for the town of Merbein. Tourism Research Australia (2008e) estimates that, in total, the Mildura Regional Local Government Area receives a total of 465,000 visitors who spend \$153 million.

4 DESCRIPTION OF THE TIMBER INDUSTRY

4.1 INDUSTRY OVERVIEW

The river red gum timber industry in the Riverina Bioregion is reliant on timber resources sourced from freehold land, Western Land Leases and State Forests. Access to resources on public land (including Western Land Lease) is regulated by Forests NSW under the *Forestry Act 1916*. Current quotas and allocations are based on long term yields of high quality sawlogs largely developed in the 1980's.

River red gum timbers are valued for a range of uses including furniture, joinery, railway sleepers, construction, landscape and garden products and firewood. These products are sold in key markets at a national scale, as well as some export.

4.2 INDUSTRY REGULATION & RESOURCE ACCESS

Industry activity on public land (Western Land Leases and State Forest land) is regulated by Forests NSW under the *Forestry Act 1916*. Forests NSW is responsible for licensing mills and harvest contractors, and providing allocations to mills.

Timber is allocated to industry either by annual quotas or through parcel sale arrangements. Annual quotas are an allocation of sawlogs made available to saw mills. As a by-product of this management, other products such as ex-quota logs and firewood, vary from year to year depending on stand conditions and market demands.

Table 28 provides a summary of the resources utilised by the industry.

Table 28 Summary of forest resources utilised by the timber industry

Resource	Description
Quota	An annual allocation of compulsory sawlog volume of greater than determined diameter limits made from a management area to a Crown sawmill. Quotas have continuing basis but are subject to annual review or, in the case of a wood supply agreement, at intervals specified in the agreement.
Ex-quota	A sawlog which when utilised by the sawmill, does not form part of its quota allocation, for a variety of reasons. This category may include both logs that are compulsory (of good quality but below size limits subject to further minimum limit) or optional, for utilisation by the sawmiller.
Residue	Those parts of the log not suitable for sawn timber that are utilised for landscaping, firewood or biofuel.
Thinnings	Logs sourced under contract arrangements from silviculture activities conducted for the purposes of improving forest health. Thinnings are generally utilised for firewood and other residue materials.

The total volume (base allocation) of each resource that is currently licensed is provided in Table 29.

Table 29 Summary of base allocation (Forests NSW)

Resource	Base allocation
Quota logs (m ³)	31,010
Ex-quota logs (m ³)	28,107
Residues (tonnes)	101,548

Note: as at August 2008/09.

Table 30 shows the breakdown of annual quota, ex-quota and residue volumes by management area.

Table 30 Volumes by management areas (Forests NSW, 2009a)

Management Area	Quota (m ³ /year)	Ex-quota (m ³ /year)	Residue (tonnes/year)
Murray Management Area	23,450	17,607	63,148
Mildura, Murrumbidgee and Narrandera Management Areas	7,560	10,500	38,400
Total	31,010	28,107	101,548

4.3 INDUSTRY STRUCTURE

The river red gum timber industry supply chain is shown in Figure 4. The industry is concentrated among a small number of large, vertically integrated milling operations that carry out activities along the supply chain from harvesting to manufacturing. The six quota holders account for 100 per cent of quota allocation, 65 per cent of ex-quota base allocation and 40 per cent of the base allocation of residue.

Smaller businesses operate in parts of the value chain providing services to the larger integrated operations (for example by harvesting saw logs for mills) and harvesting residues for lower value products.

Residue operations do not fell their own trees, but “follow through” after quota or ex-quota operations to harvest residue materials.

There are also some organisations that provide a direct service to the industry by aggregating the outputs of smaller sleeper producers to meet the requirements of larger contracts.

Figure 4 Timber industry value chain

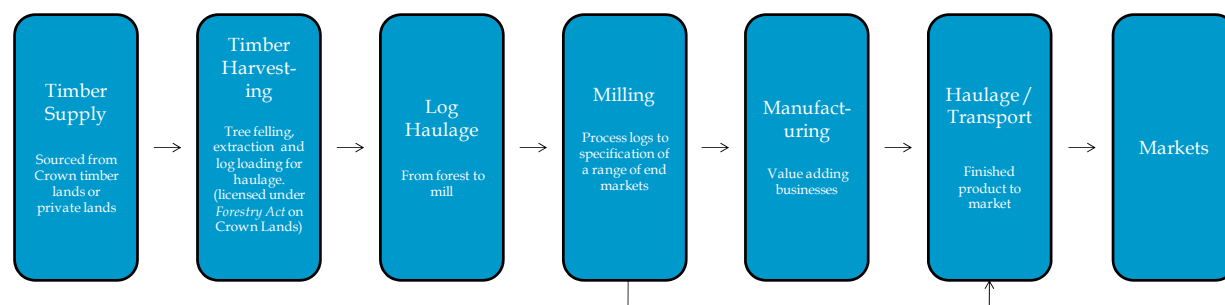


Table 31 provides a summary of the different types of businesses using categories that are generally used by the industry.

Table 31 Summary of business types

Business type	Description
Fixed location mill (Quota)	Larger mills with quota licences that are in fixed locations, usually in or near to towns. These are generally integrated operations that conduct a significant proportion of their own harvesting operations and transport to the mill.
Mobile mill (Quota)	Mobile operations that source quota and ex quota quality logs. These operations are transported to the timber source to mill timber on site. Most of these operations also source residue material.
Mobile operations (Ex-quota)	Mobile operations that source ex-quota quality logs. Most of these operations also source residue material.
Mobile operations (Residue)	Mobile businesses that source residue materials, predominantly for firewood.

Table 32 provides a summary of the volume of each type of base allocation held by different business types.

Table 32 Summary of business type by volume of allocation

	Quota (m ³)	Ex-quota (m ³)	Residue (tonnes)
Quota Sawmills	31,010	18,288	40,505
Ex Quota Sawmills		9,819	3,231
Residue Operations			57,812
TOTAL	31,010	28,107	101,548

Table 33 shows the breakdown of the number of businesses by type and forest management area (MA).

Table 33 Number of businesses by type and management area

	Murray MA	Mildura, Murrumbidgee and Narrandera MA	Total
Number of businesses with only quota and ex-quota	3	1	4
Number of businesses with quota, ex-quota & residue	1	1	2
Number of businesses with only ex-quota	5	0	5
Number of businesses with only ex-quota & residue	3	0	3
Number of businesses with only residue	7	11	18
Total	19	13	32

4.4 PRODUCTS & MARKETS

The river red gum industry has a high utilisation rate of felled log. The product mix varies as product supply contracts change (reflecting changes in demand) and with variations in the quality of the available resource.

Metropolitan and regional Victoria are the major markets for river red gum products. Adelaide and regional South Australia (SA), Sydney and Canberra are also destinations for some products. A small amount of river red gum product is exported. Table 34 provides a description of the different river red gum products and the key markets.

Table 34 Description of river red gum products

Product	Description	Key markets
Structural / Building / Furniture/ Heritage	Timbers for furniture, joinery and building	Melbourne
Veneers	Timbers for furniture and joinery	Melbourne
Weatherboards	Timbers for cladding	Melbourne
Decking	Timbers for decking construction	Melbourne
Sleepers	Replacement timbers for railways	Victoria and SA
Crossings timbers	Timbers for bridges and marine construction (both new & replacement)	Victoria and SA
Garden Timbers	Landscape sleepers	National, Victoria and SA
Firewood	Split firewood	Melbourne, regional Victoria, Canberra, SA and local
Wood chips	Residues used for biofuels and landscaping	Local markets, Victoria and SA
Mulch	Residues used for landscaping	Melbourne, regional Victoria, SA
Saw dust	Residues for feedlots	Riverina

5 INDUSTRY SURVEY RESULTS

5.1 SUMMARY OF SURVEY RESULTS

5.1.1 OVERVIEW OF SURVEY

Two surveys of industry participants were conducted: a detailed face to face interview with quota holders; and a less detailed telephone interview with ex-quota and residue holders.

Table 35 provides a summary of industry participation in the survey.

Table 35 Summary of industry participation in survey

	Quota	Ex-quota	Residue
Number of businesses	6	8	23
Number completed	6	6	12
Number contacted, not completed	-	1	5
Number not contacted		1 ¹	6
% total volume completed	100	92	70
% total volume contacted, not completed	-	6	21
% total volume completed / contacted	100	98	91
% volume not contacted	-	2	9

1. Contact number provided by Forests NSW not current.

Some businesses hold licences for more than one type of base allocation (e.g. quota and ex-quota), more than one licence of the same allocation type, or both. Therefore the total number of businesses in the population is less than the sum of the number of businesses in each category. In total, there are 32 businesses that are licensed by Forests NSW. Of these 32, 19 (59%) were respondents to the survey. Table 36 provides a breakdown of the number of businesses by allocation held.

Table 36 Summary of businesses for each allocation

	All	Respondents
Number of businesses with only quota and ex-quota	4	4
Number of businesses with quota, ex-quota & residue	2	2
Number of businesses with only ex-quota	5	3
Number of businesses with only ex-quota & residue	3	2
Number of businesses with only residue	18	8
TOTAL	32	19

5.1.2 DETAILED SURVEY OF QUOTA HOLDERS

The quota businesses surveyed:

- utilise a range of resources from public land including quota and ex-quota saw logs, residues and thinning;
- produce a range of timber products including high grade furniture and veneers, railway sleepers and construction materials, landscaping materials, and firewood;
- employ 154 people (149 FTE);
- have a combined reported revenue of \$29.95 million;
- have an average reported revenue of \$4.9 million;
- have average reliance of 74 per cent of their total combined through-put from public land (State Forests and Western Lands Leases), with a median reliance of 84 percent; and
- have an estimated asset value of approximately \$44 million, which does not include any valuation placed on quota.

5.1.3 EX-QUOTA & RESIDUE SURVEY

The ex-quota and residue businesses surveyed:

- utilise a range of resources from public land including ex-quota saw logs, residues and thinning;
- produce a range of timber products including railway sleepers and construction materials, landscaping materials, and firewood;
- employ 74 FTE (this is not the entire workforce of holders as not all businesses surveyed);

- have reliance of 91 per cent of their total combined through-put from public land (State Forests and Western Lands Leases) for ex-quota holders; and
- have reliance of 98 per cent of their total combined through put from public land (State Forests and Western Lands Leases) for residue allocation holders.

As this survey was a sample of the total population, these figures are used to estimate the total employment and activity across all ex-quota and residue operations.

5.2 SURVEY OF QUOTA HOLDERS

5.2.1 SURVEYED BUSINESSES

A total of six quota businesses were surveyed in detail. Of these six businesses, five have fixed location mills and one has a mobile mill.

These businesses account for 100 per cent of the total quota, 65 per cent of ex-quota allocation and 40 per cent of the total residue base allocation on public land. A summary of the key indicators of the operations surveyed and their reliance on access to resources on public land is provided in Table 37.

Table 37 Summary of quota businesses surveyed

Summary indicators	Survey Result
Number of businesses	6
Average reliance on State Forest for resource	74%
Median reliance on State Forest for resources	84%
Combined reported annual revenue	\$29.95 million
Average reported annual revenue	\$4.99 million
Average revenue / unit throughput	\$50
Median revenue / unit throughput	\$90

The estimated annual volume and range of unit prices for each product for surveyed businesses is provided in Table 38.

Table 38 Estimated proportion of sawn volume and indicative range of unit prices (derived from surveyed businesses and other sources)

Product	Estimated of proportion of total volume	Range of unit prices (per m ³ unless stated)
Structural / Building / Furniture/ Heritage	10.0%	\$2,000-2,500
Veneers	1.0%	\$2,000-2,500
Weatherboards	1.5%	\$2,000
Decking timbers (green)	3.0%	\$550
Sleepers	25.0%	\$600-700
Crossings timbers	2.5%	\$1,500 - \$1,800
Garden Timbers	16.0%	\$390 - \$430
Firewood	30.0%	\$100 - \$120 / tonne
Wood chips	7.5%	\$65-\$100 / tonne
Mulch	1.0%	\$30
Saw dust	2.5%	\$35
TOTAL	100%	

5.2.2 EMPLOYMENT IN SURVEYED QUOTA BUSINESSES

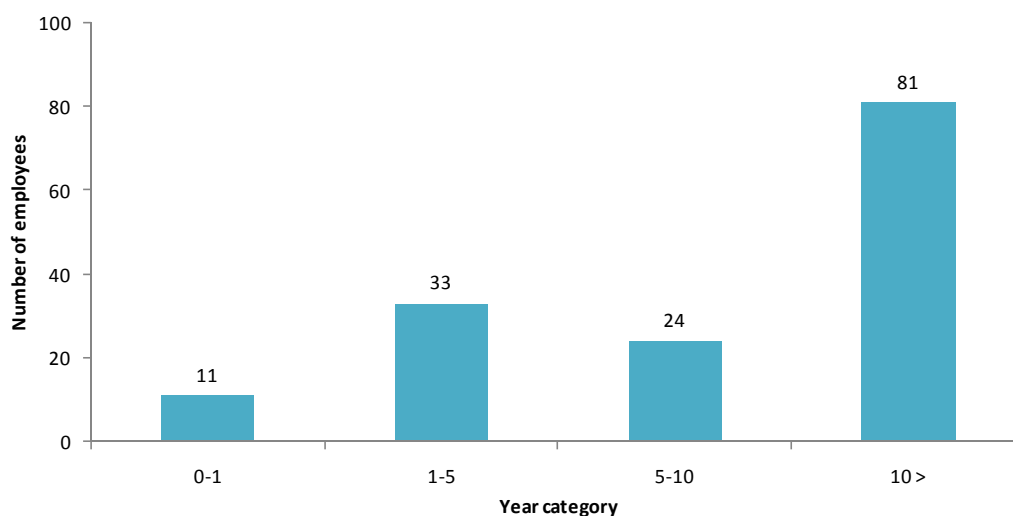
Table 39 shows the breakdown of employment for each of the surveyed quota businesses. These employment numbers have been verified by the business owners. These figures are total employment numbers, and have not yet been adjusted for reliance on public land.

Table 39 Breakdown of employment by category of surveyed quota businesses

Employment category	Number of positions	Full Time Equivalents
Management	14.0	11.5
Administration	18.0	15.5
Bush Operations	30.0	30
Milling	69.0	69
Other	23.0	23
Total Milling Business (surveyed)	154.0	149.0
Contractors (surveyed)	17.0	17.0
Total	201.0	196.0

Figure 5 shows the breakdown of the tenure (duration of employment) of employees in quota businesses.

Figure 5 Breakdown of number of employees by years of tenure (number of employees)



The employment numbers in Table 39 are the totals for the quota business operations. A proportion of the timber in these quota operations is sourced from private land. The level of employment that relies on timbers from public land (including Western Land Leases) is 125 FTE. The result is derived by multiplying the FTE of each business by the reliance on public land of that business, as reported by the quota survey respondents.

5.2.3 ASSETS

The assets of the quota businesses surveyed have been categorised as shown in Table 40. The valuation of assets is highly variable, as data included a mix of depreciation value, replacement value and insured value. Many businesses do not place an asset value on their quota licence. Total assets were estimated at \$44 million.

Table 40 Breakdown of assets by category

Asset type	Combined estimated value
Property	\$9.65 million
Buildings	\$10.49 million
Machinery and Processing Equipment	\$16.60 million
Mobile Plant	\$7.30 million
Total	\$44.04 million

Only those businesses surveyed face to face provided this information in full. Significant assets would be missed in this survey, particularly; mobile mills, harvesting equipment and trucks associated with ex-quota and residue operations.

5.3 SURVEY OF EX-QUOTA AND RESIDUE BUSINESSES

5.3.1 SURVEYED BUSINESSES

Table 41 presents the summary indicators of the ex-quota and residue businesses surveyed.

Table 41 Summary of businesses surveyed

Summary indicators	Survey Result
Number of businesses	14
Average reliance on public land for resources	97%
Average annual allocation (ex quota)	1,242 m ³
Average annual allocation (residue)	3,575 tonnes

5.3.2 EMPLOYMENT

Table 42 shows the breakdown of employment by category for the ex-quota and residue operations surveyed.

Table 42 Breakdown of employment by category

Employment category	Full Time Equivalents
Management	13
Administration	5
Bush Operations	33
Milling	19
Other	4
Total	74

5.4 AGGREGATED SURVEY FINDINGS

5.4.1 EMPLOYMENT

Table 43 shows the breakdown of employment for each of these business operations. It should be noted that in this categorisation, quota owners also hold ex-quota and residue allocations. The categories below relate to the emphasis of the business operation.

The reliance on public lands varies by mill and also between the sections of the industry (i.e., quota, ex-quota and residue).

Table 43 Confirmed total employment in the river red gum timber industry in business that rely on timber sourced from public land (FTE) by business types

Employment category	Quota mills	Ex-quota mills	Residue operators	Total
Businesses with timber licences				
Direct employees				
Surveyed businesses	149	26	48	223
Estimate for businesses not able to be surveyed ¹	0	17	34	51
Subtotal direct employees	149	43	82	274
Contractors	15			15
Trading	17			17
Total for businesses that rely on public land				306
Forests NSW employees				30

1. This result is derived by adding the survey results with an estimate of employment for non-surveyed businesses using average FTE per unit of allocation.

The current private employment that is significantly reliant on river red gum on public lands is estimated to be in the order of 300-310 FTE.

A number of the positions are based in Victoria including two of the quota mills. If the employees of these mills are assumed to be based in Victoria then 57 FTE positions are located outside NSW.

It should be noted that Victorian based mills provided information that staff members lived both in NSW and Victoria. Also, there are a number of residue operators also based in Victoria (under 5), however, this is difficult to accurately assess. Table 44 provides a summary of the breakup of positions based on location of business, allowing for 5 residue operators located in Victoria.

Table 44 Confirmed total employment in the river red gum timber industry in business that rely on timber sourced from public land (FTE) by State

Employment category	FTE employed in NSW based businesses	FTE employed in Victorian based businesses	All FTE employed in NSW and Victoria
Businesses with timber licences			
Direct employees			
Surveyed businesses	166	57	223
Estimate for businesses not able to be surveyed ¹	46	5	51
Subtotal direct employees	212	62	274
Contractors	15		15
Trading	17		17
Total for businesses that rely on public land	232	57	306
Forests NSW employees	30		30

1. As not all ex-quota and residue operators were able to be contacted for the survey, employment numbers for these businesses have been estimated on a pro-rata basis.

It should be noted that any adjustment in employment to changes in volumes will not necessarily be linear.

6.1 INPUT-OUTPUT TABLE AND ECONOMIC STRUCTURE OF THE REGION

Regional economic impact assessment is primarily concerned with the effect of an impacting agent on an economy in terms of a number of specific indicators, such as gross regional output, value-added, income and employment. These indicators can be defined as follows:

- **Gross regional output** - the gross value of business turnover;
- **Value-added** - the difference between the gross value of business turnover and the costs of the inputs of raw materials, components and services bought in to produce the gross regional output;
- **Income** - the wages paid to employees including imputed wages for self employed and business owners; and
- **Employment** - the number of people employed (including full-time and part-time).

An impacting agent may be an existing activity within an economy or may be a change to a local economy (Powell et al. 1985; Jensen and West 1986). This assessment is concerned with the impact of the existing timber industry reliant on the NSW river red gum timber resource.

The economy on which the impact is measured can range from a township to the entire nation (Powell et al. 1985). In selecting the appropriate economy, regard needs to be had to capturing the local expenditure and employment associated with the river red gum timber industry, but not making the economy so large that the impact of the proposal becomes trivial (Powell and Chalmers 1995). Based on the location of mills utilising the NSW river red gum timber resource and the location of employees the region was defined as comprising:

- Wentworth SLA, NSW;
- Balranald SLA, NSW;
- Wakool SLA, NSW;
- Murray SLA, NSW;
- Deniliquin SLA, NSW;
- Conargo SLA, NSW;
- Murrumbidgee SLA, NSW;
- Griffith SLA, NSW;
- Berrigan SLA, NSW;
- Mildura Rural City Part A - SSD, Victoria; and
- Gannawarra SLA, Victoria.

A range of methods that can be used to examine the regional economic impacts of an activity on an economy including economic base theory, Keynesian multipliers, econometric models, mathematical programming models and input-output models (Powell et al., 1985). Refer to Attachment A for a brief discussion of the main methods. This study uses input-output analysis.

Input-output analysis essentially involves two steps:

- construction of an appropriate input-output table (regional transaction table) that can be used to identify the economic structure of the region and multipliers for each sector of the economy; and
- identification of the initial impact or stimulus of the activity (timber industry based on the river red gum resource of NSW) in a form that is compatible with the input-output equations so that the input-output multipliers and flow-on effects can then be estimated for the activity (West, 1993).

A 2005-06 input-output table of the regional economy was developed using the Generation of Input-Output Tables (GRIT) procedure (Attachment B) using a 2005-06 NSW input-output table (developed by Monash University) as the parent table. The regional input-output table was then indexed to 2009 values. The 109 sector input-output table of the regional economy was aggregated to 30 sectors and 6 sectors for the purpose of describing the economy.

A highly aggregated 2009 input-output table for the regional economy is provided in Table 45. The rows of the table indicate how the gross regional output of an industry is allocated as sales to other industries, to households, to exports and other final demands (OFD - which includes stock changes, capital expenditure and government expenditure). The corresponding column shows the sources of inputs to produce that gross regional output. These include purchases of intermediate inputs from other industries, the use of labour (household income), the returns to capital or other value-added (OVA - which includes gross operating surplus and depreciation and net indirect taxes and subsidies) and goods and services imported from outside the region. The number of people employed in each industry is also indicated in the final row.

Table 45 Aggregated transactions table: regional economy 2009 (\$'000)

	Ag/ Forest/ Fish	Mining	Manufac- -uring	Utilities	Build- ing	Serv- ices	Total	H-hold Exp	O.F.D	Exports	Total
Ag/Forest /Fish	132,321	11	197,303	16	321	9,627	339,599	12,732	170,008	1,064,832	1,587,171
Mining	61	951	6,437	49	751	404	8,653	185	-595	44,867	53,110
Manufacturi ng	73,360	1,817	231,863	4,348	59,484	176,658	547,530	138,049	152,996	2,122,059	2,960,634
Utilities	20,837	427	21,057	91,142	2,829	39,586	175,878	30,922	27,669	145,029	379,498
Building	5,366	503	4,730	4,790	122,429	29,733	167,551	0	426,449	92,873	686,873
Services	139,694	3,419	400,456	14,220	58,153	741,103	1,357,045	849,415	1,075,062	1,705,463	4,986,985
TOTAL	371,639	7,128	861,846	114,565	243,967	997,111	2,596,256	1,031,303	1,851,589	5,175,123	10,654,271
H-hold Income	289,031	8,637	323,959	36,765	148,848	1,576,168	2,383,408	0	0	0	2,383,408
O.V.A.	432,151	22,594	596,982	112,017	87,946	994,121	2,245,811	141,101	65,469	9,301	2,461,682
Imports	494,384	14,752	1,177,794	116,149	206,112	1,419,604	3,428,795	1,384,876	351,752	366,883	5,532,306
TOTAL	1,587,205	53,111	2,960,581	379,496	686,873	4,987,004	10,654,270	2,557,280	2,268,810	5,551,307	21,031,667
Employment	8,341	148	5,687	744	2,440	30,151	47,511				

Gross regional product (GRP) for the regional economy is estimated at \$4,845 million, comprising \$2,383 million to households as wages and salaries (including payments to self employed persons and employers) and \$2,462 million in other value add (OVA).

The employment total working in the region was 47,511 people.

The economic structure of the regional economy can be compared with that of NSW through a comparison of results from the input-output model (Figure 6 and Figure 7). This reveals that in the regional economy, the agriculture /forestry /fishing sectors, manufacturing sectors and utilities sectors are of greater relative importance than they are in the NSW economy, while the mining sectors, building sectors and services sectors are of less relative importance than they are to the NSW economy.

Figure 6 Summary of aggregated sectors: regional economy (2005-06)

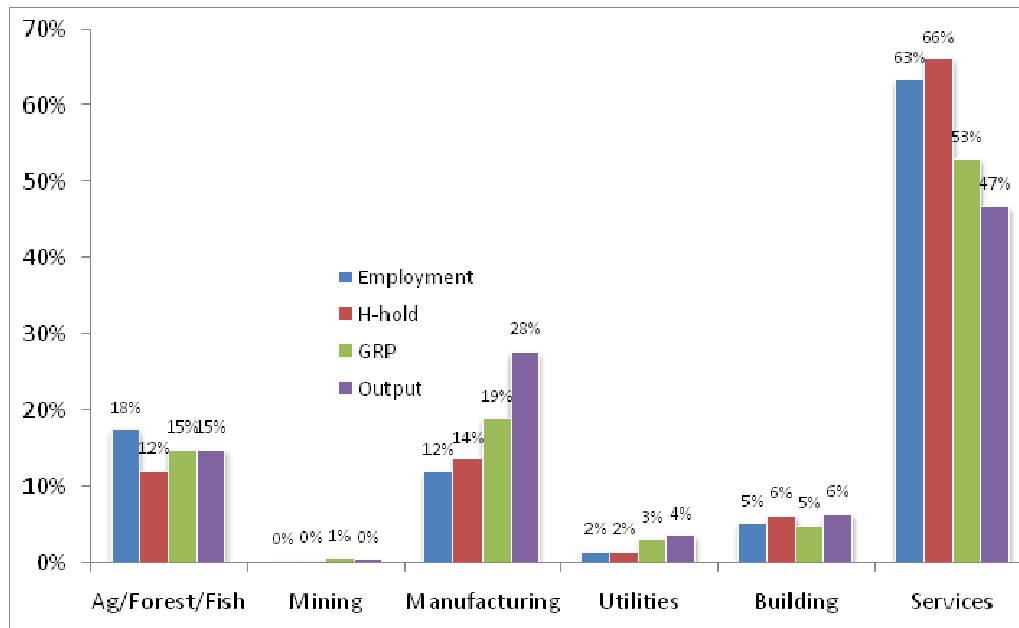


Figure 7 Summary of aggregated sectors: NSW economy (2005-06)

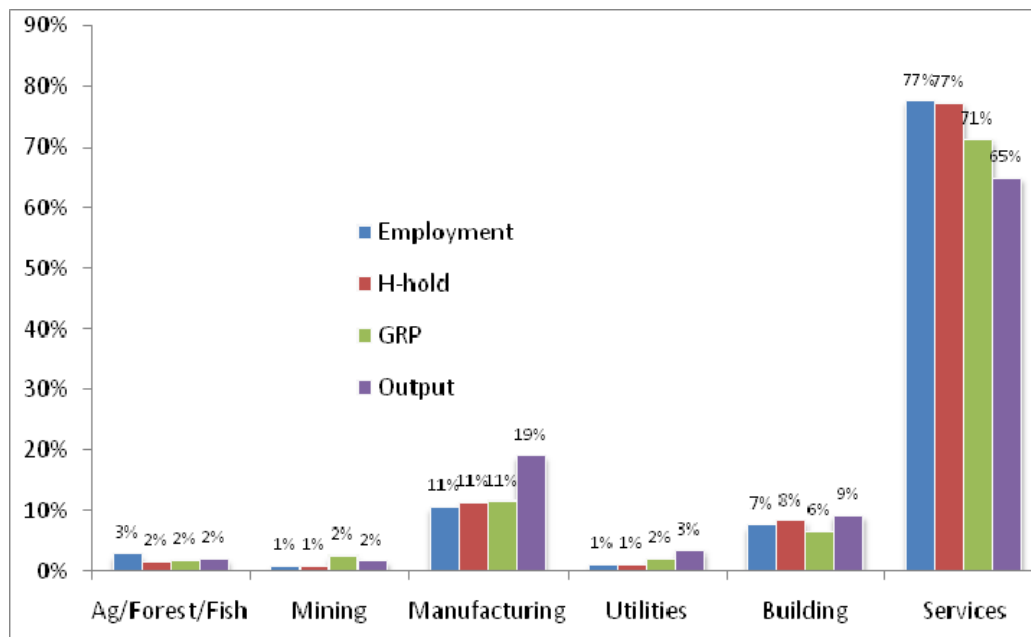


Figure 8, Figure 9 and Figure 10 provide a more expansive sectoral distribution of gross regional output, gross value added, gross regional income, employment, imports and exports, and can be used to provide some more detail in the description of the economic structure of the economy.

In terms of gross regional output, value added, imports and exports, food manufacturing and other agriculture are the most significant sectors of the regional economy. Food manufacturing is dominated by wine manufacturing followed by meat and meat products manufacturing and fruit and vegetable products manufacturing. Other agriculture is dominated by grape growing.

In terms of regional employment, the retail trade sector is the most significant sector followed by the other agricultural sector and food manufacturing sector. These sectors are also important contributors to regional income, as is the business services sectors with its high salaries.

Figure 8 Sectoral distribution of gross regional output and value-added (\$'000)

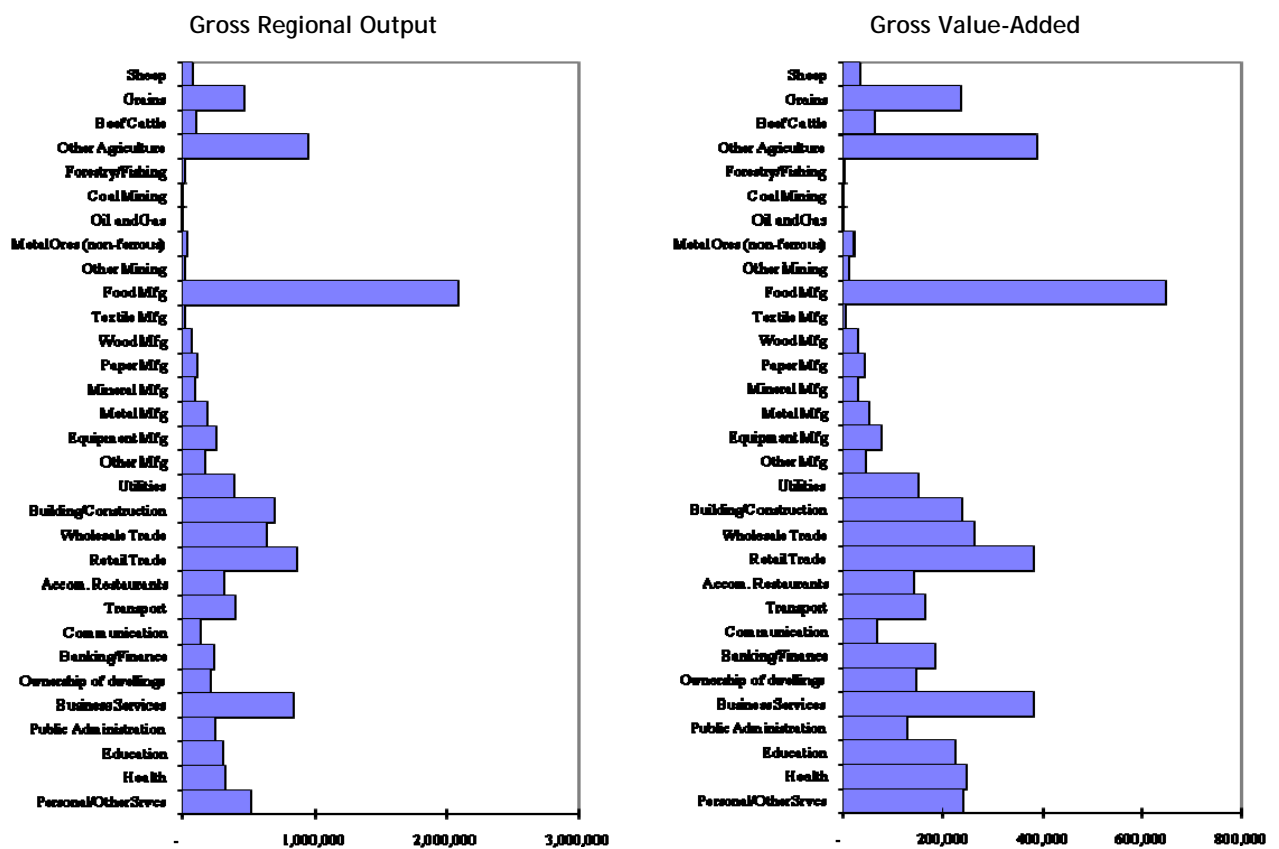


Figure 9 Sectoral distribution of regional income (\$'000) and employment (no.)

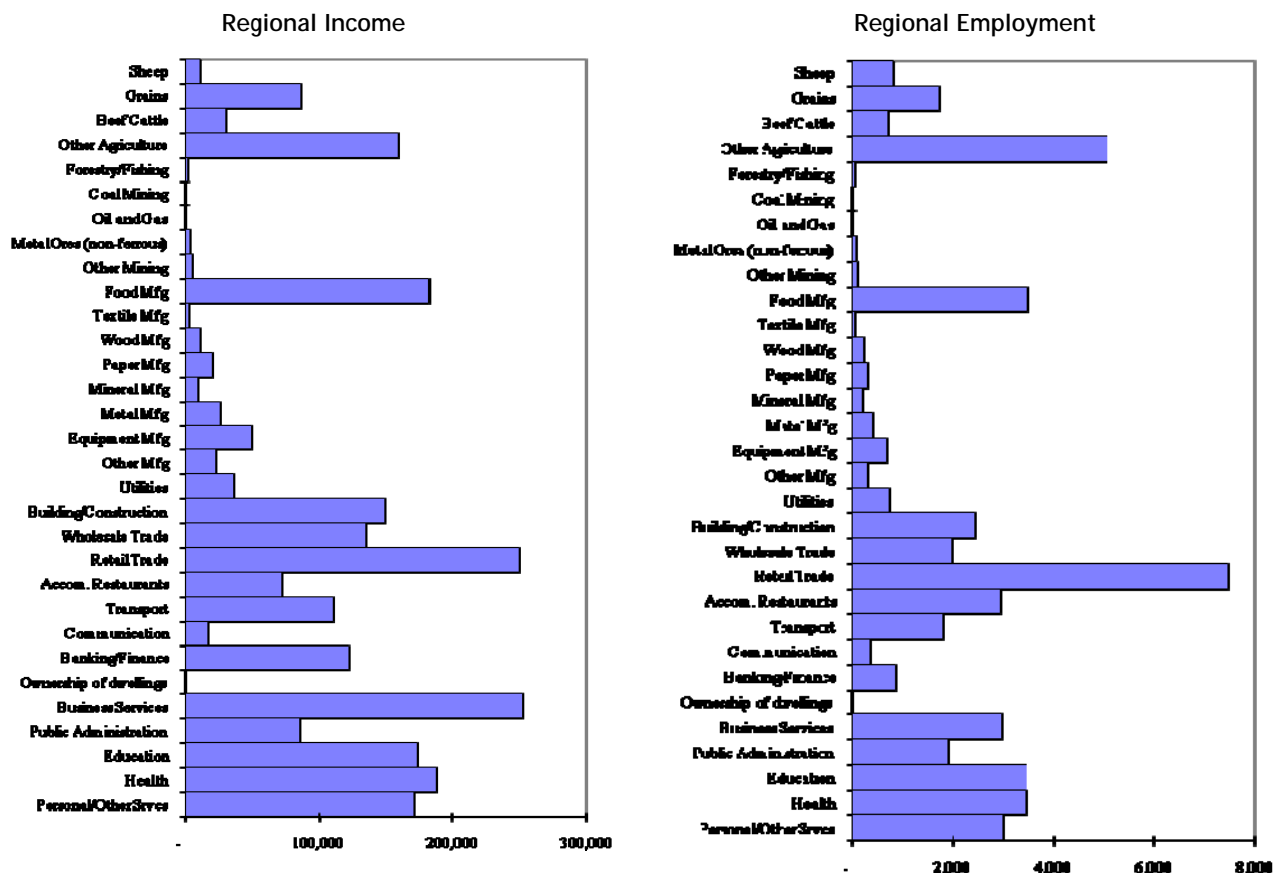
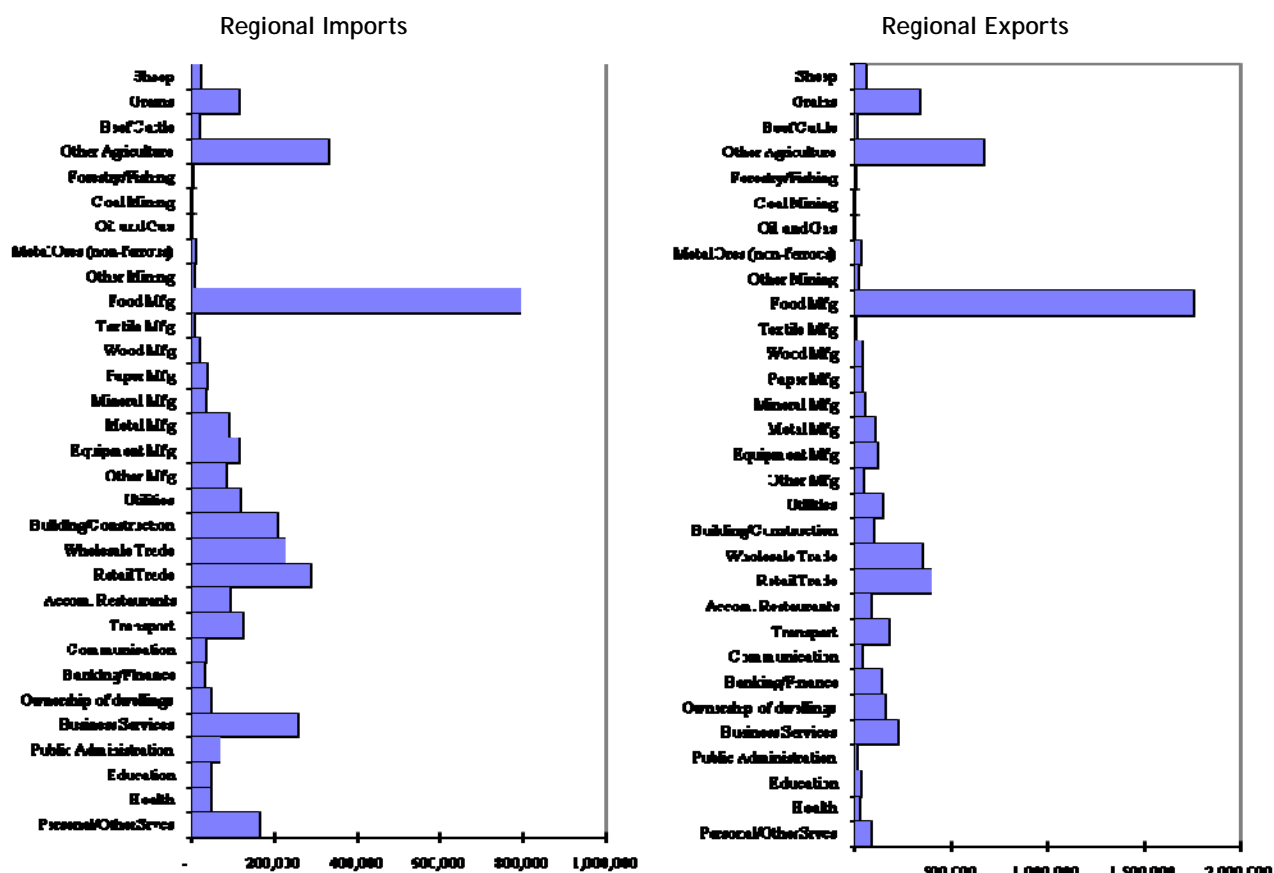


Figure 10 Sectoral distribution of imports and exports (\$'000)



6.2 REGIONAL ECONOMIC IMPACT OF THE RIVER RED GUM TIMBER INDUSTRY

The timber industry based on the NSW river red gum timber resource from public land provides a stimulus to the regional economy from the purchase of inputs to the production process and the purchases of the employees of the industry. A financial survey of mills and firewood collectors reliant on the NSW river red gum timber resource was undertaken to identify the revenue, employment and expenditure profile of the sector.

This information was adjusted for the level of reliance of each business on resource sourced from public land. This information was then used to generate a public land river red gum sector that could be inserted into the input-output table of the regional economy and be used to estimate the direct and indirect impact of the industry. For this sector:

- the estimated annual gross revenue of the timber industry was allocated to the output row;
- direct employment was allocated to the employment row. It was assumed that all direct employment lives in the region;
- wages were allocated to the household income row;

- labour on-costs were allocated to the other value-added row;
- non-labour expenditure was initially allocated across the appropriate intermediate sectors of the regional economy;
- intermediate sector expenditure was further allocated between local expenditure and imports based on information from the financial survey and location quotient for each relevant sector;
- purchase prices for each sector were adjusted to basic values and margins and taxes allocated to appropriate sectors using relationships in the latest (2001-02) National Input-Output Tables; and
- the difference between total revenue and total costs was allocated to the other value-added row.

6.3 IMPACTS OF THE RIVER RED GUM TIMBER INDUSTRY

The total and disaggregated annual regional impacts of the existing timber industry reliant on the NSW river red gum resource from public land (in 2009 dollars) are shown in Table 46.

Table 46 Annual regional economic impacts of the river red gum timber industry

	Direct Effect	Production Induced indirect effect	Consumption Induced indirect effect	Total indirect effect	Total direct & indirect effect
Output (\$'000)	47,664	27,613	10,859	38,472	86,136
Type 11A Ratio	1.00	0.58	0.23	0.81	1.81
Value-Added (\$'000)	23,167	11,044	5,107	16,151	39,318
Type 11A Ratio	1.00	0.48	0.22	0.70	1.70
Income (\$'000)	10,862	6,899	3,158	10,056	20,918
Type 11A Ratio	1.00	0.64	0.29	0.93	1.93
Employment (no)	253	131	66	197	450
Type 11A Ratio	1.00	0.52	0.26	0.78	1.78

Note: Employment in State Forests, haulage and snigging is located in production-induced flow-ons.

It should be noted that the direct employment contribution identified in Table 47 is an estimate of the employment that is reliant on only that timber sourced from public land. This estimate is derived by multiplying the FTE of each business by the reliance on public land of that business, as reported by survey respondents. This accounts for the difference in direct jobs reported in this section and the 274 direct jobs identified in Table 6, Table 7, Table 43 and Table 44. These other sections report the confirmed total employment in the river red gum timber industry in businesses that source timber from public land. This includes the employment in those businesses that relies on timber sourced from private land.

The timber industry reliant on the river red gums sourced from public land contributes the following to the regional economy:

- \$86 million in annual direct and indirect regional output or business turnover;
- \$39 million in annual direct and indirect regional value added;
- \$21 million in annual household income; and
- 450 direct and indirect jobs.

This sector represents 1% or less of the regional economy (Table 47).

Table 47 Relative magnitude of the river red gum timber industry

	Gross O/P (\$'000)	Value-added (\$'000)	Income (\$'000)	Employment (no.)
Direct contribution	47,664	23,167	10,862	253 ¹
Total contribution	86,136	39,318	20,918	450
TOTAL REGION	21,079,464	4,868,258	2,394,266	47,511
% Direct contribution	0.2%	0.5%	0.5%	0.5%
% Total contribution	0.4%	0.8%	0.9%	0.9%

1. The direct employment contribution does not include contractors or Forests NSW employees. These employees are included in the total contribution.

Based on the information collected from the survey process financial models were developed to examine the operations of three different types of river red gum businesses. The models allow the analysis of the impacts of changes in annual resource access and quality on business performance. The financial models require a number of data inputs including:

- sawlog supply to the mill (separated into public and private supplies);
- product output mix (essentially furniture timbers, sleepers, landscape timbers and firewood and a range of by-products including sawdust, chips and sawdust which are sold to various markets;
- product recovery rates;
- product prices;
- mill variable and overhead costs;
- labour costs and requirements;
- finance costs; and
- payments.

Model outputs include:

- sawmill gross margin (enterprise revenues less variable costs);
- sawmill cash flow over time; and
- sawmill net income (gross margin less overhead costs and depreciation allowance).

The key parameters which can be varied to show the impact on business performance include:

- log throughput;
- product recovery; and
- product prices.

7.1 ASSUMPTIONS

The Discounted Cash Flow (DCF) model is designed and suited to a situation where there are changes to throughput and other costs and revenue assumptions utilising the current costs structures in place. Costs are a mix of variable and fixed costs. Strictly variable costs in the model include the royalty and harvest costs of timber.

At this stage reflective of the situation in the mills, labour is assumed to be a fixed cost. The majority of variable labour costs in the industry are linked to bush operations and contract labour on firewood operations.

The initial results of the DCF model assume that there are no changes in the assets used to produce various river red gum products.

7.2 OVERVIEW OF MODELS

7.2.1 MODEL ONE - FOCUS ON HIGH QUALITY

The first model has a focus on quota operations and is geared towards high quality logs and value adding. In general these mills have a lower reliance on sleeper and residue operations.

There is a higher investment in machinery within the mill and many of the bush operations are carried out under contract. Reliance on public lands is high with 95% of current throughput sourced from State Forests or Western Lands Leases. Table 48 outlines the characteristics of the mill.

Table 48 High quality model - financial details

Current estimates and assumptions	
Total Volume of throughput (m ³)	8,500
Average Annual Revenue (AAR)	\$4,814,625
Annual Operating Costs (AOC)	\$3,989,295
Net Revenue (NR)	\$825,330
Net Revenue / Average Annual Revenue	17%
Net Revenue / Total Volume	\$97
Estimated Assets (not including quota)	\$7,250,000
Return on Assets (ROA)	9%
Reduction in throughput that results in a 0% Return on Assets	95 m ³

The high level of assets and semi-fixed costs such as labour mean that the quota operation has a margin that is sensitive to throughput. A reduction in throughput is managed currently by smoothing of income over time by storing products, some contracting of operations and a portion of casual labour. The analysis highlights the need to quickly adapt the operation to suit even minor reductions in wood volumes.

7.2.2 MODEL TWO - SLEEPERS & RESIDUE

Whereas, the first mill model has a focus on quota operations and is geared towards high quality logs and value adding, Model Two in general has a higher reliance on sleeper production and residue operations. Reliance on resources from State Forests is less than Model One (at 54%). It should be noted that the 46% from other sources is comes from western lands leases as well as private lands.

These types of operations also have a focus on bush operations and carry out some activities under contract for other allocation holders. Table 49 outlines the characteristics of this type of business.

Table 49 Sleepers & residue model- financial details

Current estimates	
Throughput (m ³)	19,500
Average Annual Revenue (AAR)	\$3,918,000
Annual Operating Costs (AOC)	\$3,322,000
Net Revenue (NR)	\$557,993
NR / AAR	15%
NR / Total Volume	\$29
Estimated Assets (not including quota)	\$4,750,000
Return on Assets	16%
Reduction in throughput that results in a 0% Return on Assets	189 m ³

The level of net revenue per volume of throughput of the participants surveyed varied from \$19/m³ to \$148/m³. This type of operation has a lower asset base on a per throughput basis than Model One. The within year variability in the level of activity and associated labour costs is higher than that of the quota based mills represented by Model One.

7.2.3 MODEL THREE - RESIDUE / FIREWOOD OPERATIONS

The firewood operation is geared towards producing firewood based on utilising the trees felled by quotas operations. Table 50 outlines the characteristics of this type of operation.

Table 50 Residue / firewood model - financial details

Current estimates	
Throughput (t)	7,350
Average Annual Revenue (AAR)	\$771,750
Annual Operating Costs (AOC)	\$607,515
Net Revenue (NR)	\$200,985
Net Revenue / Average Annual Revenue	17%
Net Revenue / Total Volume	\$17
Estimated Assets (not including quota)	\$1,175,000
Return on Assets	18%
Reduction in throughput that results in a 0% Return on Assets	220 t

7.3 CONCLUSIONS

The discounted cash flow models developed allow the modelling of possible impacts under alternative scenarios of timber supply. The NRC has not provided finalised scenario information and as such a more exhaustive financial analysis of the possible impacts on timber industry businesses has not been completed.

The models highlight the sensitivity to change for all operations. The fixed nature of assets and the high level of experience required for a quota type mill workforce raises issues for mill operators if either the total wood supply is reduced, or if there is an increase in the variability of wood volume or quality.

8.1 INTRODUCTION

Forests such as the river red gum forests in the Riverina Bioregion may have many economic values that can contribute to society. These economic values are anthropocentric in nature and so relate to anything from which individuals gain satisfaction (DEST et. al. 1995).

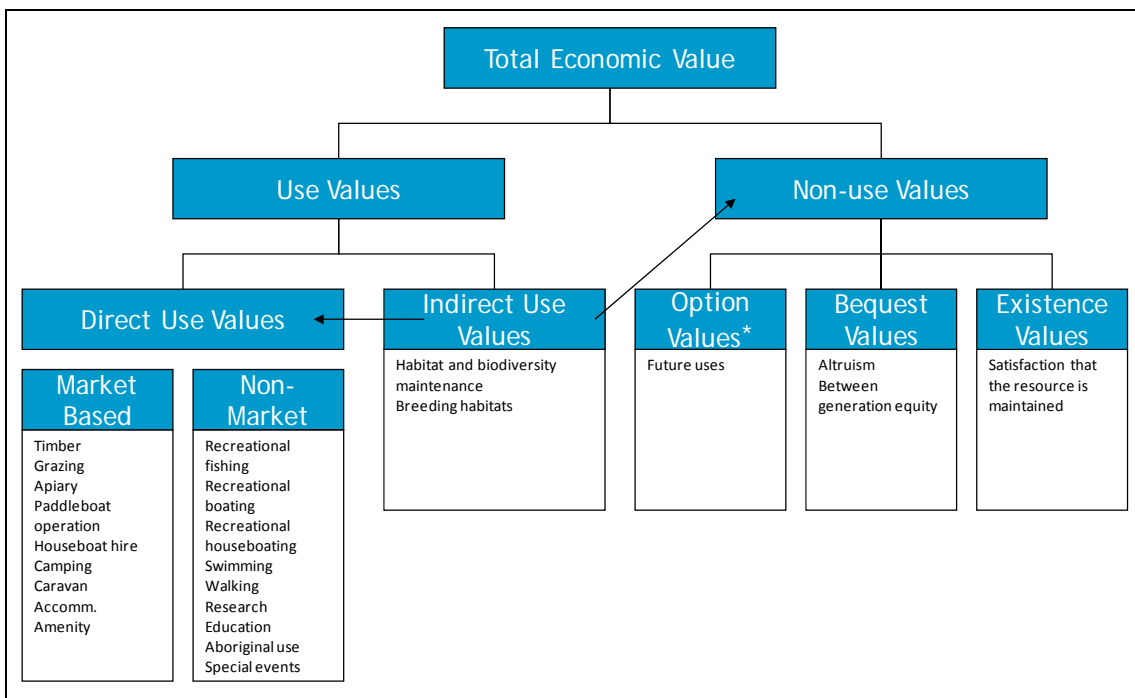
Baseline economic values of forests may be associated with goods and services the forests provide that are traded in markets, as well as goods and services that are outside the market system, provided these contribute satisfaction to individuals in society.

Combined, all the economic values that can be obtained from a resource are often referred to as total economic value.

Cost benefit analysis (CBA) involves the identification and description of all costs and benefits of any change in public land management considered. A CBA is generally conducted at a national scale, though distributional effects can be differentiated at a range of scales (e.g. local, regional, state, national).

Environmental assets such as forests often have significant non-use values. These types of values are illustrated in Figure 11. An important step associated with CBA of these types of assets is the articulation of the type of indirect benefits supported by the river red gum forests.

Figure 11 Overview of economic values



Source: Adapted from Young (1992), p. 23
 * includes option, vicarious and quasi-option values.

8.1.1 MEASURES OF ECONOMIC VALUE

The economic values of market goods to the community are measured by consumer and producer surplus. The conceptual framework for providing an understanding of consumer and producer surplus is the supply and demand, or market, model.

Consumers' surplus is the difference between what a person would be willing to pay for a good or service (the total benefit to the consumers) and what they have to pay (the cost to the consumer i.e. consumer expenditure). Producers' surplus is the difference between the costs of the inputs used in the provision of a good or services (economic cost to producers) and the price received for goods and services (total benefit to producers). In practical terms, it is the net revenue that is earned by producers of goods and services (James and Gillespie 1997).

Producers' surplus values are relevant to commercial activities and are measured via market data. Consumers' surplus values are relevant to non-market activities e.g. free in transit fishing, boating, sightseeing etc, and can potentially be estimated using non-market valuation techniques such as the travel cost method, contingent valuation or choice modelling.

The VEAC assessment of Victorian river red gums used choice modelling, a stated preference technique, to estimate non-market values such as existence values or protection values. The choice modelling technique involves surveying a sample of people and asking them to make choices between different management options, based on their impact on particular attributes of the forest.

Choice modelling is complex and lengthy research, and as such there was not sufficient time for the NRC to conduct such modelling specific to this assessment in the timeframe available.

Table 51 provides a summary of the potential economic use values of the river red gum forest environments.

Table 51 Summary of the potential baseline economic use values of the river red gum forest environments

Economic Value	Total Economic Value Measure	Regional Economic Impacts
Use Value		
Market		
<i>Forestry</i>	Direct Producer Surplus	Direct and indirect output, value-added, income and employment
<i>Grazing</i>	Direct Producer Surplus	
<i>Caravan and camping</i>	Direct Producer Surplus	
Non-market		
<i>Recreation fishing</i>	Direct Consumer Surplus	Direct and indirect output, value-added, income and employment
<i>Birdwatching</i>		
<i>Special Events</i>		
<i>Amenity</i>		
<i>Indigenous use values</i>		
<i>Indigenous cultural values</i>		
<i>Non-indigenous cultural values</i>		
Non-Use Values		
<i>Option value</i>	Direct Consumer Surplus	Not applicable
<i>Quasi option value</i>		
<i>Vicarious use value</i>		
<i>Bequest value</i>		
<i>Existence value</i>		

8.1.2 THE BASE CASE

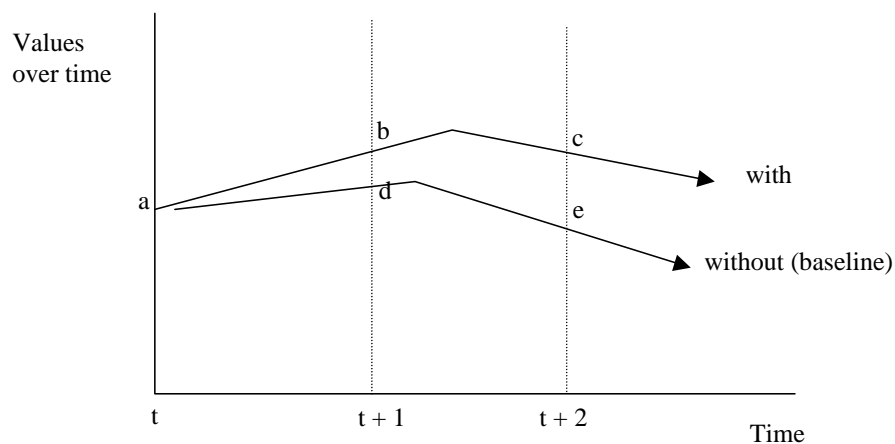
The total economic value of a red gum forest relates to the:

- producer surplus, and where relevant consumer surplus, associated with each market based activity;
- consumer surplus associated with each non-market use activity;
- producer surplus and consumer surplus (both market and non-market use values and non-use values) associated with any ecosystem function values;
- net costs to government; and
- consumer surplus associated with non-use values.

Where consideration is being given to the economic desirability of policy alternatives, the key economic consideration is the estimation of the incremental change in values. It is relevant to identify and measure how each component of total economic value, and the associated drivers, would change over time between the "with" and "without" alternative policy outcomes. That is, how producer and

consumer surpluses as well as net government costs would change over time. This consideration is presented schematically in Figure 12.

Figure 12 Measurement of economic values with and without a management action



The key principle is that any producer surpluses and/or consumer surpluses that are predicted to occur over time under the "without" or baseline case but are reduced or foregone under the "with" alternative policy scenario case are considered an economic cost, while increased or new producer and consumer surpluses generated from the "with" alternative policy case are considered an economic benefit.

For the purposes of this assessment, it is assumed that the base case will be no significant changes to current management over the next 20 years.

8.2 ASSESSMENT OF CURRENT VALUES FROM THIS STUDY

8.2.1 ESTIMATING THE MARKET-BASED VALUES ASSOCIATED WITH FOREST USE

The current market based values associated with the river red gum forests on public land that have been quantified in this study are the timber use values. Grazing and apiary uses of the river red gum forests and the use of the forests for recreation have not been quantified.

THE TIMBER INDUSTRY

The estimate of economic value of the timber industry is based on the results of a financial survey of participants in the industry, including holders of quota, ex-quota and residue licenses.

The direct gross annual value of the river red gum based timber industry is currently about \$47.7 million with a net economic contribution to the NSW economy of about \$9.7 million per year.

GRAZING AND APIARY

Grazing is licensed by Forests NSW. Graziers are issued either short term grazing permits, or annual occupational permits. Occupational permits describe the area which is able to be grazed, the time of the year when grazing is permitted, and management activities to be conducted such as weed and pest animal control. Forests NSW estimate that current occupation permits for grazing cover 115,000 ha, which supports an estimated 7,000 head of cattle.

Forests NSW estimates that there are 600 sites in State Forests in the Riverina region that are suited for bee keeping. Forests NSW issues permits that allow an apiarist to set down hives in a defined area. The permit area is generally a 1.5 x 1.5 kilometre square. In 2005/06 Forests NSW issued 461 Occupation Permits.

8.2.2 ESTIMATING THE NON-MARKET ENVIRONMENTAL VALUES ASSOCIATED WITH FOREST PROTECTION

Information about the commercial value of timber production and grazing in the river red gum forests is readily available from the markets in which the products are exchanged.

More problematic is the estimation of values associated with forest benefits that are not marketed. These benefits arise from ecosystem conservation, protection of cultural heritage, and recreation and tourism activities (VEAC 2000).

The choice modelling study carried out for the Victorian assessment used environmental attributes to assess the value placed on terrestrial ecosystem health, terrestrial threatened species and species diversity, and aquatic ecosystem health, threatened species and species diversity. A summary of the VEAC scenarios is provided in Table 52.

Table 52 VEAC - assumptions for environmental outcomes

Environmental attribute	Scenario 1	Scenario 2	Scenario 3
Healthy RRGs ('000 ha)	54	64	80
Threatened parrots ('00 pairs)	6	10	16
Murray Cod & other threatened native fish (%)	20	20	30

Source: Gillespie 2008.

The process of employing implicit prices in the CBA involves four basic stages:

1. Predicting the impact of a management change on the attributes used in the choice modelling exercise relative to the predicted continuation of the 'status quo'.
2. Multiplying the implicit prices by the respective predicted attribute change to estimate the willingness to pay (per household) for each attribute change.
3. Aggregating the willingness to pay across all attribute changes.
4. Extrapolating across the relevant population, using the percentage survey response rate, to estimate the societal willingness to pay for the management change.

There are a number of issues associated with using these results in the current assessment of river red gums in NSW. The most pertinent is the context of the choice modelling survey. The survey was carried out in Victoria using Victorian respondents and maps that discussed the Victorian forests.

8.2.3 TOURISM AND RECREATION

Tourism data is collected on a regional basis. The Murray¹⁴, Riverina¹⁵ and Outback¹⁶ tourism regions cover the area of this assessment. It should be noted that these tourism regions do not align with the study region and that visitors numbers and expenditure includes those travelling for business purposes.

The tourism expenditure by domestic day and overnight visitors for the year ending March 2009 for the NSW Murray, Riverina and Outback regions is estimated to be \$1.165 billion (Tourism NSW 2009 Regional Tourism Statistics). Tourism data provides an indicator of the importance of tourism at a regional level. Table 53 shows the number of visitors and estimated expenditure of visitors in the local government areas of towns of interest.

¹⁴ The Murray region comprises the local government areas of Albury; Berrigan; Corowa Shire; Greater Hume Shire; Jerilderie; Murray; Urana; and Wakool.

¹⁵ The Riverina tourism region covers the local government areas of Bland; Carrathool; Conargo; Coolamon; Cootamundra; Deniliquin; Griffith; Gundagai; Hay; Junee; Leeton; Lockhart; Murrumbidgee; Narrandera Temora; and Wagga Wagga.

¹⁶ The Outback Region covers the local government areas of Balranald; Bogan; Bourke; Brewarrina; Broken Hill; Central Darling; Cobar; Unincorporated Far West; Walgett; and Wentworth.

Table 53 Visitor numbers and estimated expenditure in towns of interest (Tourism Research Australia 2008 a,b,c,d)

Area	Number visitors	Estimated expenditure	Notes
Wakool Shire	80,000	\$26 million	Includes the town of Barham
Ganawarra Shire (Victoria)	62,000	\$14 million.	Includes the town of Koondrook
Deniliquin Shire	97,000	\$25 million	
Murray Shire	78,000	\$33 million	Includes Mathoura
Murrumbidgee Shire	-	-	Data not available
Balranald Shire	38,000	\$7 million	
Mildura Regional Shire	465,000	\$153 million	Includes the town of Merbein

Available data sources describe tourism activity as a whole, and not specifically tourism that is connected to river red gum forests.

The NSW National Parks and Wildlife Service estimates that visitation to Yanga National Park near Balranald is around 100 visitors per week. The park was opened to visitors in May 2009, and the service has invested \$80,000 to promote the park in the 2009/10 financial year.

8.2.4 OTHER ISSUES

It should be noted that the implications of different forest management regimes for emissions of greenhouse gases have not been considered in this study.

8.3 CONCLUSION

In a benefit cost analysis framework, any NRC conservation scenarios would have a range of potential costs and benefits. These are summarised in Table 54.

Table 54 Potential costs and benefits of NRC conservation scenarios

Costs	Benefits
Foregone producer surplus from timber production, grazing and apiary	Tourism consumer surplus benefits
Reductions in rural populations	Conservation benefits
Opportunity cost of water	

Costs would be associated with foregone producer surplus from current uses of the river red gum forests on public land including timber production, grazing and apiary.

There may also be non-market costs associated with any reduction in the population of rural communities. For instance, Bennett et al (2004) found that the Australian tax-paying public would be willing to pay to avoid losses of people from rural and regional areas as a result of environmental protection measures.

If conservation outcomes are reliant on additional environmental flows, then there would also be an opportunity cost of water.

Conservation scenarios may also have a number of benefits to the community. If protection of river red gum forests leads to increases in visitation to these areas there would be consumer surplus benefits associated with this increased visitation.

Increases in environmental outcomes as a result of conservation scenarios would also have non-market benefits to the community. The VEAC choice modelling study found that the Victorian community were willing to pay for an increase in the area of healthy river red gum forest, an increase in the number of breeding pairs of threatened parrots and an increase in the populations of Murray Cod and other threatened native fish species.

Choice modelling is complex and lengthy research, and as such there was not sufficient time for the NRC to conduct such modelling specific to this assessment in the timeframe available. There are a number of issues associated with using these results in the current assessment of river red gums in NSW. The most pertinent is the context of the choice modelling survey. The survey was carried out in Victoria using Victorian respondents and maps that discussed the Victorian forests.

This benefit cost analysis framework requires specification of alternative resource use scenarios for the river red gum forests and identification of the implications of these scenarios for current resource uses and implications for biophysical outcomes. The NRC has not provided finalised scenario information and as such a more exhaustive quantification of costs and benefits has not been conducted.

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TIMBER SURVEY QUESTIONNAIRE (MILL OWNERS) 2009

Arche Consulting Pty Ltd has been contracted by the NSW Natural Resources Commission to prepare a socio-economic impact assessment to inform the Commission's regional assessment of Riverina red gum forests.

The objective of the study is to provide a social and economic assessment of the River Red Gum and woodland forests on public land within the NSW Riverina bioregion.

The information obtained through this survey is confidential and information will only be provided to the NRC in an aggregated form.

The survey will cover the following areas:

- Background
- Financials, timber sources and practices
- Linkages and dependence to communities

SURVEY OUTLINE

Details	
Timber business name:	
<i>Owner:</i>	
<i>Address:</i>	
<i>History</i>	
<i>Nearest service town and area of operations</i>	

Operations	Enterprise	Contract
Harvest and haulage (bush)		
Milling		
Manufacture		
Distribution		
Marketing and allied services		

Quotas & Volumes	
Annual Licence quantities (tonne or m ³)	
Timber Volumes (m ³):	
Typical focus of operations	
Private forest timber volumes	
Sawlogs	
Standard logs	
Residual logs	
Sleepers	
Firewood	
Public forest timber volumes	
Sawlogs	
Standard logs	
Residual logs	
Sleepers	
Firewood	
Private Forest Timber Source(s):	
Public Forest Timber Source(s):	
Timber security - e.g. annual quota, long term wood supply agreement etc	
Product volumes e.g. m ³ of structural timber, m ³ of flooring, decking and weatherboards, tonnes of chips, tonnes of sawdust etc.:	
Source and haulage (km) refer map	

Total Volumes				
2004/05	2005/06	2006/07	2007/08	2008/09

Revenue	
Average price per m ³ for each product:	
Timber	
Manufactured	
Residue mill	
Residue log	
Other	
Annual Gross Revenue:	
Percentage from public forest timber volumes	

Markets	
Timber	
Manufactured	
Residue mill	
Residue log	
Other	
Percentage local	
Changes over the last 5 years	

Annual Costs - Mill	Estimate	Source/ Supplier
Sawlog Costs		
Royalty		
Harvesting costs		
Fall		
Snig		
Haul		
Total Log Costs		
Labour Costs		
Wages		
Payroll, Tax/Super & Workers Comp Insurance		
Total Labour Costs		
Other Inputs Costs		
Materials		
R&M		
Services		
Freight		
Rates		
Utilities		
Fuel		
Total		

Labour	Positions	EFT	Residential locations	Tenure
Owner				
Management				
Office				
Field				
Mill				
Other				

Overview of workforce and employment history	
What skills are required in the operation?	
Is there a seasonal aspect to your operations?	

Assets	Descriptions & Age	Value (current valuation)
Property		
Buildings		
Machinery and Processing Equipment		
Mobile Plant		
Do you place a value on your quota		

Has the operation made any recent investments in assets?

OTHER INFORMATION AND LINKS TO THE COMMUNITY

Can you provide an overview of your region?

Can you describe past and key attributes of the town?

Are the health services adequate in this region?

Outline the educational facilities that exist in this region?

What other employment opportunities exist for people in this region?

Are the working conditions changed over the past decade?

How does the operation relate to other major employers in the town?

What community facilities exist as a result of this industry?

OTHER

Have we missed any important points?

Is there anyone in the town/region we should talk to e.g. Centrelink or employment agency or local development officer in the council?

APPENDIX B METHODS FOR UNDERTAKING REGIONAL ECONOMIC IMPACT ASSESSMENT

Four general methods are available for estimating direct and indirect regional economic impacts of an activity, namely economic base multipliers, regional Keynesian multipliers, econometric models and input-output models.

Input-output analysis is generally considered to be methodologically superior to the simpler techniques such as the economic base approach or the use of regional Keynesian employment multipliers. This superiority is generally considered to be attributable to the following factors (Jensen and West 1986):

(i) In terms of the incidence of impact, the economic base and the Keynesian approaches normally provide impact measurement only in aggregate terms, i.e. the total impact felt by all sectors collectively. Input-output multipliers allow the analyst to examine the manner in which the total impact is distributed among the sectors of the economy. This is a reflection of the internal linkages and interdependencies in the economy which are specified in the input-output table.

(ii) Input-output multipliers also allow the identification of the components of the multiplier; the economic base and Keynesian models do not, in their standard form, provide all of these details. The components are as follows:

- a) the initial effect, which is the stimulus for the impact analysis - normally assumed to be a dollar change in sales to final demand;
- (b) the first-round effect, which refers to the purchases of inputs required from other sectors in the economy in order to produce the additional output;
- (c) the industrial-support effect, which refers to second, third and subsequent-round industrial flow-on effects triggered by the purchases in the first round; and
- (d) the consumption-induced effects, which stem from the spending of household income received as payments for labour used in producing the additional output.

Regional econometric models, including models of the general equilibrium family, were not readily available for the region or project in question, and were not considered necessary for the impact assessed in this study.

References

Jensen, R. and West, G. (1986), *Input-output for Practitioners: Theory and Applications*, prepared for Department of Local Government and Administrative Services, Local Government and Regional Development Division, Australian Government Publishing Service.

APPENDIX C GENERATION OF REGIONAL INPUT-OUTPUT TABLES (GRIT)

“The Generation of Regional Input-Output Tables (GRIT) system was designed to:

- combine the benefits of survey based tables (accuracy and understanding of the economic structure) with those of non-survey tables (speed and low cost);
- enable the tables to be compiled from other recently compiled tables;
- allow tables to be constructed for any region for which certain minimum amounts of data were available;
- develop regional tables from national tables using available region-specific data;
- produce tables consistent with the national tables in terms of sector classification and accounting conventions;
- proceed in a number of clearly defined stages; and
- provide for the possibility of ready updates of the tables.

The resultant GRIT procedure has a number of well-defined steps. Of particular significance are those that involve the analyst incorporating region-specific data and information specific to the objectives of the study. The analyst has to be satisfied about the accuracy of the information used for the important sectors; in this case the river red gum sawmilling sector. The method allows the analyst to allocate available research resources to improving the data for those sectors of the economy that are most important for the study.

An important characteristic of GRIT-produced tables relates to their accuracy. In the past, survey based tables involved gathering data for every cell in the table, thereby building up a table with considerable accuracy. A fundamental principle of the GRIT method is that not all cells in the table are equally important. Some are not important because they are of very small value and, therefore, have no possibility of having a significant effect on the estimates of multipliers and economic impacts. Others are not important because of the lack of linkages that relate to the particular sectors that are being studied. Therefore, the GRIT procedure involves determining those sectors and, in some cases, cells that are of particular significance for the analysis. These represent the main targets for the allocation of research resources in data gathering. For the remainder of the table, the aim is for it to be 'holistically' accurate (Jensen, 1980). That means a generally accurate representation of the economy is provided by the table, but does not guarantee the accuracy of any particular cell. A summary of the steps involved in the GRIT process is shown in Table A-1 (Powell and Chalmers, 1995).

The GRIT Method

Phase	Step	Action
PHASE I		ADJUSTMENTS TO NATIONAL TABLE
	1	Selection of national input-output table (106-sector table with direct allocation of all imports, in basic values).
	2	Adjustment of national table for updating.
PHASE II	3	Adjustment for international trade.
		ADJUSTMENTS FOR REGIONAL IMPORTS <i>(Steps 4-14 apply to each region for which input-output tables are required)</i>
	4	Calculation of 'non-existent' sectors.
PHASE III	5	Calculation of remaining imports.
		DEFINITION OF REGIONAL SECTORS
	6	Insertion of disaggregated superior data.
PHASE IV	7	Aggregation of sectors.
	8	Insertion of aggregated superior data.
		DERIVATION OF PROTOTYPE TRANSACTIONS TABLES
PHASE V	9	Derivation of transactions values.
	10	Adjustments to complete the prototype tables.
	11	Derivation of inverses and multipliers for prototype tables.
PHASE V		DERIVATION OF FINAL TRANSACTIONS TABLES
	12	Final superior data insertions and other adjustments.
	13	Derivation of final transactions tables.
	14	Derivation of inverses and multipliers for final tables.

Source: Bayne and West (1988).

References

Bayne, B. and West, G. (1988) GRIT - Generation of Regional Input-Output Tables: Users Reference Manual. Australian Regional Developments No. 15, Office of Local Government, Department of Immigration, Local Government and Ethnic Affairs, AGPS.

Jensen, G. (1980) The concept of accuracy in regional input-output models. International Regional Science Review, 5(2), 139-54.

Powell, R. and Chalmers, L. (1995) The Regional Economic Impact of Gibraltar Range and Dorrigo National Park. A Report for the NSW National Parks and Wildlife Service.

APPENDIX D UNDERLYING ASSUMPTIONS AND INTERPRETATION OF INPUT-OUTPUT MULTIPLIERS

The basic assumptions in input-output analysis include the following:

- there is a fixed input structure in each industry, described by fixed technological coefficients (evidence from comparisons between input-output tables for the same country over time have indicated that material input requirements tend to be stable and change slowly; however, requirements for primary factors of production, that is labour and capital, are probably less constant);
- all products of an industry are identical or are made in fixed proportions to each other; each industry exhibits constant returns to scale in production;
- unlimited labour and capital are available at fixed prices; that is, any change in the demand for productive factors will not induce any change in their cost (in reality, constraints such as limited skilled labour or investment funds lead to competition for resources among industries, which in turn raises the prices of these scarce factors of production and of industry output generally in the face of strong demand); and
- there are no other constraints, such as the balance of payments or the actions of government, on the response of each industry to a stimulus.

2. The multipliers therefore describe average effects, not marginal effects, and thus do not take account of economies of scale, unused capacity or technological change. Generally, average effects are expected to be higher than the marginal effects.

3. The input-output tables underlying multiplier analysis only take account of one form of interdependence, namely the sales and purchase links between industries. Other interdependence such as collective competition for factors of production, changes in commodity prices which induce producers and consumers to alter the mix of their purchases and other constraints which operate on the economy as a whole are not generally taken into account.

4. The combination of the assumptions used and the excluded interdependence means that input-output multipliers are higher than would realistically be the case. In other words, they tend to overstate the potential impact of final demand stimulus. The overstatement is potentially more serious when large changes in demand and production are considered.

5. The multipliers also do not account for some important pre-existing conditions. This is especially true of Type 2 multipliers, in which employment generated and income earned induce further increases in demand. The implicit assumption is that those taken into employment were previously unemployed and were previously consuming nothing. In reality, however, not all 'new' employment would be drawn from the ranks of the unemployed; and to the extent that it was, those previously unemployed would presumably have consumed out of income support measures and personal savings. Employment, output and income responses are therefore overstated by the multipliers for these additional reasons.

6. The most appropriate interpretation of multipliers is that they provide a relative measure (to be compared with other industries) of the interdependence between one industry and the rest of the economy which arises solely from purchases and sales of industry output based on estimates of transactions occurring over a (recent) historical period. Progressive departure from these conditions would progressively reduce the precision of multipliers as predictive devices." (ABS, Catalogue No. 5246.0).

References

ABS, Catalogue No. 5246.0 Information Paper Australian National Accounts
Introduction to
Input-Output Multipliers

APPENDIX E EMPLOYMENT PROFILES OF TOWNS OF INTEREST

EMPLOYMENT IN TOWNS OF INTEREST

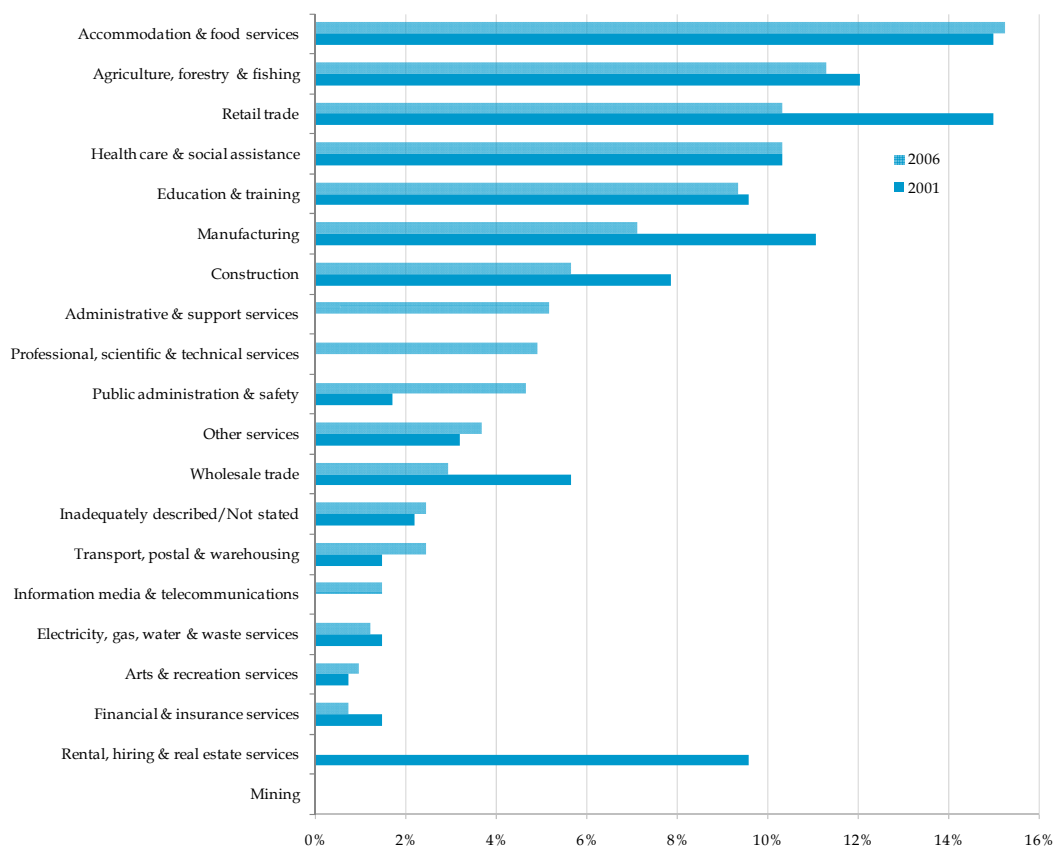
The towns of interest included in the study were:

- Barham-Koondrook;
- Deniliquin;
- Mathoura;
- Darlington Point;
- Balranald; and
- Merbein (Victoria).

BARHAM-KOONDROOK

Figure 13 shows the employment profile of Barham. In 2006, employment was greatest in the accommodation and food services sector and agriculture, fisheries and forestry. Since 2001, there has been a decline in the proportion of employment in the retail and manufacturing sectors.

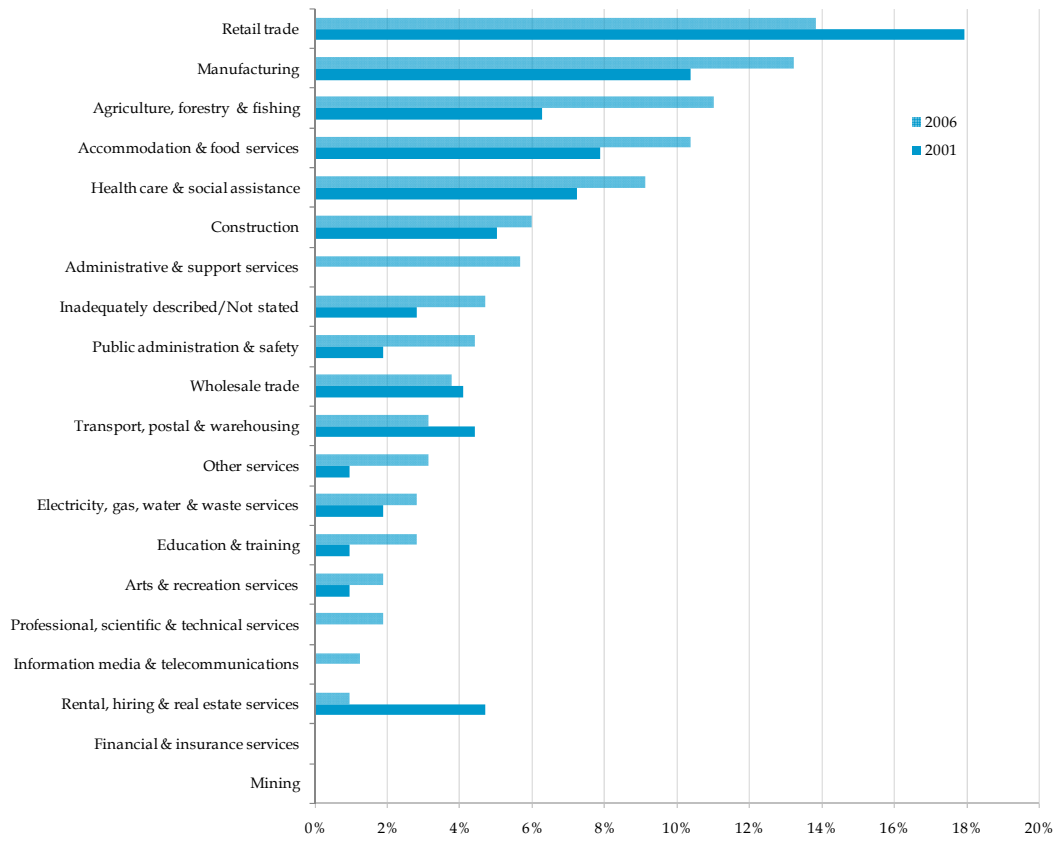
Figure 13 Employment profile of Barham



Note: There were changes in classifications between 2001 and 2006 census

Figure 14 shows the employment profile of Koondrook. In 2006, retail, manufacturing and agriculture, fisheries and forestry were the three largest employment sectors. Since 2001, there has been a decline in retail, manufacturing and construction and an increase in the proportion of employment in manufacturing, agriculture, fisheries and forestry and accommodation and food services.

Figure 14 Employment profile of Koondrook

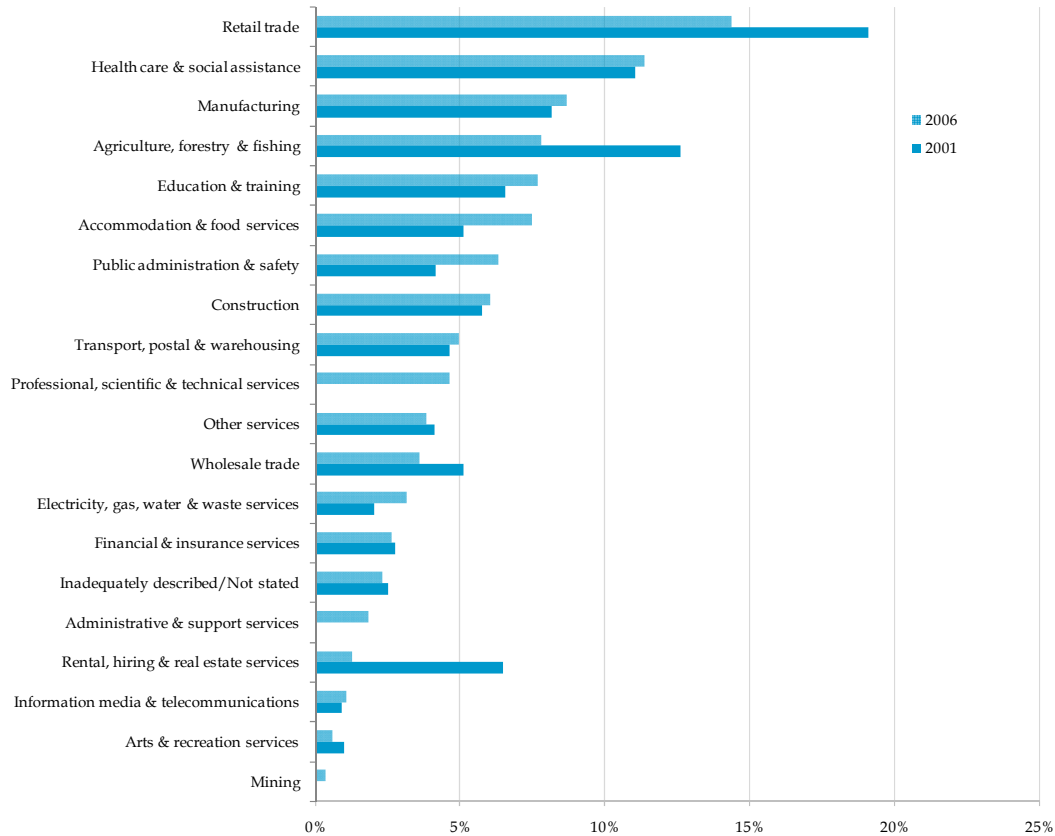


Note: There were changes in classifications between 2001 and 2006 census

DENILIQVIN

Figure 15 shows the employment profile of Deniliquin. The sectors with the largest proportion of employment in 2006 were the retail and health care and social assistance. There was a decline in the proportion of the population employed in the agriculture, fisheries and forestry between 2001 and 2006.

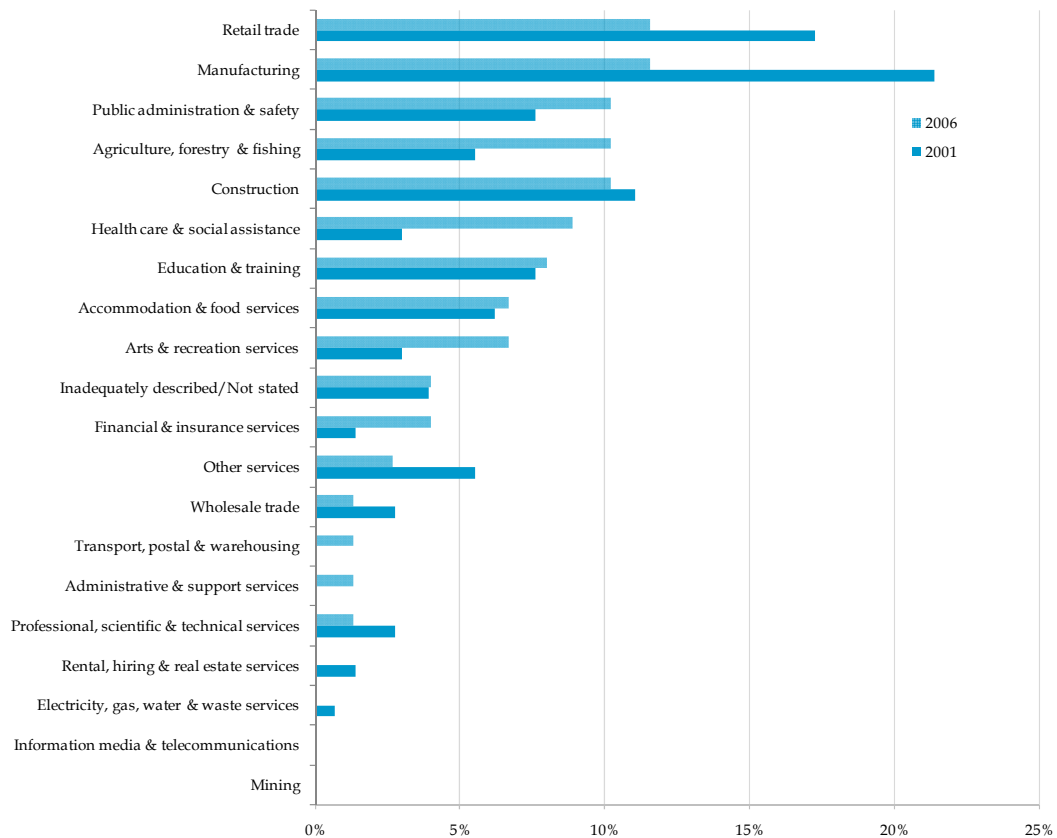
Figure 15 Employment profile of Deniliquin



Note: There were changes in classifications between 2001 and 2006 census

Figure 16 shows the change in employment profile in the town of Mathoura between 2001 and 2006. In 2006, the sectors with the largest proportion of employment were manufacturing and retail trade, followed by construction, public administration and agriculture, fisheries and forestry.

Figure 16 Employment profile of Mathoura

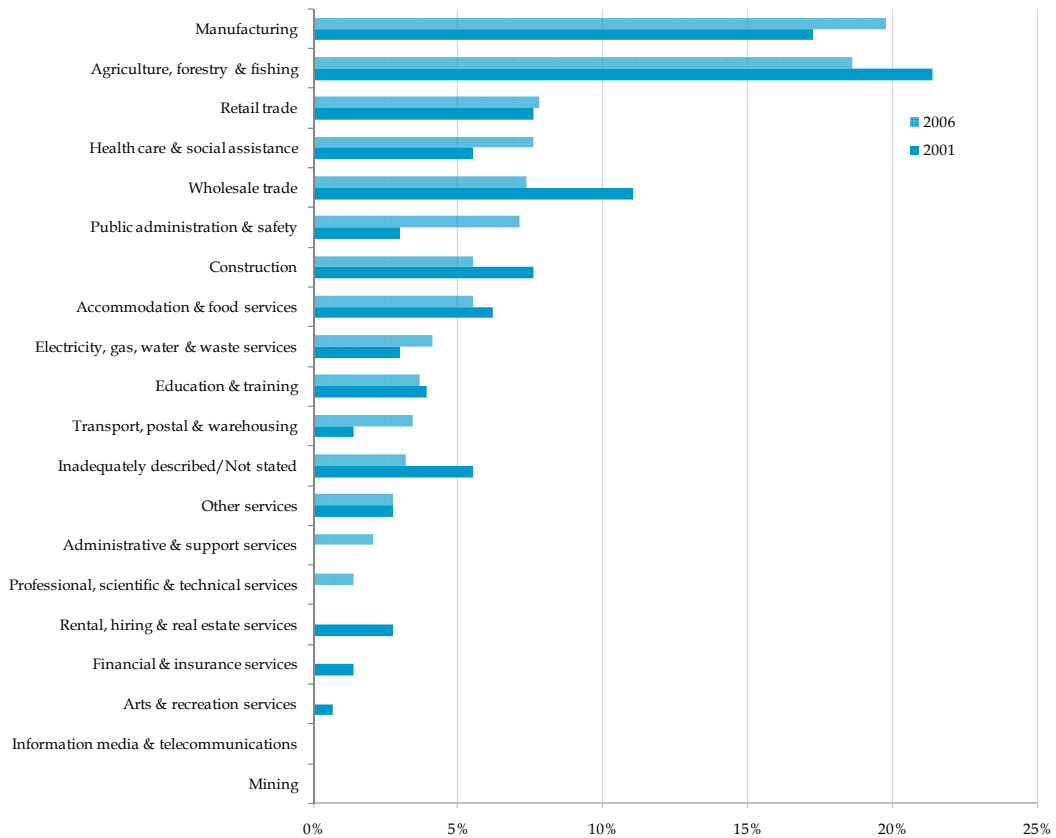


Note: There were changes in classifications between 2001 and 2006 census

DARLINGTON POINT

Figure 17 shows the employment profile of Darlington Point. Manufacturing and agriculture, fisheries and forestry are the two largest employment sectors. Since 2001, there has been an overall decline in the proportion of agriculture, fisheries and forestry sectors and wholesale trade.

Figure 17 Employment profile of Darlington Point

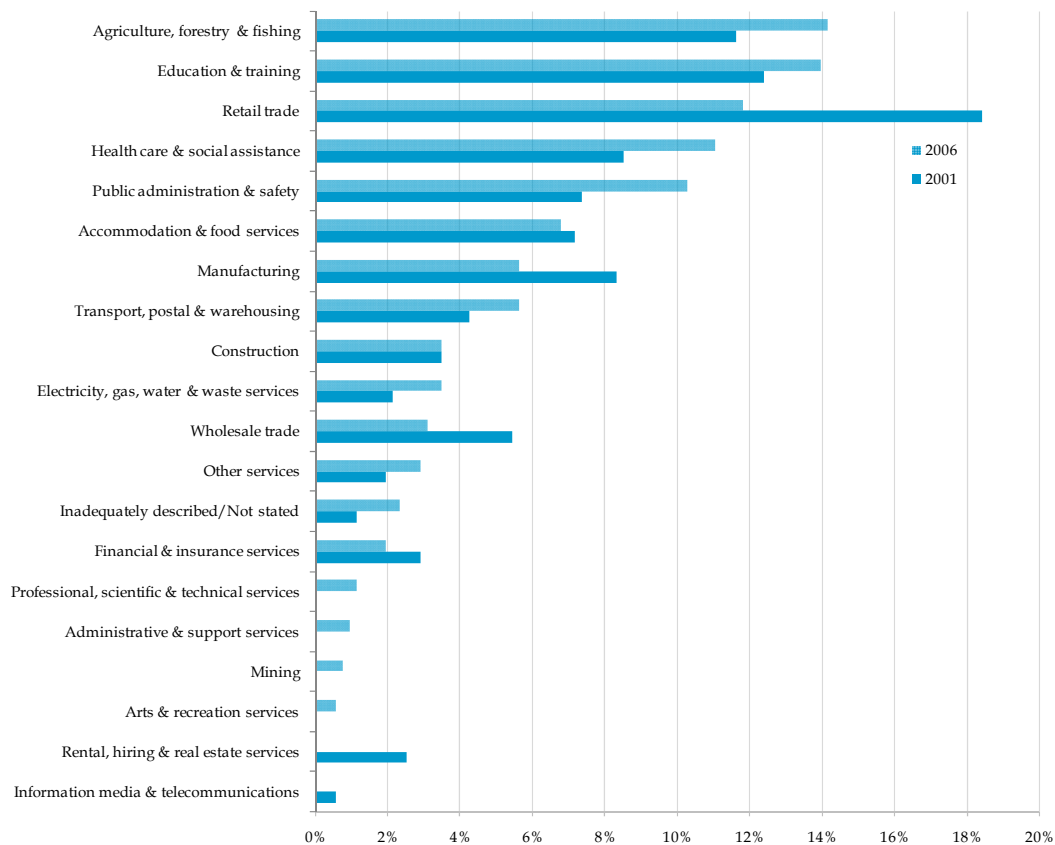


Note: There were changes in classifications between 2001 and 2006 census

BALRANALD

Figure 18 shows the employment profile of Balranald. The three largest employment sectors are retail, education and agriculture, fisheries and forestry. Since 2001, there has been a decline in employment in the retail sector. Since 2006, there has also been a reduction in an estimated 24 jobs in education as a result of the relocation of distance education services (Forests NSW, 2009a).

Figure 18 Employment profile of Balranald

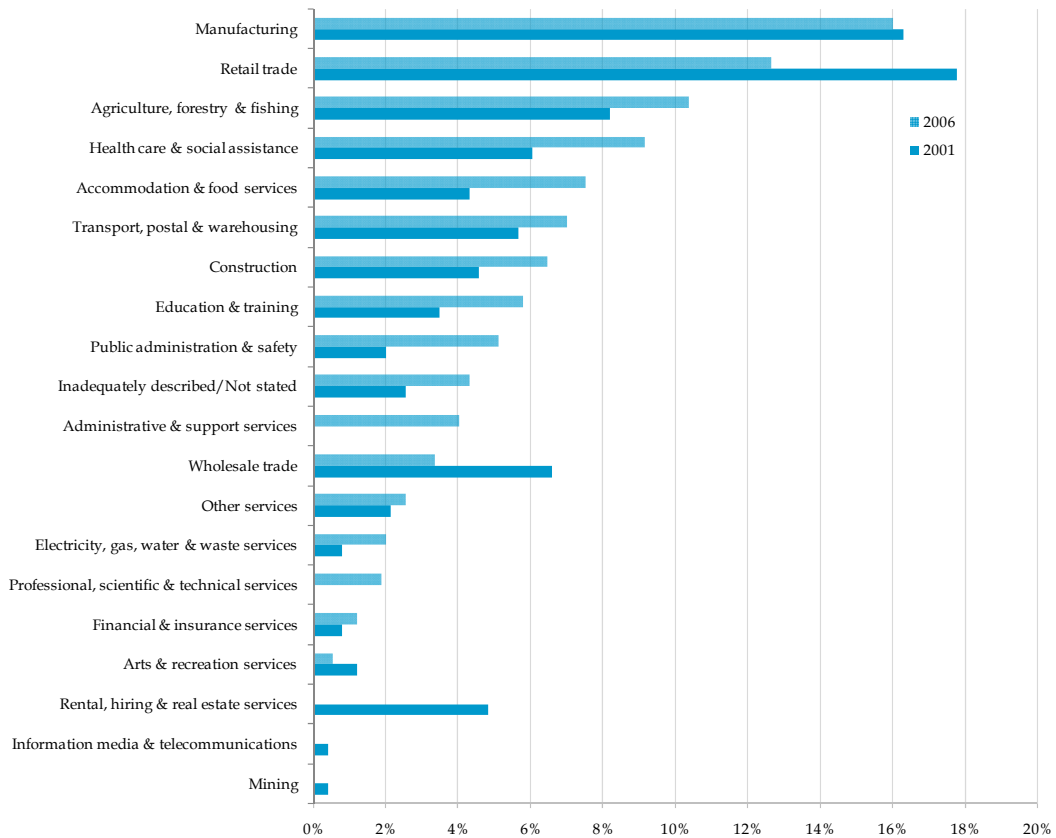


Note: There were changes in classifications between 2001 and 2006 census

MERBEIN

Figure 19 shows the change in employment profile in the town of Merbein between 2001 and 2006. Retail trade and manufacturing are the two largest sectors of employment, although there has been decline in the importance of retail since 2001.

Figure 19 Employment profile of Merbein



Note: There were changes in classifications between 2001 and 2006 census