Final Report

The Forestry Industry Database Project

Summary of Findings

8 OCTOBER 2010

Prepared for

Department of Agriculture, Fisheries and Forestry

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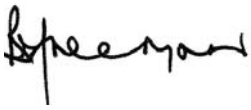

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Abbreviations

Abbreviation	Description
A3P	Australian Plantation Products and Paper Industry Council
ABARE	Australian Bureau of Agricultural Resource Economics
ABS	Australian Bureau of Statistics
ANZSCO	Australian and New Zealand Standard Classification for Occupations
BRS	Bureau of Rural Sciences
CRA	Comprehensive Regional Assessment
DAFF	Department of Agriculture, Fisheries and Forestry
DEEWR	Department of Education, Employment and Workplace Relations
FAFPESC	Forest and Forest Products Employment Skills Company
GDP	Gross Domestic Production
gmt	Green metric tonnes
ha	Hectares
m^3	Cubic metres
NCVER	National Centre for Vocational Education Research
NFI	National Forest Inventory
NPI	National Plantation Inventory
PPISG	Pulp and Paper Industry Strategy Group
RTO	Registered Training Organisation
RFA	Regional Forest Agreement
t	Tonnes
URS	URS Australia Pty Ltd, trading as URS Forestry

Executive Summary

This report presents a summary of findings from the Forestry Industry Database Project (the Project). This Project has provided an online database and information resource relating to industry employment, occupations and related skills and training, at the sectoral level. It has also developed an Outlook model to provide forecasts of employment by sector and occupation, which can be related to skill levels and training requirements, over a 20 year period to 2029.

General employment

Findings from this Project in relation to general employment include:

Total employment

- Total employment in the forest and wood products industry in 2009 is estimated to have been approximately 106,500 people. This estimate represents employed persons aged 15 years and over in the industry and includes both part time and full time employees.
- This Forestry Industry Database estimate is higher than previous estimates of direct employment using ABS data (approximately 76,800 people). This is attributed to the wider range of occupations incorporated in the Forestry Industry Database, to align employment estimates with sectors and subs-sectors designated by the FAFPESC Industry Workforce Survey of 2006 and the Pulp and Paper Industry Strategy Group – Final Report of 2010.
- The estimate is lower than that reported in the FAFPESC Industry Workforce Survey of 2006 (approximately 120,000 people employed in businesses dependent on growing and using timber). This is due to a range of factors including collation of data over a different time period; exclusion in this Project of support services; and differences in project methodology and data sources.

Employment by sector

- The largest industry sectors by employment are: Timber product manufacturing (approximately 45%); Pulp and paper production (19%); and Sawmilling and processing (15%). Other industry sectors comprise: Forest growing and management (6%); Timber merchandising (6%); Harvest and haulage (4%) and Panels and board production (4%).

Employment by region

- Industry employment by state:
  - New South Wales (29%)
  - Victoria (28%)
  - Queensland (19%)
  - South Australia (9%)
  - Western Australia (8%)
  - Tasmania (6%)
  - Australian Capital Territory and Northern Territory (less than 1%)

- Employment dependent on plantation resources is highest in the following National Plantation Inventory (NPI) regions:
  - Murray Valley (19%)
  - South East Queensland (14%)
  - Central Gippsland (13%)
  - Western Australia (12%)

- Employment dependent on native forest resources is highest in the following Regional Forest Agreement (RFA) regions:
  - Tasmania (22%)
  - Lower North East NSW (21%)
  - Central Highlands Victoria (12%)

Employment by gender

- The current workforce is approximately 79% male and 21% female.
- Female participation is highest in the Panel and board production sector (53%), and lowest in the harvesting and Haulage sector (12%).

Employment age group

- The most common age group for employees is 35-44 years, which accounts for 26% of the industry workforce. This is also the most common age group for the general workforce in Australia, accounting for approximately 24% of all employees.
- Over 55% of the workforce in the Forest growing and management and Harvesting and haulage sectors is aged over 45 years. For all remaining sectors, more than 60% of the workforce is aged less than 45 years.

Employment outlook

The Forestry Industry Database Project incorporated the development of an Outlook model to forecast employment and training requirements over time, out to 2029. The Outlook model was used to forecast future requirements, based on default assumptions about future supply (wood flows) and demand (processing configurations and markets).

Findings from this Project in relation to the employment outlook include:

Total employment

- The outlook indicates an increase in employment over the next five years, based on assumptions that include a significant increase in the harvesting of hardwood plantations over this period and also the further development of wood processing capacity, including a new pulp mill in Tasmania. If the anticipated increase in harvesting of these plantations is delayed, or major investments in processing such as a pulp mill do not eventuate, then increases in employment will likely be less. Beyond this step-up in resource availability, the outlook is for relatively stable levels of employment, at around 112,000 people between 2015 and 2029.

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Outlook by occupation

- A range of occupations is identified for which employment demands are forecast to increase significantly over this period, based on current employment and the Outlook model assumptions. These occupations incorporate both industry-specific and more generic skill sets, which are required in the Timber products manufacturing, Sawmilling and processing, and Pulp and paper production sectors in particular.
- Occupations that are relatively high in the current employment profile are expected to continue to be prominent in future requirements.

Outlook by resource dependent sectors

- Among the NPI regions, the model forecasts increases in forest-resource dependent employment in Tasmania, Central Gippsland, the Green Triangle and Western Australia. The key drivers of these trends are the forecast increase in plantation hardwood wood flows which in Tasmania has been assumed to support the operation of a new pulp mill facility, and the relatively high employment multiplier associated with pulp and paper production, which is significant for Central Gippsland and Tasmania.
- The employment outlook for most RFA regions shows a slight decline overall, which reflects the assumption that the harvest level across regions will remain at current levels or decrease, while ongoing productivity (industry efficiency) gains are achieved. In South East Queensland[1], a reduction in employment is expected beyond 2025 when supply from public native forests will cease.

Skills and training

Findings from this Project in relation to skills and training include:

Industry training

- Results of recent studies and surveys undertaken during the project have highlighted further that the industry relies on workplace based training across all sectors, with limited uptake of formal training courses:
  - More than 70% of employees in the industry are participating in workplace based training;
  - Approximately 40% of the forest and wood products industry workforce hold formal qualifications above Certificate I level; and
  - Approximately 5% of the total workforce is currently participating in formal industry-specific training courses (around 4,900 students in 2008). This includes participants in industry training packages and university forestry courses based on data provided by the National Centre for Vocational Education Research (NCVER) and universities.

Skills shortages

- Current skills shortages relate to both availability of labour, particularly in regional areas, and shortages of particular skills within the existing workforce. Key drivers of skills shortages are reported to be due to changes in technology, competition for skilled workers from other industries and availability of training providers in regional areas.

[1] The Australian and Queensland Governments completed a Comprehensive Regional Assessment (CRA) for South East Queensland, but did not sign an RFA.

Training requirements

- Indicative levels of training requirements across industry sectors have been quantified based on estimates of future employment levels by occupation. The approach undertaken in this Project is reliant upon the matching of occupations to designated training packages that provide all or most of the skills.
- While this approach has limitations, the benefit of modelling at occupation level is that the skill sets comprising a particular occupation can change over time due to advances in technology and work methods. Modelling occupations can provide a useful indication of the scale and nature of training that will be required to support future employment, across sectors, sub-sectors and regions.
- The types of skills and training expected to be in highest demand are those associated with the following industry training packages:
  - Certificate II and III in Timber Manufactured Products;
  - Certificate III in Furniture Making (Cabinet Making);
  - Certificate III in Pulp and Paper Manufacturing; and
  - Certificate II and Certificate III in Sawmilling and Processing.
- In addition, the Project modelling indicates that training requirements for non-industry specific roles – including managers, clerical and administration roles, technicians and non-specialist trades – will be comparable with the total training requirements of industry-specific roles over the same period.
- The profile of training requirements presented in the findings reflects some key assumptions, including a substantial increase in harvesting and processing (or export) of plantation hardwood pulpwood within the next five years, followed by a steady level of employment demand to support incremental growth and industry turnover.

Regional impacts

Based on this Project modelling, the regions that are expected to see significant change in employment and training requirements over the next 20 years are:

- Tasmania
  - Significant change and a net increase in employment and training requirements, on account of multiple drivers. These include:
    - The proposed new pulp mill and the maturing hardwood plantation resource that was established in Tasmania for both pulpwood and sawlog production; and
    - The forecast increase in harvest of hardwood plantation wood will drive employment in harvesting and haulage, for both pulplogs and sawlogs, and is also assumed to support an increase in sawmilling production to process the substantial increase in hardwood plantation sawlogs from 2015 onwards.
- Central Gippsland
  - It is assumed the forecast increase in harvest of hardwood and softwood plantation wood will be used for domestic pulp and paper production within the region.

- While the forecast increase in harvest of plantation wood is modest relative to other regions such as the Green Triangle, the employment multiplier associated with pulp and paper production is considerable higher than other sectors.

- Green Triangle
  - An expected net increase in employment and training requirements, principally due to the increase in hardwood plantation pulpwood production. This will drive:
    - Increased employment in harvesting and haulage; and
    - A substantial increase in employment associated with woodchip export operations during the current and subsequent periods.
  - These drivers for increased employment will be offset to some extent by the recent closures of a sawmill and LVL facility within the region.

- Southwest Western Australia
  - The region is expected to see an increase in employment and training requirements directly associated with the increasing production of hardwood plantation pulpwood. This will be offset in the current period with some consolidation and rationalisation within the Panel and board production sector, notably the recent closure of the MDF facility and two mid-size sawmills in the region.

- Bombala
  - The modelling of industry occupations also highlights an increase in employment in the Bombala and Southern NSW region, which is attributed to the development of additional softwood processing in the region.

The Project outputs provide industry stakeholders with the capacity to consider the location and indicative scale of training needs at the regional and sectoral level. The delivery of training to meet the requirements for specific skill sets will be determined through the ongoing work of the industry skills council and training providers, in association with industry associations and enterprises, in the context of current and emerging markets.

Industry priorities

Industry and government can use the Project outcomes to inform policy development and strategic planning initiatives across all sectors. Key industry priorities arising from the Forestry Industry Database Project include:

- Firstly, the need to support the establishment of the Forestry Industry Database as a central repository of industry data and information:
  - Forest & Wood Products Australia has undertaken to provide hosting for the Database for an initial 12 month period. Hosting arrangements beyond this period are yet to be determined;
  - There is scope for integration of the database within other existing programs and online portals, across a range of other industry development and promotion initiatives; and
  - The database will require periodic maintenance and data uploads; the benefit for industry will be access to current information for policy development, regional planning and other purposes.

- Secondly, the need for support for the ongoing development of flexible training delivery models:
  - Within this Project and through other initiatives that have addressed skills and development needs, the industry has identified the major contribution of workplace based training and the need for training delivery to be readily linked to methods of formal assessment that are readily accessible and cost-effective;

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- Flexible training models provide for engagement with employees and trainees in relation to the scope of training and methods by which training is undertaken and assessed, and offer potential to access Government funding support; and
- Such initiatives can increase uptake of nationally recognised training, provide more information on the training being undertaken within the industry, and assist with ongoing review of industry training needs.

- Thirdly, in light of the findings of this Project, the need for the Industry Skills Council and industry associations to review the existing capacity for registered training providers to deliver training within the scope of existing industry training package qualifications, across major resource regions and industry sectors.

1

Introduction

Lack of industry specific data has been a significant factor limiting the forestry sector's ability to identify areas of skills shortages, inform workforce planning and skills development, and understand the future demand and growth of the forest and wood products industry. The Australian Government has addressed this need through the development of a publicly available, comprehensive industry wide database.

This report presents a summary of findings from the Forestry Industry Database Project ('the Project'). The Project was funded by the Commonwealth Government, through the Department of Agriculture, Fisheries and Forestry ('DAFF'), for and on behalf of Australia's forest and wood products industry.

The five primary objectives of the Project were to:

1. Collate existing information on the industry workforce comprising; employment; current skills and training; areas of future industry growth; and identified future skills and training requirements;
2. Collect data while value-adding to existing data and maintaining industry sector classifications;
3. Develop a central, publicly available database incorporating previous and current data, with capacity to incorporate data from other sources, including wood flow statistics;
4. Model trends in employment, skills and training requirements, within industry sectors and geographic regions over time; and
5. Outline areas of knowledge and data gaps that can be collected against in the future.

A previous study by the Forest and Forest Products Employment Skills Company (FAFPESC[2]), which culminated in the *Forest and Wood Products Industry Workforce and Industry Data Collection Survey Report 2006*, delineated industry sectors and sub-sectors to enable further data collection. This previous work provided a comprehensive framework and initial workforce data for the Forestry Industry Database Project.

This summary of findings, which are derived from the following project outputs:

- An *online database and information resource* on industry employment, occupations and related skills and training, at the sector and sub-sector levels;
- An *industry employment estimate* that incorporates industry-specific multipliers, such that there is a repeatable and robust process for updating employment estimates with updated ABS census and related surveys; and
- An *Outlook model* that provide forecasts of employment by sector and occupation, which can be related to skill levels, key skills and competencies, out to 2029.

The methodology used to develop the Forestry Industry Database, incorporating an Outlook model, is described separately in the *Project Methodology* report (URS 2010).

[2] FAFPESC was the Forest and Forest Products Employment Skills Company; FAFPESC was replaced by ForestWorks in 2007; however ForestWorks is a different organisation with a different constitution.

2

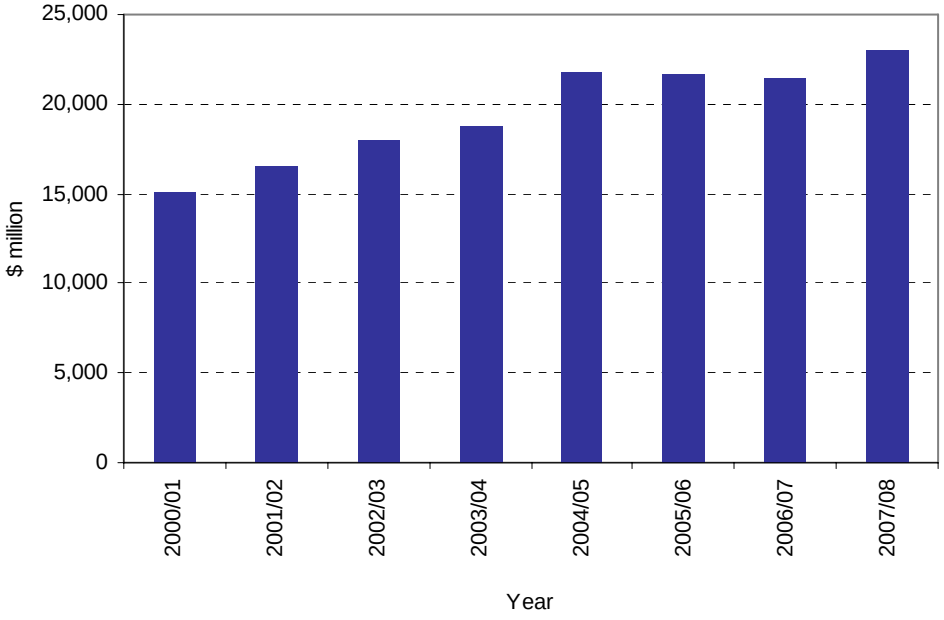
Industry trends

Australia's production forests provide the resource base for industry sectors that employ people in both urban and regional areas. The forest and wood products industry sectors covered by the scope of the Project comprise forest growing and management, timber harvesting and haulage, timber sawmilling, processing and manufacturing, pulp and paper manufacturing and timber merchandising. This coverage of sectors is aligned with the FAFPESC Industry Workforce Survey undertaken between 2002 and 2006. A detailed breakdown of the activities included within each of these sectors is provided in the *Project Methodology* report (URS 2010).

2.1 Industry scale

Australia's forest and wood products industry generates approximately $23 billion per year in turnover, representing approximately 6% of the total value of Australia's manufacturing production (DAFF 2010). Figure 2-1 shows that sales and service income (reflective of turnover) of forest product industries has increased over the last 10 years.

Figure 2-1 Sales and service income - forest product industries, 2000 - 2008



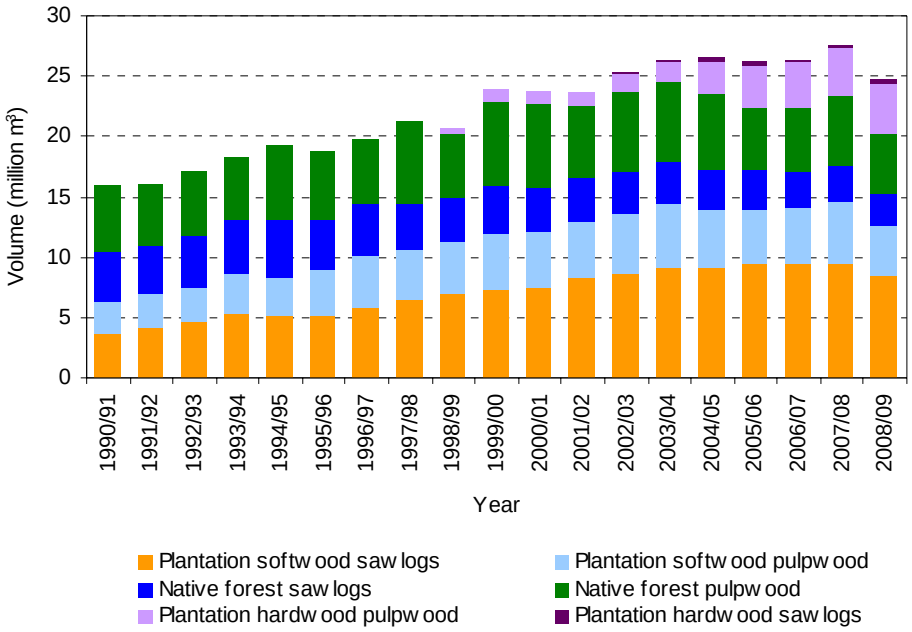
Source: ABARE 2010

The increase in sales and service income relates directly to underlying increases in the total harvest, or roundwood removals, as shown in Figure 2-2. Over the last 20 years, roundwood removals from native forests have declined, but there has been a substantial increase in the harvest of plantation wood, notably softwood sawlogs and hardwood pulpwood.

While domestic production of roundwood is increasing, Australia continues to be a net importer of forest and wood products. The value of wood and paper products exports in 2009 was $2.3 billion, up from $1.3 billion in 1999 - however, the value of imports was $4.4 billion, creating a trade deficit of approximately $2.1 billion (BRS 2010). Table 2-1 shows that paper and paperboard imports account for most of this trade deficit (51%), but imports of sawn timber and panels are substantial contributors, accounting for imports of approximately $405 million and $271 million respectively in 2009.

2 Industry trends

Figure 2-2 Total roundwood removals in Australia, 1990 - 2009



Source: ABARE 2010

Table 2-1 Australia's trade balance in forest and wood products, 1999 - 2009

Exports ($m)	**1999**	**2004**	**2009**
Woodchips	586	794	997
Paper and paperboard	314	635	605
Recovered paper	25	53	235
Sawn timber	43	74	125
Manufactured paper products	146	149	106
Other products	233	335	274
Total wood product exports	*$1,347*	*$2,040*	*$2,342*
Imports ($m)			
Paper and paperboard	1756	2137	2277
Manufactured paper products	348	341	590
Sawn timber	417	502	405
Panels	143	190	271
Wood pulp	193	235	263
Other products	407	590	653
Total wood product imports	*$3,264*	*$3,995*	*$4,459*
Trade surplus/(deficit)	*-$1,917*	*-$1,955*	*-$2,117*

Source: BRS 2010

2.2 Resource development

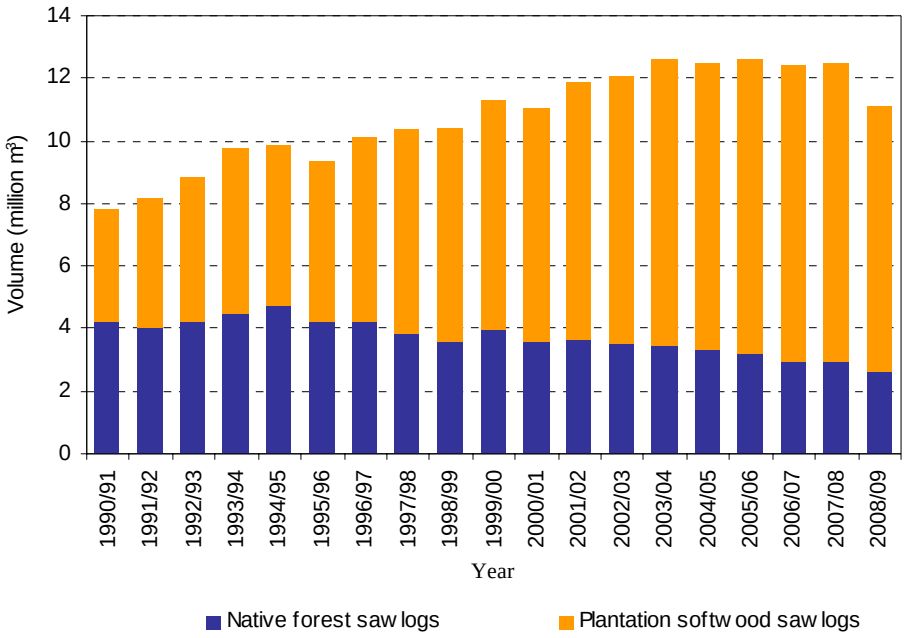
The development of plantation resources has underpinned the growth of Australia's forest and wood products industry over the last 20 years and this is expected to continue. Industry changes have been driven largely by the rapid expansion in harvest volumes available from plantations and reductions in

2 Industry trends

timber production from native forests. Forest resources managed for sustainable timber production now comprise approximately 9.4 million hectares (ha) of native forests and approximately 2 million ha of plantations (BRS 2010).

Figure 2-3 shows that sawlog production from native forests has decreased steadily over the last 20 years, while sawlog production from softwood plantations has increased substantially. Plantation grown softwood has effectively replaced most hardwood in structural timber markets over this period.

Figure 2-3 Total sawlog removals in Australia, 1990 - 2009



Source: ABARE 2010

Figure 2-3 also shows the growth of softwood sawlog production is slowing and there is evidence of a production plateau on the existing resource base. This indicates the forest and wood product industry sectors based on softwood timber is in a mature phase, and further investment in new plantation establishment would be required to generate significant growth in softwood sawlog production and industry employment.

While the consumption and production of hardwood sawn timber from native forests has declined, the hardwood sawmilling sector has increased investment in production of higher value products. This has involved targeting products that utilise the superior strength and appearance characteristics of native hardwood and has required significant investment in drying and further processing. These changes have been supported by Australian and State government policies and programs, and have created a platform for employment and skills development across primary processing and downstream processing sectors.

The other area of major growth within the industry has been the rapid expansion of hardwood plantations for the production of fibre for pulp and paper manufacturing. Figure 2-4 presents a summary of plantation establishment over the past 15 years, and highlights the substantial increase in plantation establishment (totalling approximately 830,000 ha) over this period.

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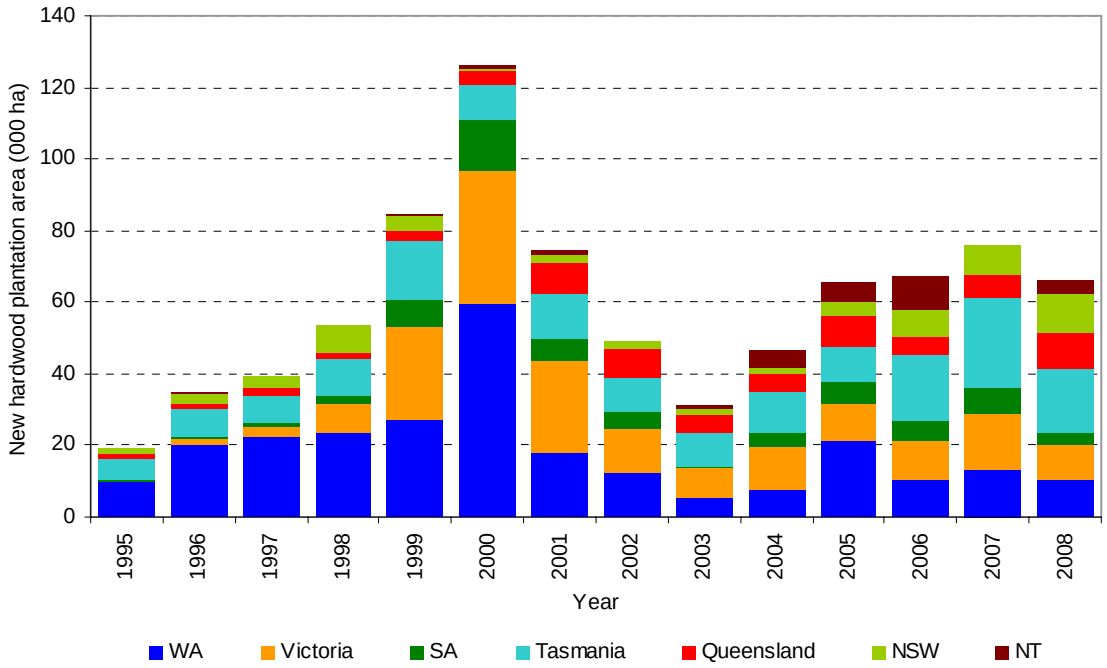
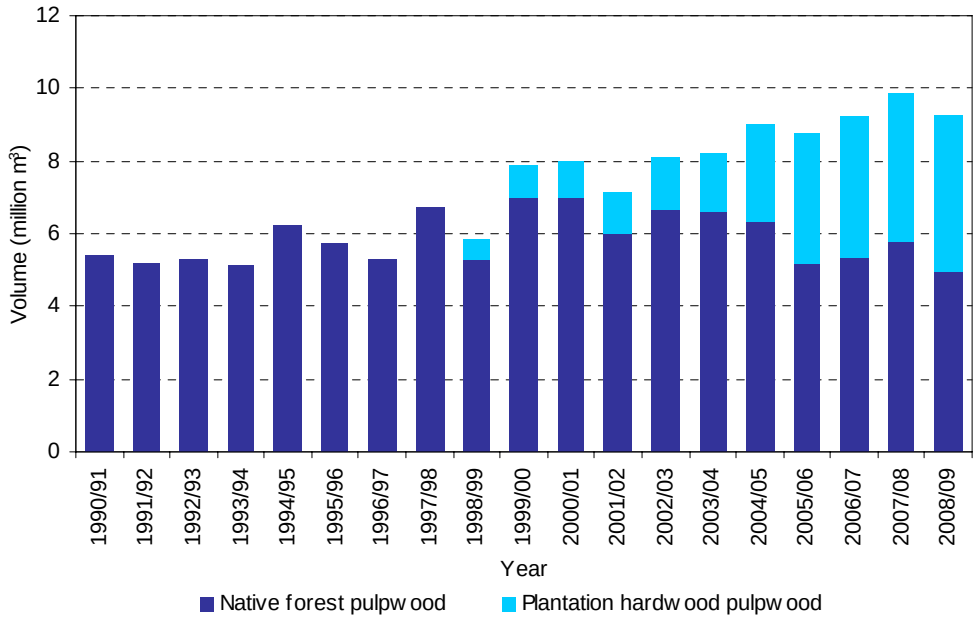
Figure 2-4 Hardwood plantation establishment by state, 1995 - 2008



Source: National Plantation Inventory 2010

Figure 2-5 shows the harvest of plantation hardwood pulpwood is increasing. Total hardwood plantation pulpwood production is expected to exceed 13 million green metric tonnes per year by 2014 (Parsons et al 2007).

Figure 2-5 Hardwood pulpwood production in Australia, 1990 – 2009



Source: ABARE 2010

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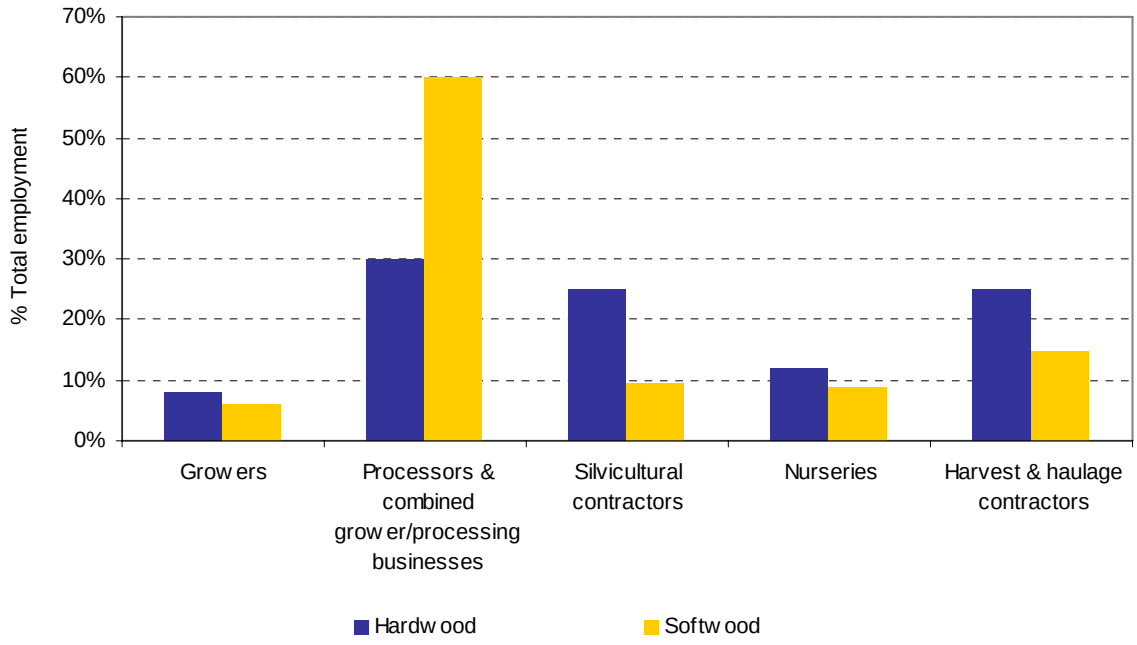
2.3 Socio-economic impacts

Considerable socio-economic research over the past ten years has found that the rapid expansion of hardwood plantations has supported increasing employment, particularly in regional centres. Based on forest and wood products industry survey work across Southwest Western Australia in 2008/09, Schirmer (2009) found there were approximately 0.45 jobs per 100 hectares of hardwood plantations, even though most of the estate was yet to reach harvest age. Based on this and previous studies, Schirmer noted that if a 'steady state' of harvesting and coppicing/replanting is reached, and assuming that plantations continue to be harvested primarily for woodchip export, the economic contribution of hardwood plantations will increase by generating between 0.5 and 0.65 jobs per 100 hectares.

Figure 2-6 shows the employment generated in different sectors of the hardwood plantation industry in Western Australia, following the commencement of harvesting and processing. In the softwood plantation industry, which is based on a relatively mature resource across most states, a higher proportion of workers are employed in downstream processing.

Figure 2-6 Proportion of workers employed in different plantation sectors in WA, 2006



Source: Schirmer 2009, based on 2006 WA Forest Industry Survey

The further development of Australia's hardwood plantation resource will have a major impact on total employment and training requirements of the industry, particularly within the key regions of Southwest Western Australia, the Green Triangle, Tasmania and Northern NSW. Current industry dynamics, which feature major changes in plantation ownership and consolidation of the resource base, need to be taken into account in considering current employment estimates and the outlook for the industry over the next 20 years.

3

Employment and occupations

Estimates of current employment and occupation profiles provide a basis for identifying current and future skills and training requirements across industry regions and sectors.

3.1 General employment

Employment data for the forest and wood products industry are available from the Australian Bureau of Statistics (ABS) and also the FAFPESC Industry Workforce Survey report from 2006.

3.1.1 Previous estimates

The ABS census and labour force survey data include several categories within the forest growing and wood product industries. Based on ABS data, total direct employment in forestry and forest product manufacturing increased marginally between 2001–02 and 2006–07, from 82,800 to 83,400 full-time equivalents, although the proportion of the Australian workforce employed in the sector declined from 0.91% to 0.82%.

The ABS classifications of forest and forest product industries do not fully capture the direct employment within the industry. For example, log haulage employment is classified by the ABS under 'road transportation', and is therefore not directly captured within forest and wood products industry. This and other limitations are discussed further in the *Project Methodology* report.

Using ABS census and labour force data, the Bureau of Rural Sciences reported that approximately 76,800 people are employed directly in Australia's forest and wood products industry (BRS 2010), including around 8,960 people in the forestry and logging sectors and 67,830 people in the wood manufacturing sectors. However, the scope of industry reported within this definition of industry does not include timber merchandising and wooden furniture, which are reported by ABS under separate classes.

Recognising the limitations of ABS categorisation of forest and wood products industry sectors, FAFPESC initiated an industry wide survey for the Forest and Wood Products Research and Development Corporation in 2002 and completed its *Industry Workforce and Industry Data Collection Survey Report* in 2006 (FAFPESC 2006). That survey covered a wider range of businesses dependent on growing and using timber than the ABS data – for example, it included support services and non-wood supplies to the industry as part of direct employment. Based on this extensive industry survey, covering more than 7,000 businesses, total national employment in businesses dependent on growing and using timber in 2006 was estimated to be about 120,000 people.

3.1.2 Database estimates

To estimate current employment within the industry, the Forestry Industry Database Project referred to both the ABS survey data and the FAFPESC survey (2006), and was supplemented by a URS survey undertaken as a part of the Project. The approach to referencing this data and estimating current employment is set out in the *Project Methodology* report.

Using a repeatable process incorporating ABS data and industry employment profiles, total employment in the forest and wood products industry in 2009 is estimated to have been approximately 106,500 people. This estimate represents employed persons aged 15 years and over in the industry and includes both part time and full time employees. The breakdown of total employment by sector is shown in Table 3-1.

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Table 3-1 Estimated total employment in forest and wood products industry, 2009

Sector	Employment (#)	Employment (%)
Forest growing & management	6,888	7%
Harvesting & haulage	4,609	4%
Sawmilling & processing	15,654	15%
Pulp & paper production	20,364	19%
Panel & board production	5,154	5%
Timber products manufacturing	47,363	44%
Timber merchandising	6,505	6%
Total	**106,537**	

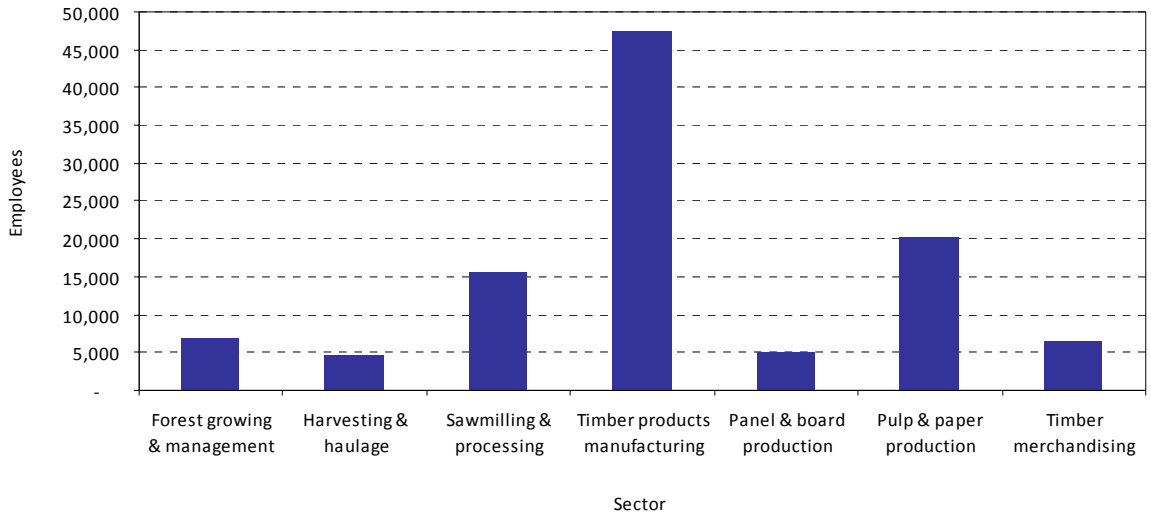
Source: Forestry Industry Database 2010

The Forestry Industry Database estimate is higher than previous estimates of direct employment using ABS data. This is attributed to the Project incorporating a wider range of occupations to align employment estimates with sectors and sub-sectors designated by FAFPESC (2006), and the Pulp and Paper Industry Strategy Group's definition of the pulp and paper industry sectors (PPISG 2010).

The Forestry Industry Database estimate is lower than that reported in FAFPESC (2006). This is due to a range of factors that include collation of data over a different time period; exclusion in this Project of support services[3]; and differences in project methodology and data sources.

Table 3-1 and Figure 3-1 show the largest sector by total employment is Timber product manufacturing, followed by Pulp and paper production and Sawmilling and processing. In broad terms, the forest growing and logging sectors account for approximately 10% of industry employment; primary and secondary processing accounts for over 80%; and timber merchandising accounts for approximately 6%.

Figure 3-1 Estimated total employment by sector, 2009



Source: Forestry Industry Database 2010

[3] It is acknowledged that enterprises providing support services and non-timber supplies to the industry are likely to be dependent on the industry, at least in part. However, these enterprises are more commonly defined within reporting of indirect employment in socio-economic evaluations. They include enterprises providing specialist services and non-wood based supplies, such as engineering and monitoring services, general freight transport services, chemicals and adhesives suppliers.

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3.2 Employment by region

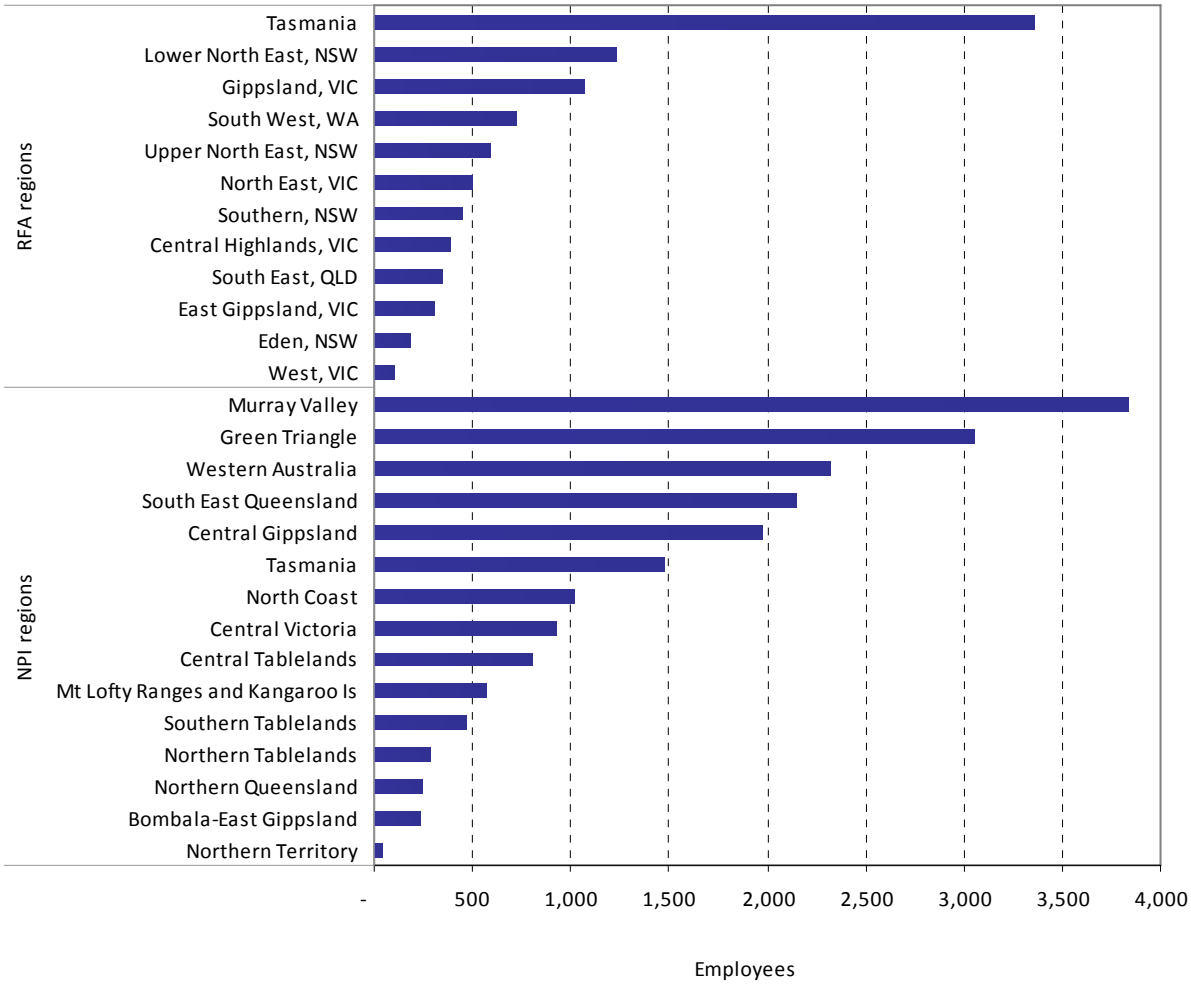
Employment by region is discussed in the context of forest-resource dependent sectors and downstream processing sectors. Resource dependent sectors relate to the sectors or sub sectors that are directly dependent on supply from native forest (RFA regions) or plantations (NPI regions). These comprise: Forest growing and management; Harvesting and haulage; Sawmilling and processing; Panel and board production; and Pulp and paper production.

Downstream sectors are only partially dependent on Australia's forest resources; they are also supplied by imported products and tend to be located closer to end-use markets in populated regional and metropolitan centres. The sectors included in downstream activities comprise: Timber products manufacturing; Timber merchandising; and Paper, tissue and board production where the enterprise is not part of an integrated pulp and paper facility receiving pulp logs and wood residues.

Resource dependent sectors

The distribution of industry employment across RFA and NPI regions is shown in Figure 3-2[4].

Figure 3-2 Estimated employment within resource dependent sectors, by region, 2005 - 2009



[4] RFA and NPI regions are described online at Forests Australia - http://adl.brs.gov.au/forestsaustralia/ - and profiles for each of these regions are incorporated in the Forestry Industry Database.

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Source: Forestry Industry Database 2010

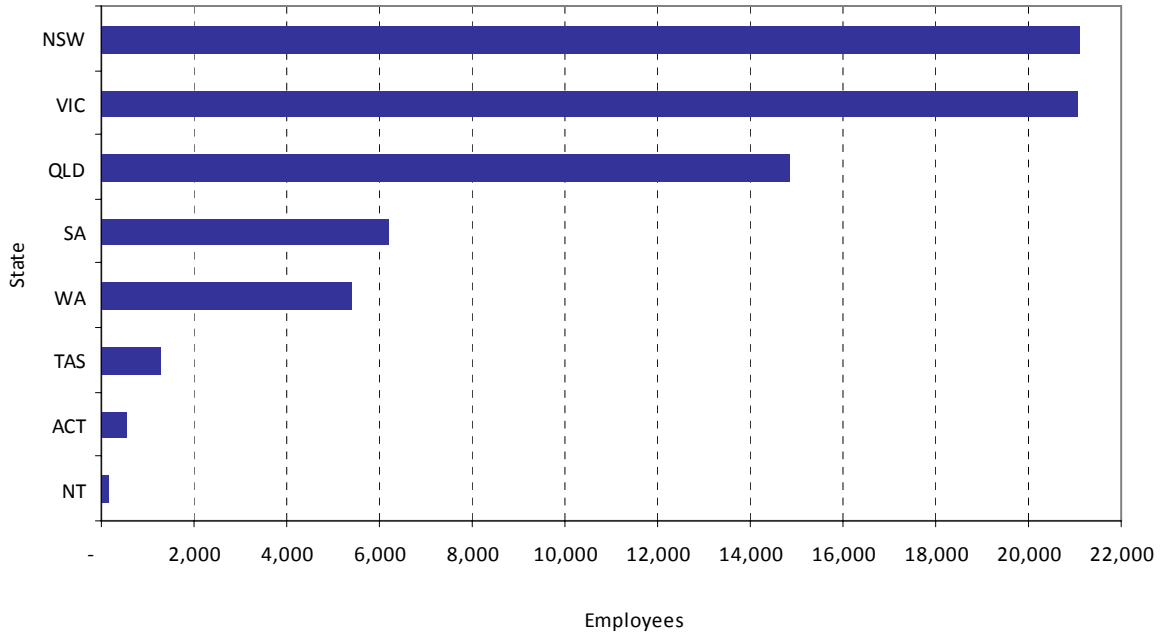
Employment in this context is associated with native forest or plantation management, harvesting and haulage and wood processing. The largest regions in terms of employment based on plantation resources include the Murray Valley, Green Triangle, Western Australia, South East Queensland and Central Gippsland. Tasmania is the largest native forest region, followed by Lower North East NSW, then Gippsland, Victoria.

It is estimated that resource dependent activities account for approximately one third of industry employment overall. This employment includes metropolitan-based roles that relate directly to forestry operations and primary processing. It also includes employment in areas such as the red gum forests of Victoria and NSW and the cypress forests of inland NSW and Queensland. There are approximately 7,227 persons employed in resource dependent sectors outside of the boundaries of NPI and RFA regions.

Downstream processing sectors

Employment in downstream sectors accounts for around two-thirds of industry employment. Figure 3-3 presents downstream employment by state.

Figure 3-3 Estimated employment within downstream sectors, by state, 2005 - 2009



Source: Forestry Industry Database 2010

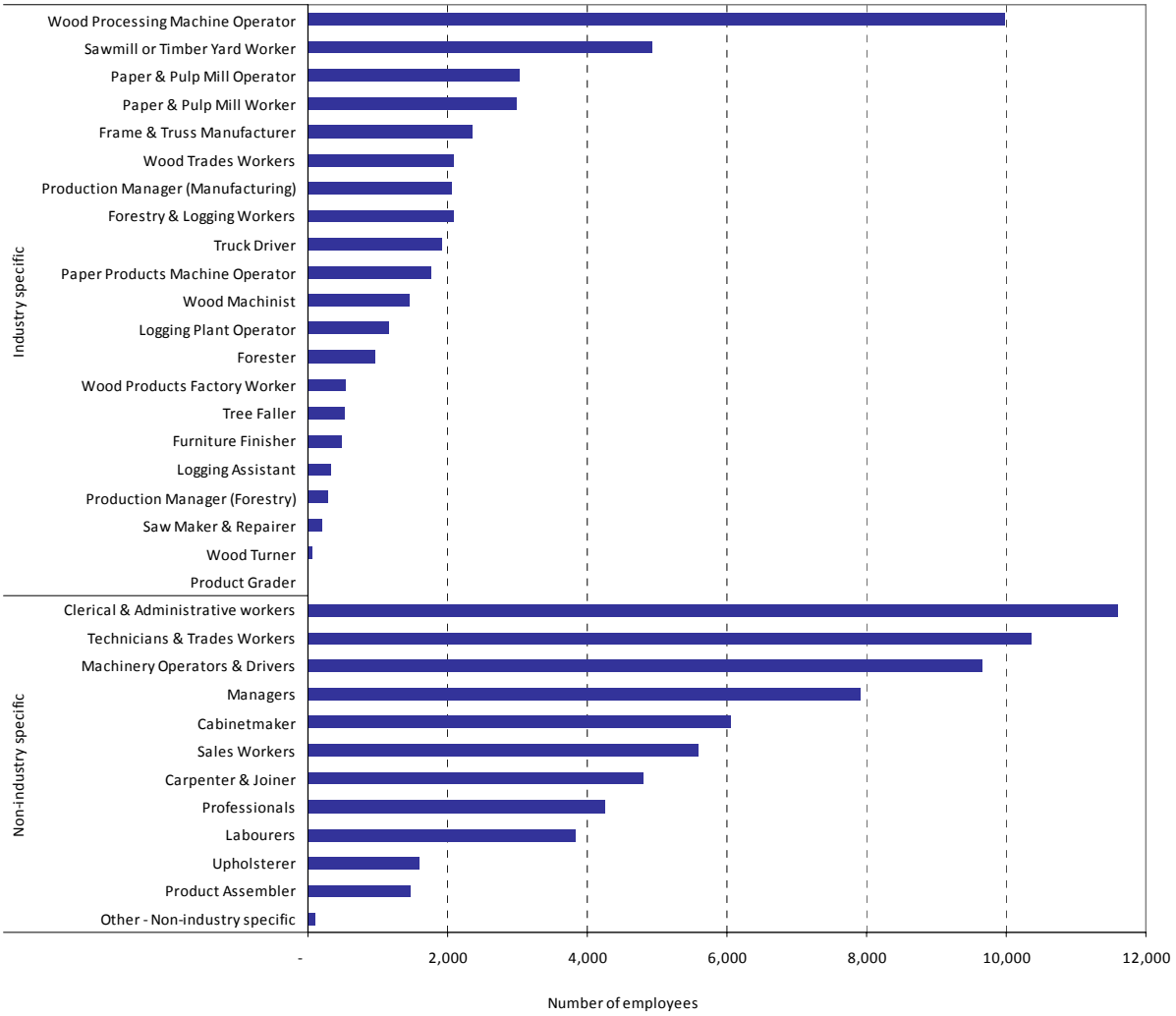
New South Wales and Victoria account for the highest levels of downstream employment, with each representing around 30% of total downstream employment. Queensland accounts for a further 21% of total industry employment. Western Australia, South Australia, Tasmania and the Territories account for the remaining 19%.

3 Employment and occupations

3.3 Employment by occupation

The Forestry Industry Database incorporates data on employment by occupation, as the basis for identifying skills and training requirements across the industry. Occupations are based on the ANZSCO[5] (First Edition) classifications, as applied by the ABS. Figure 3-4 shows estimated employment by occupation for 2009. The most prominent occupations within the industry include the broad occupation categories that feature across a range of industry sectors, for example, machinery operators and drivers, clerical and administrative workers and technicians and trades workers. These and other more industry-specific occupations, such as cabinet makers, are most prominent within the largest sectors by employment, notably Timber product manufacturing, Pulp and paper production and Sawmilling and processing.

Figure 3-4 Estimated employment by occupation, 2005 - 2009



Source: Forestry Industry Database 2010

[5] Australian and New Zealand Standard Classification for Occupations

3.4 Recruitment and retention

Obtaining reliable estimates of the number of employees exiting an industry is difficult as this is dependent on the former employer or another entity monitoring employment trends and keeping track of where employees leaving the company have obtained new employment.

Table 3-2 presents a snapshot of turnover for the Australian workforce, based on the number of people who worked in the year prior to the survey that had shifted jobs in the previous 12 months. In the 12 months to February 2008, 22% of all people employed changed jobs (ABS 2008). The average of industries within which forest and wood products employment is based was 17%.

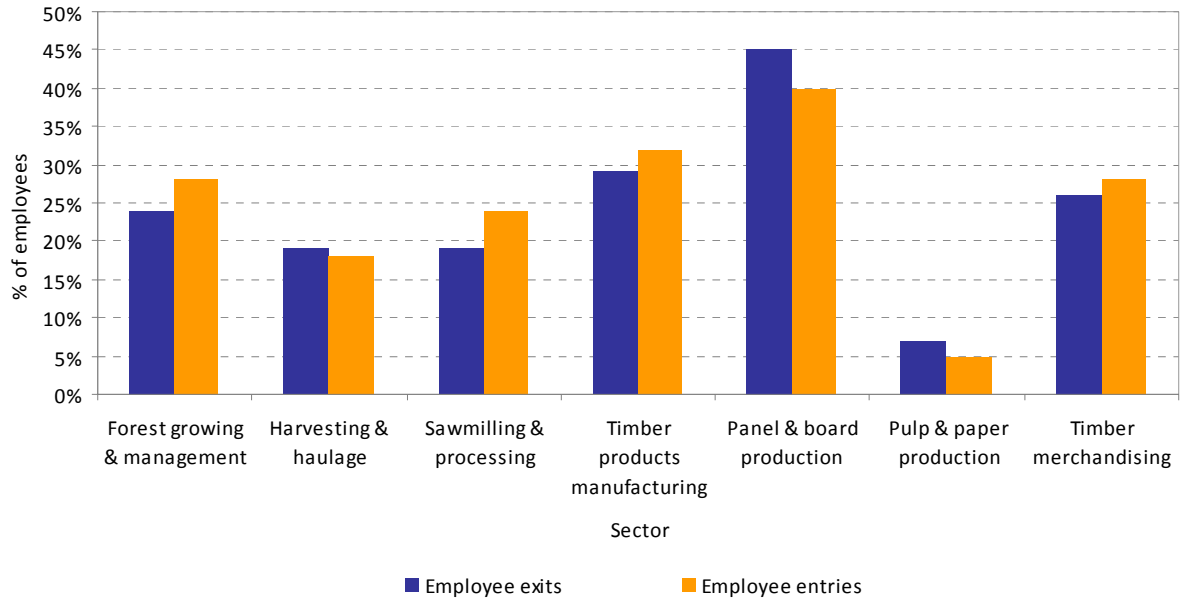
Table 3-2 Employment turnover across industry, 12 months to February 2008

Industry workforce	Turnover
Agriculture, Fishing and Forestry	13%
Manufacturing	20%
Wholesale trade	19%
Entire industry workforce in Australia	22%

Source: ABS Labour Mobility Survey 2008

Figure 3-5 presents data from the FAFPESC industry workforce survey between 2002 and 2006 that shows employment turnover within the industry varied considerably across the sectors. This data indicates that turnover in most sectors of the forest and wood products industry has been similar or slightly higher than the average turnover across Australia's entire industry workforce of 22% in 2007-8.

Figure 3-5 Industry enterprise entries and exits, 2002-2006



Source: FAFPESC 2006

Employment turnover within enterprises in the Harvest and haulage sector (approximately 17%), and the Pulp and paper manufacturing sector (6%) has been lower than this total workforce average. The high turnover apparent within the Panel and board production sector (approximately 40%) may warrant further analysis and survey reporting.

3.5 Current training

Current training across the industry comprises two broad categories: workplace based training and formal training. These categories of training are discussed in turn.

3.5.1 Workplace based training

Table 3-3 presents estimated levels of workplace-based training and, for comparison, the extent of formal qualifications held by the workforce. These estimates were compiled from different sources including the ABS Census 2006, FAFPESC industry workforce survey 2006, NCVER commencements data from 2010 and Project surveys conducted by URS in 2010.

Table 3-3 Indicative annual levels of workplace-based training, 2006 - 2010

Sector	% Employees undergoing workplace based training	% Apprentices and trainees	% Employees with formal qualifications*
Forest growing & management	60	3	42
Harvesting & haulage	54	3	16
Sawmilling & processing	66	3	25
Timber products manufacturing	73	4	46
Panel & board production	66	3	32
Pulp & paper production	87	4	48
Timber merchandising	65	3	24

Source: Forestry Industry Database 2010, based on: ABS 2006 of Population and Housing customised data report; the National Centre for Vocational Education Research (2010), the FAFPESC Forest and Wood Products Industry Workforce and Industry Data Collection Survey (2003-2006) and Project surveys (2010).

* Formal qualifications include Certificate 1 qualifications and higher.

ForestWorks conservatively estimates that more than 70% of the training and skills development in the industry is conducted by the industry "on the job", at its own expense (ForestWorks 2010[6]). This reliance on industry training has had the effect of reducing the demand placed on Registered Training Organisations (RTOs) for delivery and the number of formal qualifications obtained by the industry's workforce.

Table 3-3 shows that the proportion of employees undergoing workplace-based training is high across all sectors of the industry. The Pulp and paper production sector has both the highest level of workplace based training and employees with formal qualifications. This observation is supported by recent studies that have identified the Pulp and paper production sector as providing relatively higher disposable income and overall spending in regional communities where major pulp and paper manufacturing facilities are located (PPISG 2010, NAFI 2006). Workplace based training and formal qualification attainment is lowest within the Harvesting and haulage sector. Industry feedback during consultation for this Project suggested that this may be due to constraints relating to the location of work sites and production pressures.

[6] Based on Victorian Forestry Industry Training Advisory Committee (VFITAC) meetings in 2009

3 Employment and occupations

Employees undertaking apprenticeships and traineeships represent around 4% of the total workforce, and around 21% of enrolments in forest and wood products industry training package qualifications (NCVER 2009). The uptake of formal training is discussed further below.

3.5.2 Formal training

Formal training, or external training, currently makes a smaller contribution to the skills and training development required within the forest, wood and paper products industry than workplace training but is nonetheless a vital component. The Project has compiled data on course commencements within the Forest Industry Training packages and university forestry degrees. It is important to note that commencements in Forest Industry Training package qualifications reflect participation in individual or collective units of competency that do not lead to a qualification outcome where insufficient units are completed[7]. Nevertheless, such training contributes to ongoing up-skilling of the industry workforce and allows for progression through to qualification outcomes if additional required units are completed. Table 3-4 presents training enrolment data for a range of formal training in 2008.

Table 3-4 Formal industry training enrolments, by industry sector, 2008

Sector	Training package	Total enrolments	% total employment
Forest growing & management	Certificate I in Forest and Forest Products	0	27%
	Certificate II in Forest Growing and Management	1,152	
	Certificate III in Forest Growing and Management	625	
	Certificate IV in Forest Operations	29	
	Diploma of Forest and Forest Products	14	
	Bachelor of Science (Forestry)	18	
	Graduate Certificate Forestry	0	
	Graduate Diploma Forestry	0	
	Master of Forestry	27	
Harvesting & haulage	Certificate I in Forest and Forest Products	0	28%
	Certificate II in Harvesting and Haulage	240	
	Certificate III in Harvesting and Haulage	976	
Sawmilling & processing	Certificate I in Forest and Forest Products	0	6%
	Certificate II in Sawmilling and Processing	457	
	Certificate III in Sawmilling and Processing	402	
	Certificate III in Sawdoctoring	44	
	Certificate IV in Timber Processing	52	
Timber products manufacturing*	Certificate I in Forest and Forest Products	0	<1%
	Certificate II in Timber Manufactured Products	46	
	Certificate III in Timber Manufactured Products	166	
	Certificate III in Wood machining	59	

[7] Statements of Attainment are available to recognise completion of units of competency and skill sets. Skill sets are defined as single units of competency, or combinations of units of competency from an endorsed Training Package, which link to a licence or regulatory requirement, or defined industry need.

3 Employment and occupations

Sector	Training package	Total enrolments	% total employment
Panel & board production	Certificate I in Forest and Forest Products	0	5%
	Certificate II in Wood Panel Products	149	
	Certificate III in Wood Panel Products	94	
Pulp & paper production*	Certificate I in Pulp and Paper Manufacturing	1	1%
	Certificate II in Pulp and Paper Manufacturing	2	
	Certificate II in Pulp and Paper Services	0	
	Certificate II in Pulp and Paper (General)	0	
	Certificate III in Pulp and Paper Manufacturing	149	
	Certificate III in Pulp and Paper Services	0	
	Certificate IV in Pulp and Paper Manufacturing	81	
	Certificate IV in Pulp and Paper Services	0	
	Diploma of Pulp and Paper Industry Operations	9	
Timber merchandising	Certificate I in Forest and Forest Products	0	2%
	Certificate II in Timber Merchandising	82	
	Certificate III in Timber Merchandising	67	
Total		**4,941**	

Source: Forestry Industry Database 2010, based on: National Centre for Vocational Education Research (2009); and Pratley, J, Kanowski, P and Bull, L (2010). The proportion of total employment is based on total employment by sector, 2009, as presented in Table 3-1.
* A significant amount of training within these sectors is provided under training packages that are not specific to the forest and wood products industry.

The enrolments data in Table 3-4 reflects training within the existing workforce and new industry entrants. The proportion of employees enrolled in training is significantly higher in the Forest growing and management, and the Harvesting and haulage sectors. Enrolment levels in these sectors may reflect regulatory licensing requirements for forest operations in some states. For example, in Victoria, New South Wales and Tasmania, forest operators are required to be licensed and demonstrate evidence of required competencies when applying for a licence[8].

More broadly, the uptake of formal forest and wood products industry training is low relative to total employment by sector. Based on discussions during Project consultation and survey interviews, training within the industry is characterised predominantly by the following types of informal training:

- On the job training for new workers;
- Provision of training from equipment and technology suppliers; and
- External training obtained without government funding to meet specific enterprise requirements.

ForestWorks reports that TAFE enterprises and private training providers are providing around 40% and 80%, respectively, of training undertaken within the industry on a private fee-for-service basis (ForestWorks 2010). This is likely to increase in the future given industry demand for targeted training.

[8] Recognition of competencies to meet licensing requirements may not necessarily align with a formal qualification outcome.

4

Employment outlook

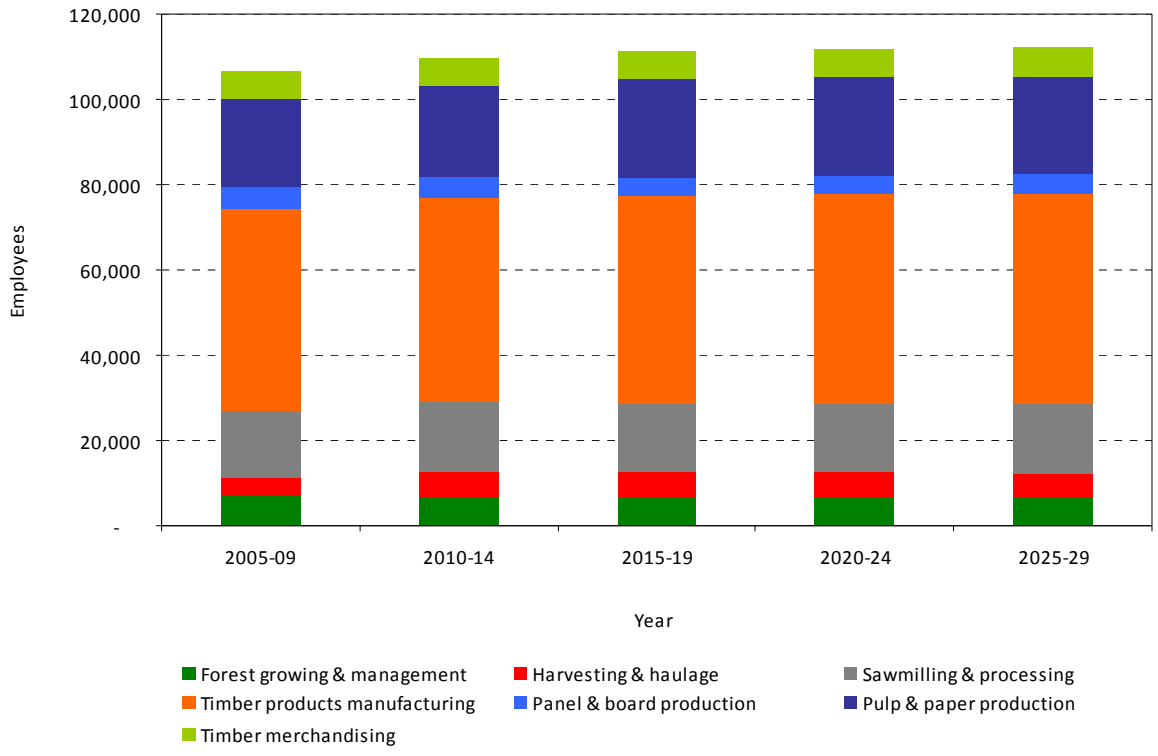
The Forestry Industry Database Project incorporated the development of an industry workforce model ('Outlook model') to forecast employment and training requirements over a 20 year period to 2029. The development of the Outlook model is described in the *Project Methodology* report.

Key findings from use of the Outlook model to forecast future requirements based on assumptions about future supply (wood flow) and demand (processing facilities and markets) are outlined below.

4.1 Employment by sector

The outlook for total employment by sector out to 2029 is shown in Figure 4-1. This outlook indicates a moderate increase in employment over the next five years, based principally on the assumption of a significant increase in harvesting and processing of hardwood plantations over this period. If the anticipated increase in harvesting of these plantations is delayed or major investments in processing such as a pulp mill do not eventuate, then increases in employment will likely be less[9]. Beyond this step-up in resource availability, the outlook is for relatively stable levels of employment, at around 112,000 people between 2015 and 2029. Key assumptions made in preparing this national outlook are provided in Appendix A.

Figure 4-1 Forecast employment by sector, 2009 - 2029



Source: Forestry Industry Database 2010

[9] These forecasts are based on assumptions about processing of the available log supply as forecasted by BRS (2009), and the assumption that GDP growth and dwelling commencements will be positive on average over the forecast period. The Project's Outlook model allows users to change assumptions based on alternative views of industry trends.

4.2 Employment by region

The employment outlook by region is discussed below in the context of resource-dependent sectors and downstream processing sectors.

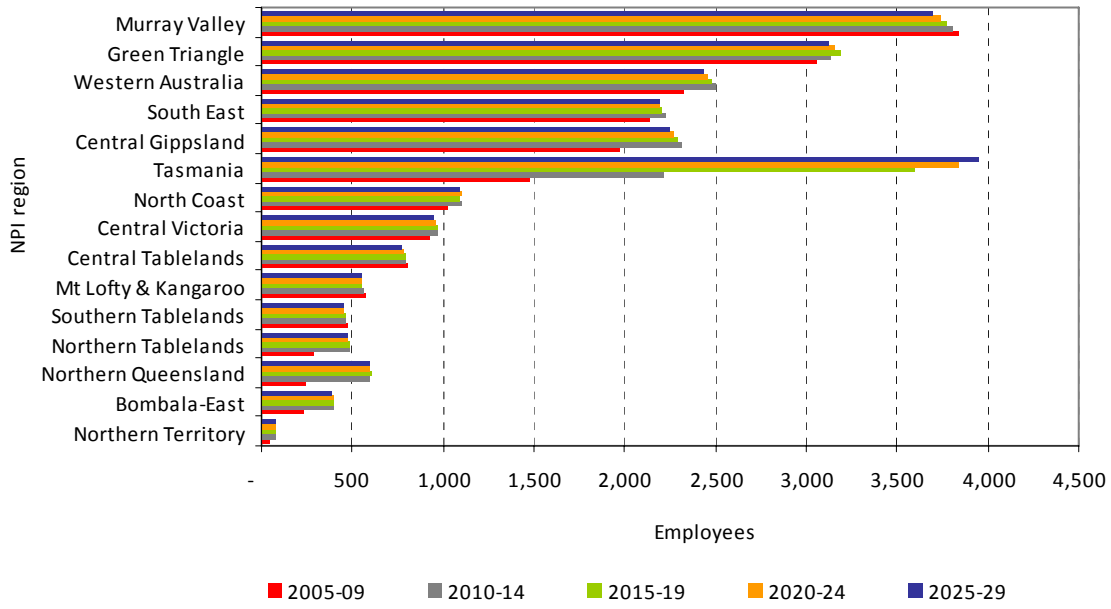
Resource-dependent sectors

Figure 4-2 and Figure 4-3 present the employment outlook for resource-dependent sectors, for NPI regions and RFA regions respectively. During 2005-09, these sectors experienced considerable change, including:

- Contraction and consolidation of native forest sawmilling and processing activities, in Queensland and Victoria in particular;
- Closures or consolidation of plantation wood processing facilities in the Green Triangle, Western Australia, Tasmania, the Murray Valley region and Southern Tablelands;
- Reduction in demand for woodchips from overseas buyers and a subsequent reduction in harvesting levels, particularly in Tasmania; and
- Failures in the Managed Investment Scheme (MIS) sector, which have seen a reduction in new plantation establishment from 2008.

These changes are expected to result in net reductions in employment levels for regions where there is no significant step up in volume.

Figure 4-2 Forecast employment from plantations by NPI region, 2009 - 2029



For plantation regions, the employment outlook incorporates a projected increase in plantation hardwood wood flows. In Tasmania this increase in resource availability has been assumed to support the operation of a new pulp mill facility. In other regions, such as Western Australia and the Green Triangle, it is assumed there will be an increase in export wood chip operations. For Central Gippsland and Tasmania in particular, the employment impact of increased wood flows is increased by the relatively high employment multiplier associated with pulp and paper production.

4 Employment outlook

For plantation regions in which there has been minimal plantation establishment in recent years, such as the Murray Valley and the Central Tablelands of NSW, the outlook is for a progressive reduction in employment, due to ongoing productivity improvements and the imperatives to maintain cost competitiveness.

For native forest regions where current levels of harvest are expected to continue[10], employment is expected to decline slightly, due primarily to the assumption of ongoing productivity improvements and drivers for cost competitiveness. In South East Queensland there is a reduction in employment from 2025 associated with the reduction in harvesting resulting from withdrawal of public native forests from timber production. It is assumed the private native forest sector will increase production to account for around half of the volume reduction from public native forest supply.

Figure 4-3 Forecast employment from native forest operations by RFA region, 2009 - 2029

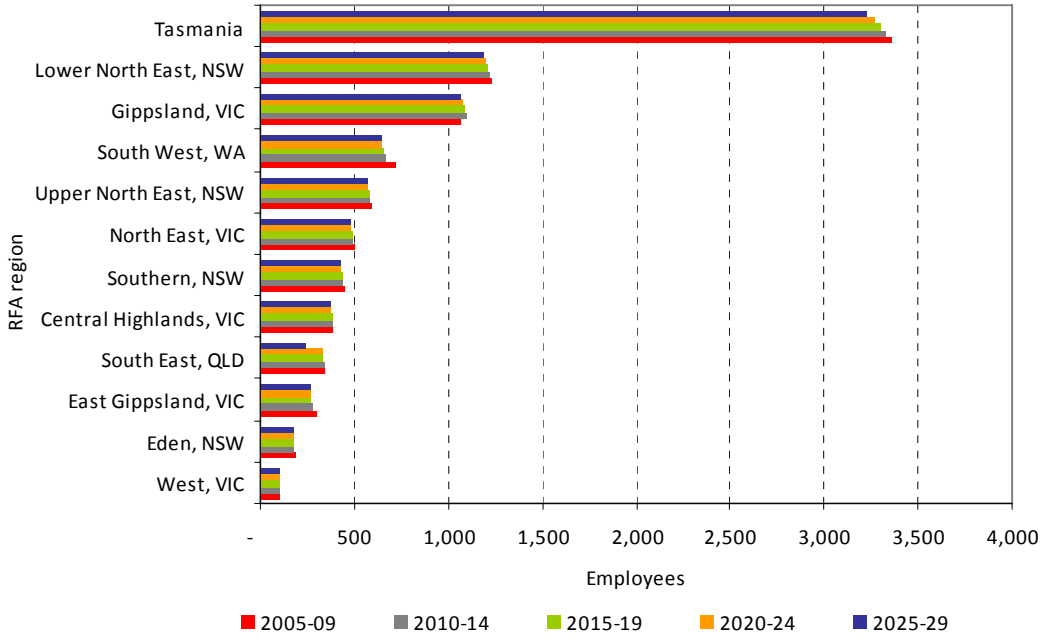


Table 4-1 presents a summary of changes in employment within forestry regions, as well as projected employment in the resource-dependent sectors located outside these regions.

Table 4-1 Total employment in resource dependent sectors by region, 2009 - 2029

Region	2005-09	2010-14	2015-19	2020-24	2025-29
RFA regions	9,255	9,131	9,036	8,943	8,762
NPI regions	19,423	21,678	22,960	23,049	23,003
Outside NPI & RFA regions	7,227	7,354	7,311	7,306	7,286
Total	35,904	38,163	39,307	39,298	39,051

Source: Forestry Industry Database 2010

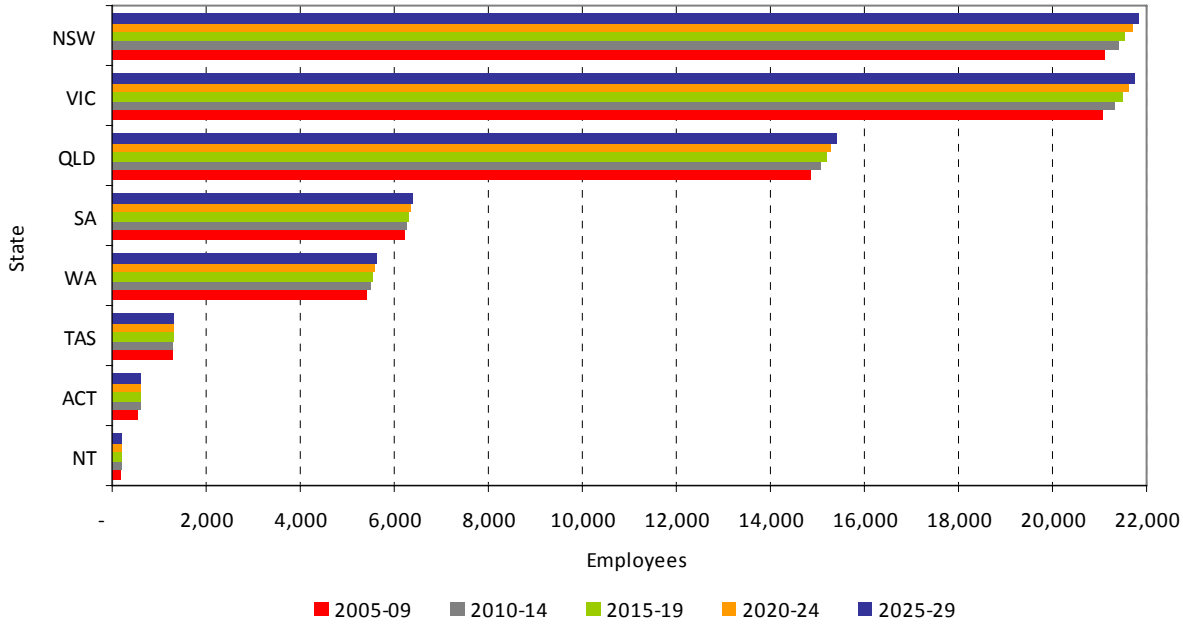
[10] Future levels of harvesting in native forests were assumed to be in line with existing supply commitments for each region, based on resource data provided by BRS during 2009/10 for this Project.

4 Employment outlook

Downstream processing sectors

Figure 4-4 presents the projected outlook for employment in downstream sectors. There is a high level of employment outside NPI and RFA regions that is attributable to metropolitan-based employment in downstream sectors including Timber product manufacturing, Pulp and paper production, and Timber merchandising. Employment within these sectors has been assumed to change in line with longer term forecasts of GDP and dwelling commencements, derived from ratios of these drivers to production and employment productivity in downstream sectors[11].

Figure 4-4 Forecast employment for downstream sectors, by state, 2009 - 2029



Source: Forestry Industry Database 2010

Summary by region

A summary of the employment outlook for all regions is presented in Table 4-2. This summary by region incorporates employment in resource-dependent sectors and the proportion of downstream sector employment that can be attributed to each region. The balance of total employment, outside of designated plantation (NPI) and native forest (RFA) regions, is presented separately.

These employment estimates are based on modelling using the Outlook model and incorporate the key assumptions about resource availability and processing configurations that will impact on the outlook for each region.

[11] Industry employment ratios were developed based analysis of trends in housing commencements to sawn timber production, and GDP growth to pulp and paper production, over a 25-year period.

4 Employment outlook

Table 4-2 Forecast employment estimates by region, 2009 - 2029

Region	2005-09	2010-14	2015-19	2020-24	2025-29	Key assumptions
Plantation (NPI) regions						
Bombala - East Gippsland	451	618	616	615	612	• No major change in resource supply (surplus sawlogs in 2005-09) • Sawmill facility expansion during 2010-14
Central Gippsland	7,378	7,794	7,809	7,826	7,842	• Increase in hardwood plantation volumes from 2010 • Increased capacity of Maryvale pulp mill during 2010-14
Central Tablelands	1,813	1,819	1,819	1,819	1,819	• No major changes in resource supply or processing configuration
Central Victoria	4,377	4,469	4,484	4,501	4,516	• Increase in hardwood plantation volumes from 2010 • Increase in hardwood chip exporting from 2010
Green Triangle	4,200	4,301	4,354	4,329	4,305	• Significant increase in hardwood plantation volumes from 2010 • Increased hardwood chip exporting from 2010 • Plans for new pulp mill were not incorporated in default assumptions • Increase in capacity of large scale softwood sawmilling operations from 2010 • Closure of Dartmoor sawmill and Nangwarry LVL plant from 2010
Mt Lofty Ranges / Kangaroo Island	4,875	4,918	4,941	4,968	4,994	• No major changes in resource supply or processing configuration
Murray Valley	11,102	11,160	11,175	11,189	11,204	• No major changes in resource supply or processing configuration
North Coast	3,303	3,410	3,421	3,451	3,459	• Increase in hardwood pulpwood plantation volumes from 2010 • Increase in hardwood chip exporting from 2010
Northern Queensland	1,088	1,459	1,470	1,471	1,472	• No major change in resource supply (surplus sawlogs in 2005-09) • Sawmill facility expansion during 2010-14 and 2015-19
Northern Tablelands	576	780	778	775	773	• Increase in hardwood pulpwood plantation volumes from 2010 • Increased hardwood chip exporting from 2010
Northern Territory	240	273	274	275	276	• Increase in hardwood pulpwood plantation volumes from 2010 • Increase in hardwood chip exporting from 2010

4 Employment outlook

Region	2005-09	2010-14	2015-19	2020-24	2025-29	Key assumptions
South East Queensland	7,942	8,097	8,120	8,153	8,201	• Increase in hardwood pulpwood plantation volumes from 2010 • Increase in hardwood chip exporting from 2010 • Slight increase in softwood sawmilling capacity from 2010
Southern Tablelands	1,293	1,299	1,300	1,302	1,303	• No major changes in resource supply or processing configuration
Tasmania	1,933	2,683	4,060	4,306	4,427	• Increase in hardwood plantation volumes from 2010 • Increase in hardwood chip exporting during 2010-14 • Proposed pulp mill incorporated in the outlook from 2015 • Increase hardwood sawlog processing from 2020
Western Australia	6,876	7,153	7,164	7,177	7,186	• Increase in hardwood pulpwood plantation volumes from 2010 • Increase in hardwood chip exporting from 2010 • Maintained bioenergy processing at Albany facility from 2010
Native forest (RFA) regions						
Central Highlands, VIC	2,123	2,136	2,142	2,149	2,156	• Current sustainable yields under RFAs to be maintained until 2029 • No major change in processing capacity
East Gippsland, VIC	344	319	317	314	312	• Current sustainable yields under RFAs to be maintained until 2029 • Rationalisation of sawmilling operations in 2005-09
Eden, NSW	274	273	272	271	270	• Current sustainable yields under RFAs to be maintained until 2029 • No major change in processing operations
Gippsland, VIC	1,268	1,297	1,287	1,278	1,269	• Current sustainable yields under RFAs to be maintained until 2029 • No major change in processing operations
Lower North East, NSW	3,734	3,756	3,762	3,769	3,777	• Current sustainable yields under RFAs to be maintained until 2029 • No major change in processing operations
North East, VIC	611	608	603	599	595	• Current sustainable yields under RFAs to be maintained until 2029 • No major change in processing operations

4 Employment outlook

Region	2005-09	2010-14	2015-19	2020-24	2025-29	Key assumptions
South East, QLD (CRA region)	1,955	1,971	1,978	1,985	1,901	• Supply from public native forests will cease in 2025 • Ongoing supply from private native forests will reduce the impact of the cessation of harvesting in public native forests • Closure of five small scale sawmills in 2025
South West, WA	927	873	868	863	858	• Current sustainable yields under RFAs to be maintained until 2029 • Closure of one sawmill in 2005-09
Southern, NSW	1,392	1,401	1,403	1,406	1,409	• Current sustainable yields under RFAs to be maintained until 2029 • No major change in processing operations
Tasmania	4,092	4,069	4,041	4,014	3,987	• Current sustainable yields under RFAs to be maintained until 2029 • No major change in processing operations
Upper North East, NSW	1,196	1,198	1,197	1,196	1,195	• Current sustainable yields under RFAs to be maintained until 2029 • No major change in processing operations
West, VIC	220	220	219	219	218	• Current sustainable yields under RFAs to be maintained until 2029 • No major change in processing operations
Outside NPI and RFA regions						
	30,952	31,332	31,442	31,597	31,747	• Average rate of change for all regions applied to resource dependent sectors
Total	**106,537**	**109,687**	**111,319**	**111,819**	**112,084**	

Source: Outlook model, Forestry Industry Database 2010

Notes:

- Employment forecast estimates for plantation (NPI) regions and native forest (RFA) regions include employment in resource-dependent sectors and downstream sectors;
- Employment forecast estimates based on default assumptions incorporated within the model, including resource availability, industry configurations and utilisation levels;
- Downstream paper manufacturing to grow in line with GDP forecasts; and
- Downstream components of the Timber products manufacturing and Timber merchandising sectors to grow in line with forecast growth in dwelling commencements.

4.3 Comparison with other industries

Economic modelling of employment and skills requirements for a broad range of Australian industries over the next 15 years (to 2025) was undertaken by Access Economics for Skills Australia in 2009. Three selected scenarios were compared and the estimated average annual growth in employment ranged between 0.9% and 2.1% per year over this period (Access Economics, 2009). The scenarios incorporated drivers of growth including the introduction of a Carbon Pollution Reduction Scheme, and varying levels of net immigration, productivity improvements and trade protectionism.

Competitive industries

Table 4-3 summarises projected employment requirements, in terms of average annual growth between 2010 and 2025, for key industries where the forest and wood products industry competes for a common labour pool. Overall national trends are also presented (as 'All of industry').

Table 4-3 Projected trends in industry growth, 2010-2025, by average annual variation

	Scenario 1	Scenario 2	Scenario 3
Sectors	***Open doors*** **(high growth and high net migration)**	***Low-trust globalisation*** **(moderate growth and net migration)**	***Flags*** **(lower growth, higher protectionism)**
Agriculture, fisheries and forestry	1.1%	-0.2%	-1.8%
Mining	1.0%	0.5%	-0.7%
Construction	1.8%	1.0%	0.5%
Manufacturing	0.0%	-1.0%	2.3%
All of industry	2.1%	1.5%	0.9%

Source: Access Economics 2009

Employment growth in the mining sector and the agriculture, fisheries and forestry sector was expected to be lower than the national average due primarily to ongoing productivity improvements. Manufacturing growth is projected to be low or negative under high and moderate growth scenarios, due to increasing productivity and specialisation of manufacturing offshore. If higher levels of industry protection are in place, the local manufacturing sector would be likely to grow. The construction sector is expected to grow under all scenarios, driven by demand for housing and engineering construction for infrastructure due to population growth, although it will be influenced strongly by economic cycles.

The Access Economics research shows that employment requirements are highest for professionals, community or personal service workers, clerical and administration workers, and sales workers. Demand for lower skilled occupations of machinery operators and drivers and labourers is expected be 'solid' due predominantly to the profile of these occupations in the construction and transport industries. While positive in terms of requirements over the 15 years, the requirements for technicians and trades workers are expected to be generally lower than has been experienced in recent years.

The mining industry

During industry consultation for the Forestry Industry Database Project, competition for labour with the mining sector was identified as key factor influencing current and future skill shortages. Projections of mining industry workforce requirements prepared for the Minerals Council of Australia (Molloy and

4 Employment outlook

Tan, 2008) estimated that industry labour requirements would increase by an average of 3.9% each year between 2010 and 2020, assuming no productivity improvements over this period. This study noted that while the key skills requirements for Australian industries overall are likely to be managers, administrators and associate professionals, driven by the services industries in particular, its requirements are likely to be highest in the occupational groupings of technicians, tradespersons, semi-skilled workers and labourers, of which around 51,000 additional workers are expected to be required by 2020.

The forest and wood products industry

By comparison, the Outlook model developed for this Project forecasts overall employment growth for the forest and wood products industry to average 0.1% per annum between 2010 and 2025, which represents a net increase of around 5,550 additional employees overall. Employment growth is expected to be strongest in the Pulp and paper production and Timber products manufacturing sectors, and weakest in the Forest growing and management sector and the Panel and board production sector.

The demand for skills is expected to be strongest in the following occupational areas for the forest and wood products industry:

- Paper and pulp mill operators and workers;
- Labourers;
- Machinery operators and drivers; and
- Production managers (Manufacturing).

On average, these occupations are expected to grow by more than 0.3% per annum out to 2025.

Based on the model assumption of minimal changes to the resource base, requirements for Forestry and logging workers and Foresters is expected to be weakest, with an average annual reduction in the workforce requirement of around 0.1% per annum to 2025.

Given a more modest growth outlook compared to the mining and construction sectors in particular under high and moderate growth scenarios, the demand for labour in other industries is likely to continue to impact on the availability of employment and skills in the forest and wood products industry.

Labour availability is directly related to other socio-economic factors that can impact on employment and training requirements within the forest and wood products industry, including educational attainment of industry entrants, perceived job security among workforce participants and rates of technological change. These factors are not directly incorporated in the Outlook model for this Project, and therefore estimates of employment and training requirements are also subject to these factors.

5

Training requirements and pathways

A primary focus of the Project was to identify skills and training requirements - current and future - across the industry sectors and regions.

Skills shortages in the Australian forest and wood products industry have been identified as an important issue, and it is a key issue for a number of other industries drawing on a common labour pool, such as mining, construction and non-wood based manufacturing industries. Relevant studies include the NAFI-A3P *Wood and Paper Products Industry Skills Shortage Audit* in 2006 (NAFI 2006) and ForestWorks' *Industry Skills Scan* series (ForestWorks 2010). Qualitative information on current skills shortages was also collected as part of the targeted industry survey for this Project.

A summary of key occupations and associated skills shortages[12], based on a range of industry studies completed over the last five years, is presented in Appendix B. This provides a baseline for initiatives that address skills and training requirements in the future.

Occupations identified as being in shortage at present, that are expected to see a strong increase in demand in future years include:

- Machinery operators & drivers;
- Truck drivers;
- Technicians and trades workers;
- Logging plant operators; and
- Logging assistants.

These do not necessarily align with the ANZSCO occupations referenced in the modelling of future requirements. In respect to other occupations identified as being in shortage, while relatively lower in terms of the number required within the industry workforce overall, most have been identified as critical occupations and skills requirements of the forest and wood products industry.

5.1 Occupation profiles

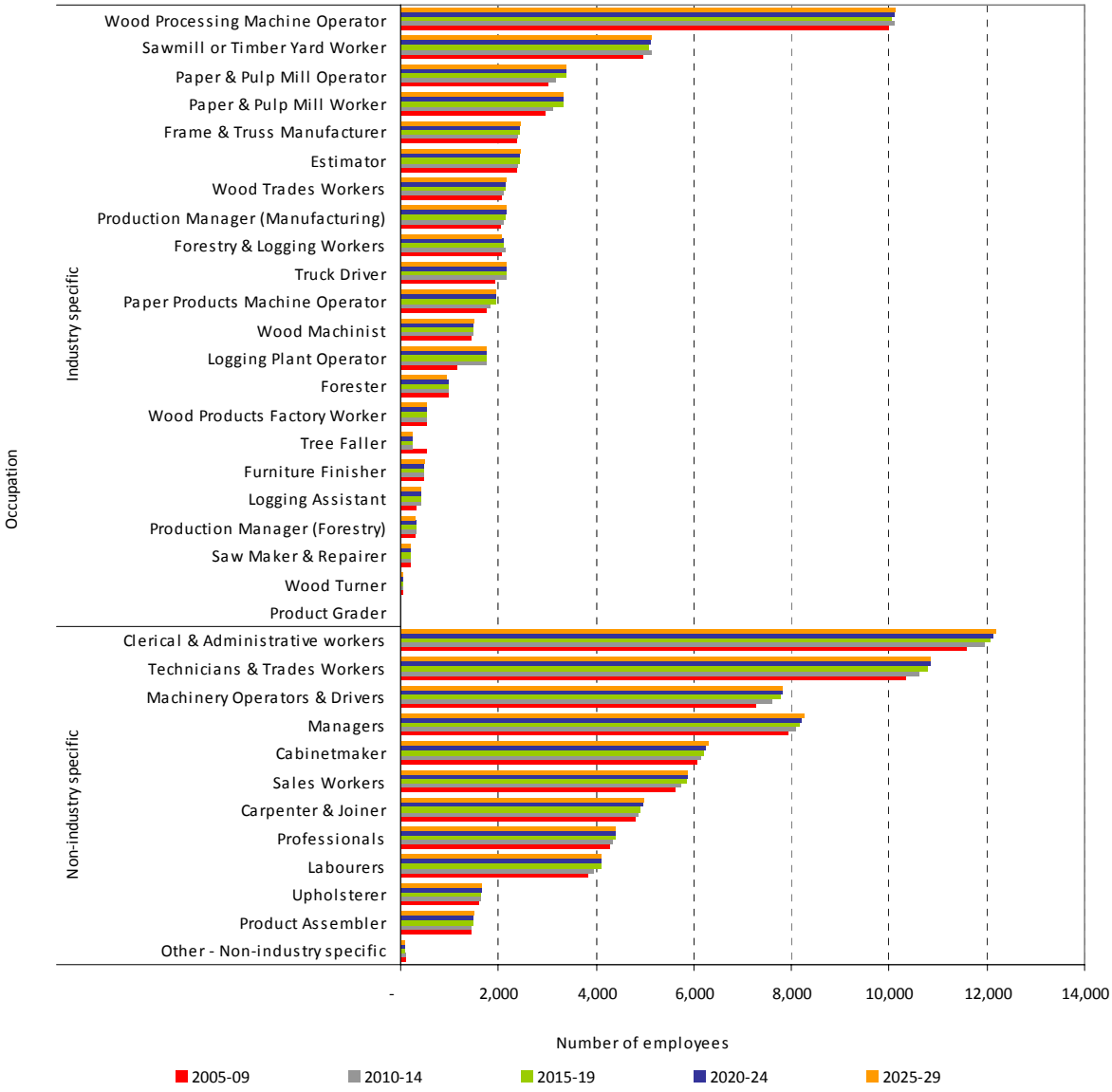
Industry skills and training requirements have been identified by modelling employment by occupation type, for each industry sector and sub-sector. This will contribute to industry initiatives to address current skills shortages and ensure that skills and training requirements do not constrain the competitiveness of the industry in the future.

Figure 5-1 summarises the outlook for employment by occupation across all industry sectors, comprising industry specific competencies and more generic skills sets. ANZSCO occupations may not comprehensively reflect the range of job titles utilised by the industry; however, this classification forms the basis of occupations and skills reporting by a number of key research and statistical agencies, and provides for comparisons over time and across industries. The Project methodology report (URS 2010) outlines occupations associated with ANZSCO occupations, as identified by industry within project surveys, and in the definitions framework.

[12] In the context of this project, skills shortages are described as occupations where employers have experienced difficulty filling available positions, including a lack of suitably qualified or experienced persons applying, and particular skills or groups of skills that are considered lacking or undersupplied within the existing workforce.

5 Training requirements and pathways

Figure 5-1 Forecast employment by occupation, 2009 – 2029



Based on this analysis, Figure 5-2 provides a profile of key occupations in terms of their current employment base and employment growth over the next 10 years in particular. A range of occupations are identified for which employment demands are forecast to increase significantly over this period. These occupations incorporate both industry-specific and more generic skill sets, required across the range of industry sectors.

5 Training requirements and pathways

Figure 5-2 Profile of employment growth by occupation, 2009 – 2029

Level of employment	Employment forecasts		
		Steady	**Growth**
	High proportion of industry employment	• Wood Processing Machine Operators • Sawmill or Timber Yard Workers • Cabinetmakers • Carpenter and Joiners • Wood Trades Workers • Frame & Truss Manufacturers • Professionals* • Production Managers (Manufacturing) • Managers* • Sales Workers*	• Machinery Operators & Drivers* • Technicians & Trades Workers * • Paper & Pulp Mill Workers • Truck Driver • Labourers*
	Low proportion of industry employment	• Forestry and Logging Workers • Foresters • Saw Maker & Repairers • Wood & Wood Products Factory Workers • Production Managers (Forestry) • Wood Machinists • Wood Turners • Pest or Weed Controllers • Furniture Finishers • Product Assemblers • Upholsterers	• Paper Products Machine Operators • Logging Plant Operators • Logging Assistants

Source: Forestry Industry Database – Outlook model 2010

* These occupations represent a grouping of non-industry specific occupations, grouped for the purposes of clearly presenting the scope of employment within the industry.

5.2 Training pathways

Training requirements across industry sectors can be identified broadly with estimates of future employment levels by occupation and mapping these to skill levels and associated training packages. This approach is reliant upon the matching of occupations to designated training packages that provide all or most of the skills.

There are limitations to this approach. For example, it does not take into account the existing skill sets of incoming employees. Furthermore, it does not clearly differentiate between training that is provided internally, within the workplace, and externally through registered training providers. However, the analysis of employment data by occupation provides a useful indication of the scale and nature of training that will be required to support future employment, across sectors and regions.

Table 5-1 summarises the indicative training requirements across the industry between 2009 and 2029. Indicative levels of training are presented as totals for each five year period, which aligns with the modelling based on wood flow forecasts for these designated periods.

5 Training requirements and pathways

Table 5-1 Indicative training requirements based on external pathways, total by period

Training package	2005-09	2010-14	2015-19	2020-24	2025-29
Forest growing & management	*963*	*954*	*935*	*910*	*865*
Bachelor of Forestry	200	198	194	189	180
Diploma of Forest and Forest Products	50	49	48	47	45
Certificate II in Forest Growing and Management	583	577	566	550	523
Certificate II in Harvesting and Haulage	9	9	9	8	8
Certificate III in Harvesting and Haulage	104	103	101	98	93
Certificate II in Sawmilling and Processing	8	8	8	7	7
Certificate III in Sawmilling and Processing	10	10	10	10	9
Harvesting & haulage	*507*	*1,129*	*631*	*631*	*631*
Bachelor of Forestry	22	48	28	28	28
Diploma of Forest and Forest Products	24	53	30	30	30
Certificate II in Forest Growing and Management	24	51	29	29	29
Certificate II in Harvesting and Haulage	107	231	132	132	132
Certificate III in Harvesting and Haulage	311	705	390	390	390
Certificate II in Sawmilling and Processing	19	41	23	23	23
Pulp & paper manufacturing	*2,101*	*2,618*	*2,939*	*2,355*	*2,357*
Certificate II in Pulp and Paper Manufacturing	746	930	1,044	837	837
Certificate III in Pulp and Paper Manufacturing	915	1,140	1,280	1,026	1,026
Certificate III in Pulp and Paper Services	440	548	615	493	493
Sawmilling & processing	*2,240*	*2,757*	*2,157*	*2,417*	*2,338*
Bachelor of Forestry	20	24	19	21	20
Certificate II in Sawmilling and Processing	875	1,077	843	945	913
Certificate III in Sawmilling and Processing	1,036	1,275	997	1,118	1,081
Certificate III in Sawdoctoring	48	59	46	52	50
Certificate III in Woodmachining	76	94	74	82	80
Certificate II in Timber Manufactured Products	132	162	127	142	138
Certificate II in Forest Growing and Management	12	15	11	13	12
Certificate II in Harvesting and Haulage	7	8	6	7	7
Certificate III in Harvesting and Haulage	9	11	9	10	9
Certificate III in Carpentry	10	12	9	11	10
Certificate III in Furniture Making (Cabinet Making)	8	10	8	8	8
Certificate III in Joinery – Timber	8	10	8	8	8
Timber merchandising	*640*	*688*	*676*	*681*	*687*
Certificate II in Timber Merchandising	539	580	569	574	578
Certificate III in Timber Merchandising	80	86	84	85	85
Certificate III in Wood machining	21	23	22	23	23
Timber products manufacturing	*6,726*	*7,230*	*7,099*	*7,156*	*7,214*
Certificate II in Timber Manufactured Products	1,149	1,235	1,212	1,222	1,232
Certificate III in Timber Manufactured Products	2,119	2,278	2,237	2,255	2,273
Certificate III in Woodmachining	260	280	275	277	279
Certificate II in Furniture Finishing	118	127	125	126	127
Certificate II in Upholstery	403	433	425	428	432
Certificate III in Carpentry	781	840	825	832	838
Certificate III in Furniture Making (Cabinet Making)	1,492	1,604	1,575	1,587	1,600
Certificate III in Joinery – Timber	403	433	425	428	432

5 Training requirements and pathways

Training package	2005-09	2010-14	2015-19	2020-24	2025-29
Panels and board production	*708*	*404*	*623*	*619*	*615*
Certificate II in Wood Panel Products	232	132	204	203	201
Certificate III in Wood Panel Products	437	250	385	383	380
Certificate III in Sawdoctoring	3	2	2	2	2
Certificate III in Woodmachining	18	10	16	16	16
Certificate III in Furniture Making (Cabinet Making)	17	10	15	15	15
Total - Industry specific training	**13,884**	**15,780**	**15,060**	**14,770**	**14,705**
Other - Non-industry specific training	12,750	14,825	14,279	13,671	13,626
Total - Training requirements	**26,634**	**30,604**	**29,339**	**28,441**	**28,331**

Source: Forestry Industry Database 2010; * 2005-09 training requirements are based on average turnover for the period, and are presented to enable comparison of future requirements relative to current levels.

The profile in Table 5-1 relates specifically to addressing employment turnover and the training of entrants for industry-specific roles, at all levels. It does not incorporate training requirements of the existing workforce, on the broad assumption that present incumbents are generally competent in fulfilling the requirements of their roles. Therefore, this profile should be considered as industry's minimum requirements for industry-specific roles over the next 20 years. For example, trends in the uptake of new processing technologies are expected to drive further training requirements ('upskilling' requirements) for existing workers within specific processing functions or technology applications.

This profile indicates the type of skills and training expected to be in highest demand are those associated with:

1. Certificate II and III in Timber Manufactured Products[13];
2. Certificate III in Furniture Making (Cabinet Making);
3. Certificate III in Pulp and Paper Manufacturing; and
4. Certificate II and Certificate III in Sawmilling and Processing.

In addition, the Project modelling indicates that training requirements for non-industry specific roles – including managers, clerical and administration roles, technicians and non-specialist trades – will be of a similar magnitude to the total training requirements of industry-specific roles over the same period. This represents substantial additional training for incoming industry employees, however it is expected that this training can be provided for through education and training frameworks and organisations that are not dependent on the forest and wood products industry for support.

Key drivers

Key drivers, and associated assumptions, for this forecast profile of training requirements include:

- *Ongoing industry turnover* – the Project modelling assumes that turnover of the industry workforce is 5% per year, which relates to employees leaving the industry and requiring replacement with new entrants. This turnover estimate, based on available data presented in the Forestry Industry Database, accounts for a substantial proportion of ongoing training requirements;

[13] Training requirements represented by Certificate II and III in Timber manufactured products include skills requirements for the frame & truss sub-sector. This sub-sector is currently formalising a training program specifically for frame & truss manufacturers.

5 Training requirements and pathways

- *Increase in hardwood plantation pulpwood production over the next five years* – this industry dynamic is expected to underpin significant growth in employment and therefore new training requirements in particular sectors and regions;
- *Development of a new pulp mill in Tasmania* – the Project modelling assumes the proposed new pulp mill for Tasmania will proceed. This would have a significant impact on employment and also employment distribution across sectors, notably the Sawmilling and processing and Pulp and paper production sectors, and skill levels within those sectors; and
- *Growth of downstream processing sectors in line with national economic drivers* – the Project modelling assumes that growth in the Timber products manufacturing, Pulp and paper production (downstream processing and merchandising sub-sectors) and Timber merchandising sectors will be driven by forecast increases in GDP and demand for new housing. This is a key driver of total training requirements throughout the forecast period, given the relative high employment base in these sectors (approximately 70% of industry employment in 2009).

Regional impacts

The outlook for industry employment by region was discussed in Section 4. Key drivers for industry training requirements were incorporated in this outlook.

Based on this modelling, the regions that are expected to see significant change in employment and training requirements are:

- Tasmania

  Tasmania is expected to see significant change and a net increase in employment and training requirements, on account of multiple drivers. These include the proposed new pulp mill and the maturing hardwood plantation resource that was planted in Tasmania for both pulpwood and sawlog production. The forecast increase in harvest of plantation wood will drive increased employment in harvesting and haulage, and is also assumed to support an increase in sawmill production to process the substantial increase in hardwood plantation sawlogs from 2015 onwards.

- Central Gippsland

  Central Gippsland is expected to see an increase in employment and training requirements, principally due to the employment multiplier associated with pulp and paper production. It is assumed the anticipated increase in harvest of hardwood and softwood plantation wood from 2010 onwards will be used for domestic pulp and paper production within the region. While the forecast increase in harvest of plantation wood is modest relative to other regions such as the Green Triangle, the employment impact from this uplift is expected to be significant.

- Green Triangle

  The Green Triangle region is expected to see a net increase in employment and training requirements, principally due to the increase in hardwood plantation pulpwood production over the next five years. This will drive increased employment in harvesting and haulage and also a substantial increase in employment associated with woodchip export operations during the current and subsequent periods.

  This employment impact will be offset, from 2010 onwards, by the recent closure of the LVL facility and a medium-scale sawmill within the region, without other processing developments to absorb these redundancies.

5 Training requirements and pathways

- Southwest Western Australia — Similar to Green Triangle, the Southwest region is expected to see an increase in employment and training requirements directly associated with the increasing production of hardwood plantation pulpwood. This will be offset in the current period by rationalisation within the Panels and board production sector, notably the recent closure of the MDF facility and two mid-size sawmills in the region.
- Bombala — The modelling of industry occupations also highlights an increase in employment in the Bombala and Southern NSW region, which is attributed to the development of additional softwood processing in the region.

The Project outputs are expected to provide industry stakeholders with the capacity to investigate the location and indicative scale of training needs at regional and sectoral level. The delivery of training to meet these requirements will be determined through ongoing work of the industry skills council and training providers, with industry associations and enterprises, in the context of emerging markets.

6

Conclusions

Recognising the considerable ongoing work on skills development and training delivery, this Project has sought to provide a central information resource for the industry and training providers to estimate the levels of employment and training requirements for each type of occupation.

It has provided a methodology for the industry to estimate employment by occupation based on ABS data, and reporting for designated sectors, sub-sectors and regions. It has also provided a model for the industry to use to forecast employment requirements over a 20 year horizon, on the basis of current industry forecasts and user-defined scenarios and assumptions.

However, the industry and its workforce are clearly dynamic and, as the shape of the industry changes in response to market forces and other drivers, the workforce skills and training requirements will need to change also. In this context, industry workforce information needs to be regularly updated to meet the requirements of strategic planning and operational delivery.

Furthermore, there are current areas of knowledge and data gaps for which further work is required to understand the current industry profile and forecast future requirements so that the industry can maintain its competitiveness within domestic and international markets.

6.1 Knowledge gaps

The key knowledge gaps identified through the development of this Project are:

- The nature and full extent of workplace based training:
  - A range of studies have identified and estimated the levels of workplace-based training. However, given its major contribution to meeting industry's training requirements, there is a requirement to develop some industry-standard metrics to account for this training; and
  - This knowledge is required to assist industry and training providers with ongoing development of cost-effective and streamlined models for workplace-based training to achieve alignment and formal recognition under forest and wood products industry training packages.

- The capacity for improved alignment of ANZSCO occupation titles to key industry specific roles:
  - Through an improved alignment and description of ANZSCO occupations and definitions with key industry specific roles, there is scope for the industry to monitor changes in employment and employment characteristics in a more cost effective way, based on statistics produced from existing surveys undertaken by the ABS and education and training researchers; and
  - Industry has sought this greater alignment with ANZSCO and ABS data previously; this Project builds on previous work and highlights further the scope for industry benefits if statistical reporting can be aligned.

- Improved resource information and/or production estimates to assist with review of employment productivity for the following aspects of forest growing and management:
  - Areas being established and managed for carbon sink forestry; and
  - Current and future private native forest areas managed for timber production, and associated supply levels.

6.2 Industry priorities

The industry is striving to address and deliver a large array of training requirements, through both workplace-based training and formal training programs. Workplace-based training accounts for a large proportion of these requirements, and this trend appears likely to continue. Therefore, industry and government need to consider how they can further support flexible training models to provide enterprises and employees with access to the specialist and non-industry specific skills and qualifications they require.

In this context, key industry priorities arising from the Forestry Industry Database Project include:

- Firstly, the industry will need to support the establishment of the Forestry Industry Database as a central repository of industry data and information:
  - Forest & Wood Products Australia has undertaken to provide hosting for the Database for an initial 12 month period. Hosting arrangements beyond this period are yet to be determined;
  - There is scope for integration of the database within other existing programs and online portals, across a range of other industry development and promotion initiatives; and
  - The database will require periodic maintenance and data uploads; the benefit for industry will be access to current information for policy development, regional planning and other purposes.

- Secondly, this Project has highlighted further the need for support for the ongoing development of flexible training delivery models.
  - Within this Project and other initiatives developed to address skills and development needs, the industry has identified the major contribution of workplace based training and the need for training delivery to be readily linked to methods of formal assessment that is readily accessible, cost-effective;
  - Flexible training models provide for engagement with employees and trainees in respect to the scope of training and methods by which training is undertaken and assessed, and offer potential to access Government funding support; and
  - Such initiatives can increase uptake of nationally recognised training, provide more information on the training being undertaken and assist with ongoing review of industry training needs.

- Thirdly, in light of the Project outcomes, the industry skills council and industry associations need to review the existing capacity for registered training providers to deliver training within the scope of the existing industry training package qualifications, across major resource regions and industry sectors.

7

References

ABARE (2010) *Australian forest and wood product statistics, September and December quarters 2009*. Australian Bureau of Agricultural and Resource Economics. Canberra.

Access Economics (2009) *Economic modelling of skills demand*. Report prepared for Skills Australia, October 2009. Online: http://www.skillsaustralia.gov.au/PDFs_RTFs/AE_Skills_Demand.pdf

BRS (2010) *Australia's forests at a glance*. Bureau of Resource Sciences, DAFF, Canberra.

Department of Agriculture, Fisheries and Forestry (2010) *Australia's Forest Industries*. Online: www.daff.gov.au/forestry/national/industries

FAFPESC (2006) *Forest and Wood Products Industry Workforce and Industry Data Collection Survey Report 2002-2006.* Forest and Forest Products Employment Skills Company Ltd.

ForestWorks (2010) *Industry Skills Scan*, May 2010.

Molloy, S and Tan, Y (2008) *The Labour Force Outlook in the Australian Minerals Sector: 2008 to 2020*. Report prepared for the Minerals Council of Australia by the National Institute of Labour Studies, Flinders University, Adelaide, June 2008. Online: http://www.minerals.org.au/__data/assets/pdf_file/0020/33851/V2020_Phase_1_NILS_LABOUR.pdf

Montreal Process Implementation Group for Australia (2008). *Australia's State of the Forests Report 2008*. Bureau of Rural Sciences, Canberra.

NAFI (2006) *Wood and Paper Products Industry Skills Shortage Audit*. Published by the National Association of Forest Industries, Canberra. Online: http://www.nafi.com.au/skills/

NCVER (2009) *Apprentices and trainees 2008 – Annual*. NCVER, Department of Education, Employment and Workplace Relations, Adelaide.

NCVER (2009) *Australian vocational education and training statistics Employers' use and views of the VET system 2009*. Department of Education, Employment and Workplace Relations, Adelaide.

Parsons, M, Frakes, I and Gavran, M (2007), *Australia's Plantation Log Supply 2005–2049*, Bureau of Rural Sciences, Canberra.

Pratley, J, Kanowski, P and Bull, L (2010) *Education and training challenges for the Australian forestry sector: an analysis based on recent trends in university and VET completions*. Unpublished report.

Pulp & Paper Industry Strategy Group (2010) *Pulp and Paper Industry Strategy Group – Final Report, March 2010*. Department of Innovation, Industry, Science and Research, Canberra.

Schirmer, J. (2009) *Socio-economic impacts of the plantation industry on rural communities in Western Australia*. Technical report 198, Cooperative Research Centre for Forestry, June 2009.

URS Australia (2010) *Forestry Industry Database Project - Project Methodology Report*. Report prepared for the Australian Government Department of Agriculture, Fisheries and Forestry, Canberra.

8

Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of the Department of Agriculture, Fisheries and Forestry and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the Proposal dated 26 March 2009.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared between 1 March 2010 and 20 July 2010 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

A

Appendix A Key assumptions for the Outlook model

Key assumptions made in the Forestry Industry Database Outlook model to estimate future employment and training requirements across industry sectors are set out below.

Model element	Assumption
Wood flow forecasts	• BRS data provided to the Forestry Industry Database Project — Based on BRS log supply forecasts set out in Parsons et al 2007 — Hardwood pulpwood forecasts for three NPI regions (Green Triangle, Western Australia and Central Victoria) smoothed over the first two 5-year periods (i.e. 2010-2014 and 2015-2019), in recognition of current delays in development of processing and export infrastructure to supply forecast increase in supply. — Current sustainable yields under RFAs to be maintained until 2029 with the exception of South East Queensland where supply from public native forests will cease in 2025
Processing facilities	• Existing facilities continue operation where there is no major change in resource supply. Recently announced closures of major processing facilities (e.g. Carter Holt Harvey LVL plant in Nangwarry) have been incorporated. • Additional or expanded wood chip facilities to process the increase in hardwood pulp log supply in all regions except Tasmania, where the proposed pulp mill has been included in the future configuration from 2014 onwards. • Plans for a new pulp mill in Tasmania were considered to be well advanced at the time this Project was developed. Plans for a new pulp mill in South Australia (within the Green Triangle NPI region) were not as advanced, and this proposed development was not incorporated in the default assumptions, although there is scope to do so with user-defined variables. • Expansion in sawmilling operations in the Green Triangle, South East Queensland, Bombala and North Queensland to process increasing sawlog resource coming on line.
Downstream processing	• Downstream paper manufacturing to grow in line with GDP forecasts from the International Monetary Fund World Economic Outlook (April 2010), based on a correlation of production with GDP growth over a 25 year period. • Timber products manufacturing and Timber merchandising to grow in line with forecast growth in dwelling commencements from the Housing Industry Association (June 2010), based on a correlation between sawn timber production and dwelling commencements.
Productivity gains	• Productivity gain of 1% per annum for all sectors, except Pulp & paper production, based on historical trends of around 1.5% per annum. Recent trends in the Pulp & paper production sector indicate productivity improvements of around 3% per annum over the last five years. A productivity gain of 2% per annum has been applied to this sector accordingly.
Employment turnover	• Turnover reflecting industry exits based on retirement of existing workers and movement to other industries of 5% per annum.
Occupational profiles	• No changes in future occupational profiles in comparison to the current profile with the exception of Tree Fallers. It is expected around 50% of future requirements for Tree Fallers will be replaced by Logging Plant Operators, reflecting *inter alia* workcover authority preferences for mechanised falling. • Other factors that may influence occupational profiles include technology changes, the skills and experience of industry entrants, general labour availability, and broader drivers in the economy such as relevant government policies and climate change.

B

Appendix B Current skills shortages across industry sectors

Table B-1 presents a summary of key occupations and associated skills shortages, based on a range of industry studies completed over the last five years. These do not necessarily align with the ANZSCO occupations referenced in modelling of future requirements.

In the context of this project, skills shortages are described as occupations where employers have experienced difficulty filling available positions, including a lack of suitably qualified or experienced persons applying, and particular skills or groups of skills that are considered lacking or undersupplied from within the existing workforce.

Table B-1 Current skills shortages across industry sectors

Sector	Occupations in shortage	Skills shortages
Forest growing and management	• Forestry workers • Foresters • Logging plant operators • Electricians • Truck drivers • Managers • Clerical & administrative workers • Entry level labour shortage	• Literacy/numeracy skills • Business management skills • Marketing skills • Management skills • Communication / engagement skills • Mapping/GPS skills • Integrating forestry in faming • Indigenous forest management practices • Industry trainers and assessors • Roading skills • Operations management knowledge
Harvesting and haulage	• Logging plant operators • Truck drivers • Logging assistants • Forestry & logging workers • Entry level labour shortage	• Business management skills • Leadership/supervisory skills • Forest management knowledge • Fire management and salvage operations • Cording / matting of tracks and landings • Value recovery (log grading and marking) • Machine maintenance and care
Sawmilling and processing	• Saw doctors • Wood machinists • Sawmill operators • Kiln operators • Sawmill & timber yard workers • Managers • Machinery operators and drivers • Boiler makers • Clerical and administrative workers • Sales workers • Truck drivers • Electricians • Fitters • Foresters • Forestry workers • Entry level labour shortage	• Literacy/numeracy skills • Problem solving skills • Marketing skills • Management skills • New timber drying techniques • Chemical use and handling • Computer controlled equipment • Industry trainers and assessors • Chain of custody systems • Log and/or timber grading

Appendix B

Sector	Occupations in shortage	Skills shortages
Panel and board production	• Saw doctors • Wood machinists • Electricians • Entry level labour shortage	• Literacy/numeracy • Leadership/supervisory skills • Problem solving skills • Timber properties knowledge • New processing technology
Pulp and paper production	• Engineers (electrical) • Electricians • Fitters • Entry level labour shortage	• Leadership/supervisory skills • Problem solving skills • Marketing skills • Management skills • New pulp and paper process technology • Integrated process - control room operations
Timber products manufacturing	• Saw doctors • Wood machinists • Wood processing machine operator • Cabinet makers • Timber & wood process workers • Frame and truss manufacturers • Managers • Technicians and trades workers • Sales workers • Clerical and administrative workers • Machinery operators and drivers • Estimators and detailers • Product assemblers • Entry level labour shortage	• Technical estimating and detailing • Estimation using 3D CAD software • New timber processing skills • Wood processing / machining skills • Timber grading and quality control • Chain of custody systems
Timber merchandising	• Wood machinists • Wood processing machine operator • Timber & wood process workers	• Timber product & application knowledge • Computer controlled machinery

Source: NAFI/A3P Industry Skills Audit 2006; ForestWorks Environmental Scan Reports 2008-09; DEEWR Skills Shortage Research, Productivity Places Program Skills Priority List 2008-09. Forestry Industry Database – Project surveys 2010;

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