

**Socio-economic impacts of the softwood plantation industry:
Examining a post-bushfire salvage period**

Murray Region Forestry Hub

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Executive Summary

The Murray Region Forestry Hub (originally the South West Slopes Forest Industry Hub) was formed out of the Federal government's National Forest Industries Plan (launched in 2018) to facilitate forestry and timber industry growth across Australia. The Murray Region Forestry Hub extends from the NSW South West Slopes region around Gundagai/Tumut, down to Mt Buller in Victoria, and covers the extensive softwood plantations that have been established in this region.

The Black Summer bushfires of 2019/20 were unlike any other experienced by the softwood plantation industry in the MRFH, and had a variety of impacts on businesses, individuals and communities. With the help of state and federal Government funding, approximately 42% of the burnt area was successfully salvaged (almost all plantation of harvestable age) over almost two years before the quality of the wood deteriorated.

This study, funded by the Murray Region Forestry Hub (MRFH), focusses on the social and economic contribution of the softwood forest industry within the Murray Region Forestry Hub area during the post-bushfire salvage period. A subsequent proposed study will examine how the industry is adjusting after the salvage period, before the new fibre resource grows to harvestable age.

During this recovery stage, the softwood plantation industry in the Murray Region Forestry Hub area continues to be a significant component of the regional economy. In 2021/22, the industry generated a total of \$3,823 million of gross value of output for the region, including \$1,985 million from flow-on effects. Contribution to Gross Regional Production (GRP) (or the 'value-added' to the economy excluding transfers between industries) in the region was \$1,741 million, including \$962 million from flow-on effects. The direct net expenditure of the industry (the amount spent by the industry, rather than the sales value of its output), was \$1,452 million in 2021/22. These economic contributions to the Murray Region Forestry Hub are higher than those reported in previous years.

The significant contribution of the industry during 2021/22 is likely a reflection of the increased fibre being processed during salvage operations (with the volume and length of salvage time made possible through the state and federal Government support), as well as the increase in the value of the raw fibre, labour and sawn timber output (heightened by COVID stimuli applied to the construction sector by Government increasing demand at a time of limited supply). Of the total expenditure, almost 75% was contributed by the wood and paper processing sector.

The industry directly employed 2,189 people dependent on the region (up to and including primary processing), with 54% of these generated by primary wood and paper processing. When flow-on effects of the industry on other industries are included, the direct and flow-on employment generated by the Murray Region Forestry Hub softwood plantation industry during this recovery period provided jobs for a total of 11,429 people across Australia.

Recruiting and maintaining a strong workforce can be a challenge for industries that are based regionally, as many rural and regional areas have a smaller labour force compared to larger urban areas. The industry in the Murray Region Forestry Hub region continues to employ more people full-time and with higher overall wages than the workforce as a whole but is still not successfully accessing the female labour force in the region, with very few of the workers available in the female labour force are being successfully recruited into the forest industry. One of the main challenges for

the industry is the ageing workforce and difficulty in attracting and retaining younger people, particularly in the harvest and haulage, and silviculture sectors.

The types of staff most challenging to recruit amongst forest industry businesses are managers and high level professional staff, foresters, forest operations supervisors, specialised technicians, heavy machine operators and transport/drivers. There is ongoing difficulty in finding suitably qualified staff, and when they are employed, retaining them.

Overall businesses reported confidence in business outlook despite the 2019/20 bushfires, however many businesses are still going through the recovery process, with many reporting that they are not likely to invest in the business in the coming years. Bushfire impacts and lack of resource due to the bushfires were reported as a challenge for businesses fairly equally across all sectors of the industry, while rising input costs and rising costs of labour were more commonly reported by wood and paper processors and contractors than by growers.

The findings of this report reinforce the importance of the softwood plantation industry to the Murray Region Forestry Hub economy, particularly during the challenging conditions immediately after the 2019/20 bushfires when other sectors may have been struggling. (e.g. Agriculture, horticulture and tourism). As the reality of a reduced resource becomes clearer, it is important to gain a deeper understanding about what the business needs are looking like moving forward into a relatively uncertain future.

1. Introduction

Study background

The Murray Region Forestry Hub (originally the South West Slopes Forest Industry Hub) was formed out of the Federal government's National Forest Industries Plan (launched in 2018) to facilitate forestry and timber industry growth across Australia. In 2020 a report was produced by University of Canberra and BDO EconSearch examining the social and economic contribution of the softwood forest industry within the Murray Region Forestry Hub area (Schirmer et al. 2020). The 2020 report was based on data collected for the region in 2017 (funded by Forest and Wood Products Australia) and reported for two separate regions, the South West Slopes and Bombala region of NSW, and Victoria (excluding the Green Triangle) (Schirmer et al. 2018a & 2018b).

In 2019/20 a large scale bushfire spread through the MRFH region with devastating impacts on the standing forest resource, as well as communities, businesses and entire industries in the region. Approximately 44,000 ha of softwood plantation in NSW and 6,000 ha in NE Victoria was burnt, equivalent to around 30% of the log resource in the region. With the help of state and federal funding, approximately 42% of the burnt area was successfully salvaged over almost two years before the quality of the remaining burnt wood deteriorated. This area included almost all plantations of harvestable age (over 12 years), with the remaining 58% largely consisting of stands that were too young to produce commercially viable logs, or in some cases, older stands on inaccessible land (e.g. too steep to harvest).

This study, funded by the Murray Region Forestry Hub (MRFH), is the first of two examining the impacts of the 2019/20 bushfires. This report focusses on the social and economic contribution of the softwood forest industry within the Murray Region Forestry Hub area during the post-bushfire salvage operation, to better understand what happens in the industry during a period of increased harvest and processing of fire affected softwood fibre. A subsequent proposed study will examine how the industry is adjusting after the completion of the salvage operation, during the period before the new fibre resource grows to harvestable age.

The Murray Region Forestry Hub

The Murray Region Forestry Hub extends from the NSW South West Slopes region around Gundagai/Tumut, down to Mt Buller in Victoria (Figure 1). The MRFH was identified as having significant competitive advantages in forestry, including large areas of plantation, integrated transport and processing infrastructure as well as a skilled forestry workforce with supportive local governments (Schirmer et al. 2018a). The region includes the local government areas (LGAs) of Albury City, City of Wagga Wagga, Cootamundra-Gundagai Regional Council (formerly the Shires of Cootamundra and Gundagai), Greater Hume Shire, and Snowy Valleys Council (formerly the Shires of Tumut and Tumbarumba) in New South Wales (NSW), and Alpine Shire Council, Benalla Rural City Council, Indigo Shire Council, Mansfield Shire Council, Strathbogrie Shire Council, Towong Shire Council, Wangaratta Rural City Council and Wodonga Council in north east Victoria. Processors include a large pulp and paper mill, sawmills, particleboard and plywood production, and cross laminated timber manufacturing.



Figure 1 Murray Region Forestry Hub region. Source: <https://murrayregionforestryhub.com.au/>

As of the 2021/22 financial year, an estate of approximately 168,000 hectares (ha) of softwood plantations (reported by softwood plantation businesses in the MRFH) continues to supply considerable amounts of fibre annually to several wood and paper processors, supporting significant employment in several towns within the MRFH, despite the impacts of the 2019/20 bushfires. This report provides up-to-date information about the socio-economic contribution of the forest industry in the Murray Region Forestry Hub during the recovery and salvage period immediately following the bushfires.

The study

There is a limited understanding about the social and economic activity of the softwood forestry industry during salvage operations in the period following a large-scale bushfire. Following the 2019/20 bushfires there was considerable support from state and federal governments for the industry to make adjustments that enabled a salvage operation that extended for a longer than typical period after the bushfires. This included assisting the industry to make investment in new processing mechanisms that would allow mills to adjust to the different resource that would be available into the future with the aim of optimising recovery at all stages; providing funding to assist in the storage of salvaged timber; and to assist in the cost of transporting large quantities of salvaged timber to processing facilities further away.

This study focusses on the social and economic contribution of the softwood forest industry within the Murray Region Forestry Hub area during the post-bushfire salvage period, as depicted in Figure 2. This diagram attempts to represent the expected rise and fall of economic activity in the forest industry before and after the bushfires – it is important to note that this is a representation only and not to scale. The ‘Critical Point’ line represents a point at which there would be insufficient supply of wood to sustain the level of current activity and closure of mill/s would be inevitable. The post-fire financial assistance provided by governments will likely assist the industry to remain above that critical point, enabling the industry to better deal with current volumes and to have the capacity to increase processing activities as supply volumes increase.

When initially gathering the data for this project, it was predicted that the period being examined was around the beginning of ‘Zone 5 – the new normal’, but in reality the data collected was more likely situated somewhere in ‘Zone 4 – transitioning to a new normal’. A subsequent proposed study will examine how the industry is adjusting to a ‘new normal’ after the salvage period (Zone 5), and before the new fibre resource is available for harvest (Zone 6). It is a notable feature of this post-fire period in that the salvage operations remained viable for much longer than previous experience.

Supply – Scenario Relativity Curve

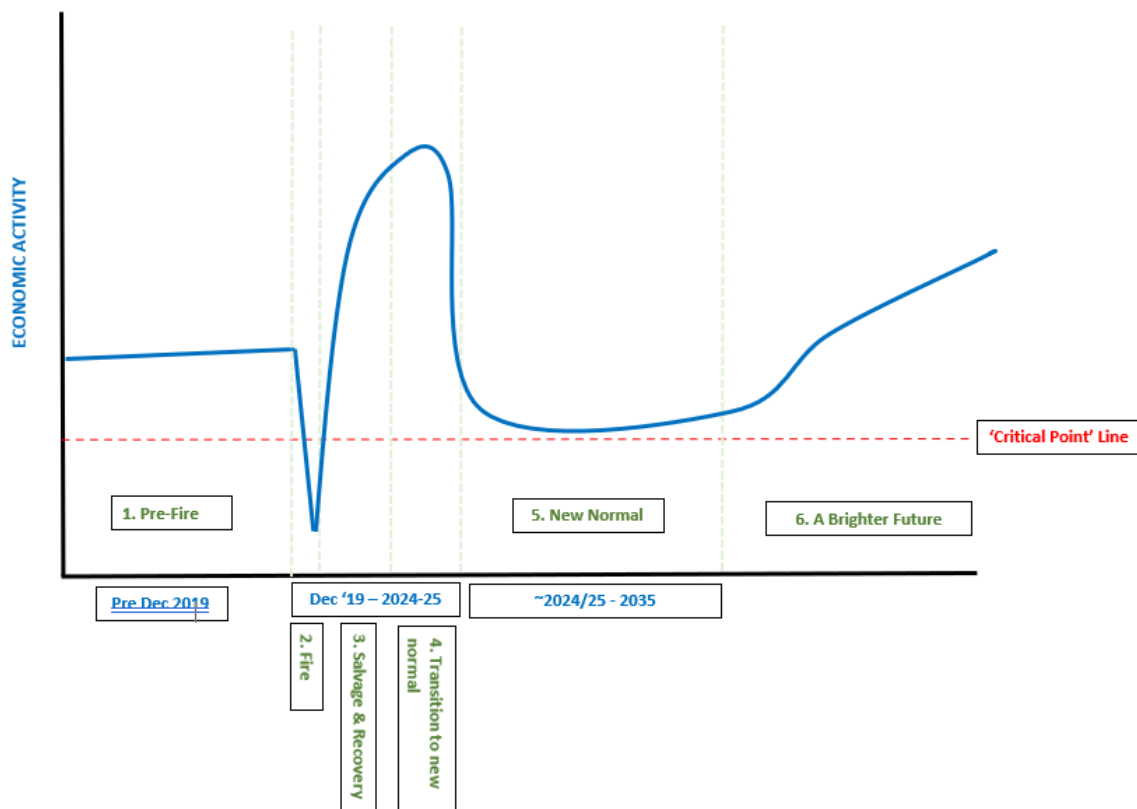


Figure 2 Predicted economic activity in the Murray Region Forestry Hub from the softwood forest industry before and after the 2019/20 bushfires. Source: Murray Region Forestry Hub

This report provides data on employment, economic value, workforce characteristics, industry skills needs and business outlook for the softwood plantation industry in the Murray Region Forestry Hub during the salvage and recovery period after the 2019/20 bushfires. It examines:

- The economic value of the industry, including direct and flow-on economic activity generated by the industry during the salvage and recovery period
- The employment generated by the softwood plantations and primary wood and paper processing facilities located in the MRFH up to and including primary processing, including the direct and indirect employment generated by the planting, growing, harvesting, haulage and processing of timber
- Workforce characteristics of the industry including work hours, income, age, gender and Aboriginal and Torres Strait Islander participation
- Industry recruitment challenges and skills needs
- Business and market outlook and challenges.

Data sources and methods

In 2023, all businesses involved in the planting, growing, managing, harvesting, haulage or primary processing of commercial wood or paper products in the MRFH were asked to take part in a survey focussed on business activity during the 2021/22 financial year. Initially, a total of 103 businesses were identified as possibly operating in the softwood forest industry in the MRFH at this time. A total of 17 of these businesses confirmed they were no longer working in the industry or were outside the scope of the study, and 5 had their data captured elsewhere (e.g. where a separate company manages on behalf of another). A further 18 businesses were suspected not to operate in the industry or were outside the scope of the study through second hand information, because their phone number no longer worked and there were no alternatives, or an online search indicated that the business had closed.

A total of 63 businesses were identified as being within the scope of this study, of which 51 were contacted directly (the remaining were uncontactable, despite several attempts at contact via phone, email and post, where possible). Of the 63 businesses believed to be operating in the industry in the region, 37% completed the full survey or most of the survey, including all but 2 large businesses employing more than 50 people. Of the 40 who did not complete the full survey (predominantly small businesses employing fewer than 10 people), 40% provided partial information or verbal information by phone. Information on the remaining businesses were estimated based on information provided by industry experts, previous survey responses and industry research.

Appendix 1 provides more detailed information on the survey process and responses achieved. Data from the survey were analysed to identify the direct employment and economic activity generated by the industry, industry recruitment challenges and skills needs, and business outlook. These data also informed economic input-output modelling using BDO EconSearch's RISE model, which identified flow-on employment and economic activity generated by the industry in the MRFH.

In addition to the analysis based on direct survey of industry members and economic modelling, existing data from previous studies of the region, including a recent ForestWorks (2023) study examining current and future skills needs, and the Australia Bureau of Statistics *Census of Population and Housing (2006, 2011, 2016, 2021)* were analysed. These data are presented throughout the report as appropriate.

Study scope

The Murray Region Forestry Hub softwood plantation industry has a supply chain with three distinct parts. In the first two parts – primary production and primary processing - plantations are grown and harvested (primary production), and logs are transported and processed into primary products such as sawn timber, woodchips, pulp and paper (primary processing). In some cases, further processing takes place at the primary processing facility (for example production of roof trusses or MDF). In primary production and primary processing the jobs generated depend on harvest of wood and fibre from plantations grown in the region. These ‘primary’ products are then either sold directly into end-use markets, for example into industries such as construction; or are sold for further processing into ‘secondary’ products by other processors (often occurring outside the region).

In the third part of the supply chain, the ‘secondary processing’ sector, those primary wood and fibre products sold for further processing are processed into a range of products (for example, cabinets, furniture, and paper packaging products). While some manufacturing facilities in the region engage in both primary and secondary processing of plantation roundwood, most are primary processors, and there is limited secondary processing in the region: most secondary processing of primary products produced in the region occurs in other locations such as Sydney or Melbourne. The main exception is the cross laminated timber manufacturing facility XLam in Wodonga Victoria, which was excluded from this study because in discussion with relevant businesses it was considered secondary processing only – with all primary processing being undertaken at their sister facility, the sawmill owned by Hyne in Tumbarrumba.

This report examines the primary production and primary processing parts of the softwood plantation industry in the region. It does not examine secondary processing in detail.

Report structure

This report includes data for the Murray Region Forestry Hub region, with the following sections:

- An overview of the Murray Region Forestry Hub region (Chapter 2)
- A summary of the immediate 2019/20 bushfire impacts on forest industry businesses (Chapter 3)
- The economic value of the industry during the salvage and recovery operations (Chapter 4)
- Employment generated by the industry during the salvage and recovery operations (Chapter 5)
- Workforce sociodemographic characteristics (Chapter 6)
- Industry recruitment challenges and skills needs (Chapter 7)
- Business and market outlook, needs and challenges (Chapter 8)
- Conclusions: Future industry needs

2. Overview of the Murray Region Forestry Hub softwood plantation industry

Brief history of the MRFH softwood plantation industry

The Murray Region Forestry Hub softwood plantation industry began in the early 1900s, when the NSW and Victorian State Governments began establishing softwood plantations on large areas of government-owned land, including many areas cleared of native forest to establish the plantations. Areas of planting increased substantially in the 1960s and 1970s, supported by Commonwealth government loans made to State Governments to encourage establishment of softwood plantations (Schirmer et al. 2018a, Williams 2018).

In the 1980s and early 1990s, small private investors established additional areas of plantation, typically located close to the large areas of State-owned plantation. During this period state-owned plantations were also expanded by the then Victorian Plantation Corporation and what is now known as Forestry Corporation of NSW (FCNSW). The Victorian Plantation Corporation was sold to a private company, HVP Plantations, in 1998.

In the late 1990s and early 2000s, new areas of softwood plantations were established in the region through funding provided by Managed Investment Scheme (MIS) companies (Schirmer et al. 2005). The collapse of most of the MIS companies in the late 2000s resulted in the sale of those plantations to large institutional investors such as Global Forest Partners, New Forests and Agriwealth. The rate of new plantation establishment in the region slowed from around 2001, and then declined from around 2015.

This long history of establishment means that many softwood plantations in the region have been harvested and replanted two to three times since they were first established. As more of the region's plantations have reached maturity, with a growing volume of plantation harvested annually, increasing wood and paper processing capacity has been established in the region to utilise this wood fibre resource.

Softwood sawmills began to be established in the region from the 1950s (Schirmer et al. 2005), with eight processing facilities taking in large volumes of logs in the region today.

2019/2020 bushfires

Over the years there have been several bushfires that have impacted areas of the plantation estate, but none so devastating as the bushfires in 2019/20. The 'Black Summer' bushfires impacted much of the east side of Australia, from Victoria through to Queensland, and burned between August 2019 and March 2020. These bushfires were unprecedented in their size as well as the length of time that they were burning.

In the MRFH region, the Dunns Road and Green Valley fires had devastating impacts on the softwood plantation forestry estate. The Dunns Road fire started in the Ellerslie area near Adelong NSW on the 31st of December 2019, burning over 330,00 ha in total. The Green Valley fire started south of Tumbarumba on the 29th of December 2019. The two fires merged on the 11th of January 2020, and together with a third smaller fire that had already joined the Dunns Road fire on 4th of January (East Ournie Creek fire) burnt over 600,000 ha in total. The fires were active until mid-February 2020.

What was described as a ‘megafire’ had enormous social, environmental, economic and financial impacts for the region. The softwood plantation estate was severely damaged, with a total of 49,790 ha of plantations within the MRFH burnt in the 2019/20 bushfires - 43,767 ha damaged in the NSW part of the MRFH and 6,023 in the Victorian part. A total of 20,909 ha was salvaged, and 47,187 ha replanted or planned for future replant. Only 2,160 ha of damaged softwood plantation will not be replanted (Table 1).

Not only were there direct impacts on the growers of the softwood plantation resource, but there were significant impacts on the harvest, haulage and processing sectors of the forest industry as well. Various State and Federal Government grants were made available to assist in the additional costs associated with long haulage distances to other processing facilities, storage and processing of burnt timber to allow for longer processing times, repairing infrastructure such as roads, innovation and diversification for processing facilities (for example to enable use of younger smaller wood), and expansion of nurseries for future planting needs (State Government of Victoria 2020, DAFF 2022, NSW Government 2023). These grants included:

- Federal Government
 - Forestry Recovery Development Fund Program (\$40M): This program assists privately-owned wood processing facilities to recover and rebuild using innovation and product diversification. It enables wood processing facilities to set up new processing lines, including upgrades to existing facilities and technologies, and new facilities that complement existing activities.
 - Forestry Transport Assistance (\$15M): This program assists with the increased costs of transporting burnt salvaged logs further distances to surviving timber mills or storage sites, focused on bushfire affected areas in NSW and Victoria. A total of 944,648 tonnes of timber was recovered and transported from bushfire affected areas to mills under this program. This program enabled the valuable timber resources not to be wasted.
 - Salvage Log Storage Fund (\$10M): This program was provided through the COVID-19 Relief and Recovery Fund, and helped establish storage facilities for fire-affected timber (including processed timber products, logs and other forestry products). A total of 701,390 tonnes of burnt timber was stored under the program, providing extra certainty for mills because it could help businesses plan their long-term recovery.
 - Construction Softwood Transport Assistance Program (\$15M): to assist with transportation of bushfire-salvaged softwood longer distances to timber mills with capacity to manufacture structural timbers outside of the region. While this program was aimed at transporting timber from Kangaroo Island, any region was eligible to apply for this grant.
- NSW Government
 - Bushfire Industry Recovery Package (\$140M total)
 - Supply Chain Support Grants (forestry): This package was to assist with the cost of burnt timber storage, haulage of burnt timber from out of area forests, nursery expansion, measures to improve soil stabilisation and road construction.

- Sector Development Grants (forestry): to assist medium to long-term job retention and creation in the forestry, horticulture, and agriculture industries in bushfire impacted regions. Project include building industry sustainability, increasing value-add production, supporting supply-chain efficiencies, product diversification and market expansion.
- Victorian Government
 - Bushfire Recovery Timber Storage Grants (\$2.5M): This grant covered a range of activities to help keep unprocessed and processed wood viable or expand existing storage capacity, including rental or leasing costs, equipment hire and additional costs for water.

Softwood plantation estate in 2021/22

During the 2021/22 financial year, there was an estimated 168,000 ha of softwood plantation within the MRFH. In addition to the 2,160 ha not planned for replant after being damaged in the bushfires, approximately 2,760 ha were reverted to agriculture or other uses during the 2021/22 financial year (Table 1). Some plantation growers reported less softwood area managed since 2017 (Schirmer et al. 2020), with some areas being reverted to agriculture or other uses between 2017 and 2021. One of the major processors has also recently purchased land in the Tumut region to use for the establishment of plantations, however this area was not captured in this study as it was not yet being established at the time of the survey.

Comparison with the 2017 data indicates that the area of softwood plantation in the MRFH area has been decreasing, before accounting for losses associated with the fires. The dramatic loss of additional areas as a result of the fires has greatly exacerbated the problems associated with the decline of the plantation estate. Support for the industry by the State and Federal Governments in the form of 'bush fire recovery grants', to encourage restructuring of processing operations, has therefore been very timely.

Table 1 Area managed, harvested, replanted, burnt, salvaged and reverted in 2021/22 FY, as reported by the main forest growing businesses in the MRFH region

		MRFH (Ha)	NSW part of MRFH (Ha)	VIC part of MRFH (Ha)
Total area managed (includes reserves/ buffers/ unplanted areas)		215,404	197,492	62,426
Total area of softwood managed		167,639	122,053	45,586
Planned harvest (not part of salvage operations)	Area of softwood plantation harvested	7,993	3,891	4,102
	Area of softwood plantation replanted	8,581	6,927	1,654
	Area of softwood plantation reverted to agriculture	1,829	0	1,829
	Area of softwood plantation reverted to other uses	931	720	211
Operations associated with the 2019/20 bushfires	Total area of softwood plantation burnt/ impacted by the bushfires	49,790	43,767	6,023
	Total area of softwood plantation salvaged since the bushfires	20,909	17,460	3,449
	Total burnt area replanted to softwood since the bushfires	27,571	22,676	4,895
	Total burnt area planned for future softwood replant	19,616	18,931	685
	Total burnt area that will not be replanted to softwood	2,160	2,160	0

Wood and paper processing in 2021/22

The majority of timber grown in the Murray Region Forestry Hub (over 90% of total harvested volume) is processed at facilities within the region. The current processing industry in the Murray Region Forestry Hub consists of:

- Visy Pulp and Paper, located in Tumut NSW. The key products at Visy in Tumut include kraft paper and cardboard/ packaging products.
- AKD NSW Pty Limited, located in Tumut NSW. The key products at AKD include dry structural and appearance grade timber.
- Hyne Timber, located in Tumbarumba NSW. Key products at Hyne Timber include green and dry sawnwood and treated timber.
- Alpine MDF, located in Wangaratta VIC. Their key product at Alpine MDF is high quality pine MDF.
- Benalla Timber Products Pty Ltd, located in Benalla VIC. The key product at Benalla Timber Product is treated pine posts.

- D&R Henderson, located in Benalla VIC. Key products at D&R Henderson include solid pine, particleboard and melamine laminated products.
- Carter Holt Harvey (CHH), located in Myrtleford VIC. The key product at CHH is plywood.
- Plantation Pine Products (Borg), located in Tumut. This facility is currently used mainly as a holding yard for logs before transport to Oberon where they are processed. As such there are limited jobs associated with this site.

Since the last data collection in 2017, the Norske Skog mill in Albury closed, with almost 200 job losses, and Big River Group in Wagga Wagga ceased operations at the beginning of the 2021/22 financial year with around 50 job losses. These facilities were not included in this study. There were also some changes in ownership, with one CHH site in Tumut taken over by AKD, while the other CHH site was taken over by Plantation Pine Products (Borg).

The majority of total raw fibre volume for these processing facilities (approximately 60%) was sourced from sawlogs, pulplogs and woodchip harvested in plantations within the MRFH during 2021/22. The remainder came mainly from surrounding regions in Victoria, NSW and the ACT.

The need to source fibre outside the region to meet current supply needs for the region's mills will present more challenges in the years to come while the industry re-establishes the softwood plantation estate after the bushfires. Much of the resource that would have been harvested over the next 20-30 years to meet the requirements of the mills in the region has been burnt and will not be available for at least the next 12 years or so, when the first thinning of replacement plantings delivers some pulp resource. Processors will need to increasingly source fibre from outside the region, however this will incur additional costs due to the transport distance required and growing demand for limited resource across Australia generally. Dependency on other regions for supply will also reduce ability for potential expansion and create a risk to current production if any of the fibre inputs currently imported from other regions become unavailable. The extent of these impacts will be clearer in the next few years.

Residues such as woodchips and shavings produced as by-products at some of the region's processing facilities (e.g. AKD and Henderson's) are used in the manufacture of products such as paper, cardboard, MDF and particleboard at other processing facilities in the region, such as Visy and Alpine MDF. Other residues are typically used as fuel for onsite energy needs, or in some cases sold to local landscapers or other industries requiring wood shavings or bark etc. This results in the utilisation of the full log through more than one stage of production, minimising potential waste.

3. Bushfire impacts

The bushfires of 2019/20 were unlike any other experienced by the softwood plantation industry in the MRFH, and had a variety of impacts on businesses, individuals and communities. This report provides up-to-date information about how the industry has performed during the salvage and recovery period, and the associated social and economic contributions to the Murray Region Forestry Hub shortly after the bushfires. To better understand some of the results of the study, we first provide some context about how businesses in the softwood plantation industry within the MRFH were impacted by the 2019/20 bushfires and other significant events (eg. COVID-19); whether businesses accessed any State or Federal Government funding to assist with bushfire related business recovery; and to what extent businesses feel they are recovering from the events.

Many businesses, particularly growers and contractors (harvest and haulage, roading and some silvicultural contractors), were heavily involved in the firefighting effort during the bushfires, with some businesses reporting over 10,000 staff hours dedicated to the firefighting effort. The forest industry played an enormous role in the effort to keep communities safe, as well as minimising damage to their forestry assets.

Of the 21 businesses who answered the question about bushfire impacts, 67% reported being impacted in some way by the 2019/20 bushfires, with some businesses reporting also being impacted by bushfires in the past (growers and processors). Of the businesses impacted by bushfires, 88% reported being severely/very severely impacted by those bushfires.

A total of 70% of businesses were impacted by two or more significant events in recent years, including bushfires, floods, storms, drought and smoke. All businesses impacted by bushfires also reported COVID-19 impacting their business operations in some way. These cumulative impacts were reported as being challenging for many businesses since the bushfires.

Direct impacts on businesses included loss of machinery, reduction in resource resulting in reduction in business capacity and ability for future investment, ongoing reduction in resource and revenue, loss of long-term employees who left the region after the bushfires, reduced log supply resulting in reduced production, reduced revenue and profitability, emotional and wellbeing impacts, wear and tear on machinery with considerable repair costs and staff burnout.

But not all impacts were negative. For some businesses, it created new or additional opportunities and the ability to expand their business, from new roles in moving the additional fibre associated with salvage operations to processing facilities, to expanded nurseries and planting contracts.

Government funding

In response to the 2019/20 bushfire, state and federal Governments provided support to the forest industry to assist in the salvage efforts as well as help adapt to life after completion of the salvage operations, while waiting for the new fibre resource to be of harvestable age. This Government funding provided an opportunity to salvage and stockpile more fire affected timber than what would have been possible without it, allowing the salvaged timber to be processed for a longer period than what is typical after a bushfire.

Of the 20 businesses that answered the question, 11 had received some kind of Government funding to help assist with bushfire related business recovery. A total of 8 businesses received State Government funding, and 4 received Federal Government funding.

Funding was used for capital improvements and upgrades, to assist with salvage of burnt resources and transport of burnt material over longer distances, to assist with stockpiling of fire affected fibre, to expand nurseries and planting operations, to repair roads and to assist in staff training.

Road to recovery

While much of the forest business survey focussed on the 2021/22 financial year when salvage operations were continuing, businesses that were impacted by the 2019/20 bushfires were asked to reflect on how they felt they were going at the time of the survey (2023), and how their business may have changed since before the bushfires (Figure 3). A total of 17 businesses answered these questions.

Many businesses reported that they felt the business had recovered fairly well since the bushfires (44%), that they were financially recovered from the bushfires (38%) and that their business is back to normal (35%). However, most businesses indicated that they were still in the recovery process. A total of 64% still experience some level of stress or anxiety caused by the impact of the bushfires on their business, and a large proportion of the businesses reported that their business was financially worse off now than before then event (64%), and that it will take many years for their business to recover financially (54%). A total of 29% of businesses felt that they were better able to cope with difficult or challenging events now than before the bushfires, but 43% felt that if another disaster or challenging event occurred, their business would have difficulty coping with it.

These results highlight that the bushfires had a significant impact on the softwood plantation industry within the MRFH, and while many businesses are doing well and are better able to cope with future challenges, the majority are still struggling to cope with the impacts now and into the future. A further study will be required, to assess the extent to which all businesses involved in the forest and wood products sector have been able to settle into a 'new normal' phase, operating with significantly reduced levels of resource.

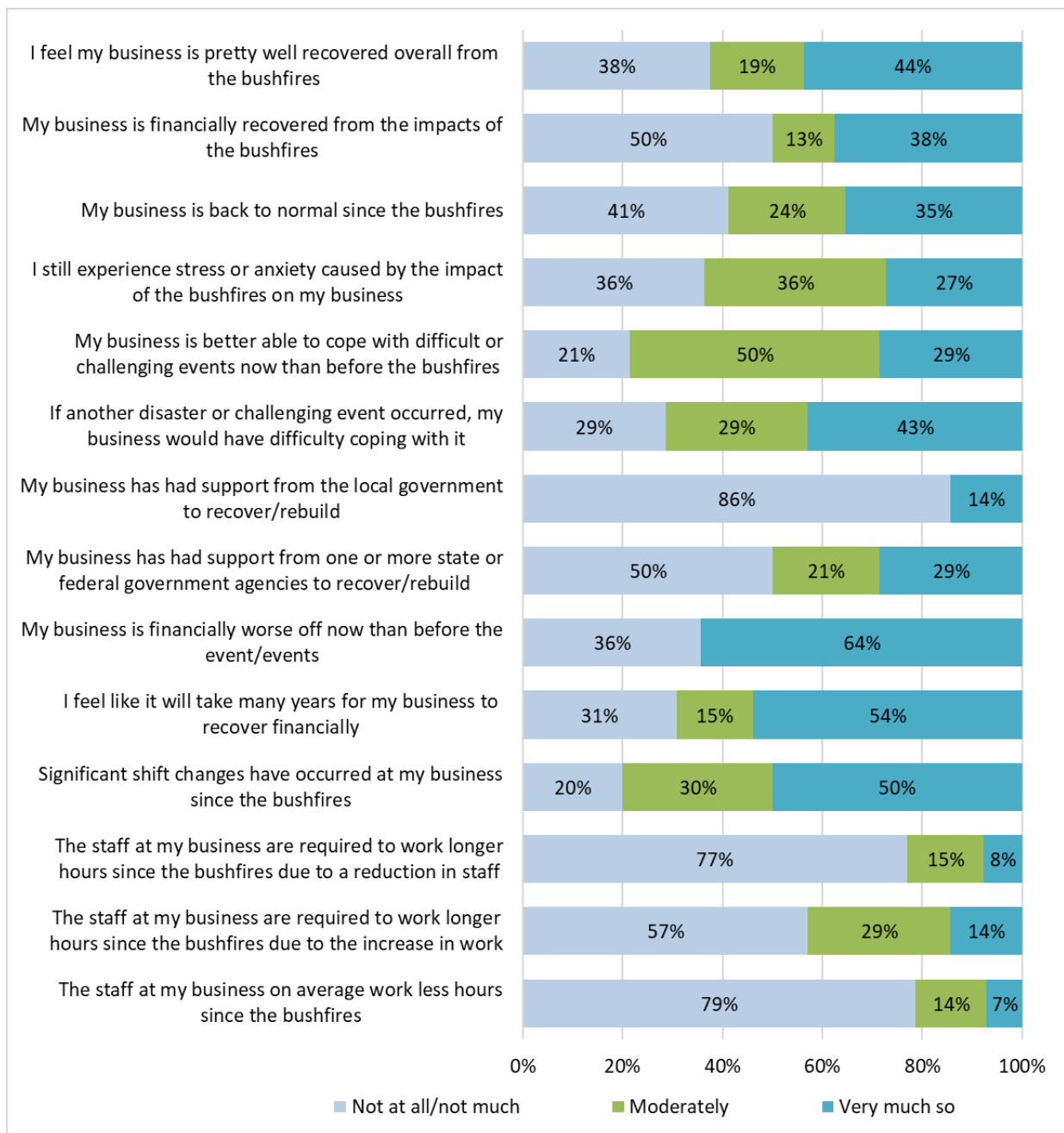


Figure 3 Business recovery and changes after the 2019/20 bushfires

4. Economic value of the industry

One aim of this study was to gain an insight into the economic activity generated by the softwood forest industry during the period of salvage operations and the subsequent transition period from recovery to the 'new-normal' period of operation. While it was expected that economic activity would be higher during salvage operations than before the bushfires, this type of data has not been previously collected. A subsequent proposed study will examine the economic activity of the industry in the post-salvage period.

The softwood plantation industry in the Murray Region Forestry Hub represents a significant part of Australia's softwood plantation estate and associated processing. The 168,000 hectares of softwood plantation in the region in 2021/22 made up 16.3% of Australia's total of 1,028,054 hectares of softwood plantations as of 2019/20 (ABARES 2021). Multiple wood and paper processors operate in the region, ensuring the logs harvested from these plantations undergo considerable 'value-adding' prior to finished products being sent to domestic and international wholesale and retail markets. After the bushfires there was an influx of fibre that required processing, the tail end of which was captured in this study, which included all primary processors in the region (some of which also undertake secondary processing activities).

The economic value of the industry in the MRFH can be measured by estimating the total net expenditure of the industry in the region, after taking into account transfers between different parts of the industry. This figure is typically less than the total value of gross output (the sale value of the products produced by the industry at the end point of sale), as it measures what is spent by the industry rather than the sale value of output. Direct net expenditure is a useful measure of the amount the industry contributes to the local economy, as it excludes transfers of profits to head companies located outside the region.

In 2021/22, the MRFH softwood plantation industry generated \$1,452 million in direct net expenditure as a result of investment in growing, harvesting, log haulage and processing of wood and paper products in the region. This is a significant increase from the \$954 in 2015/16 (Schirmer et al. 2020). This is likely a reflection of the increased fibre being processed during salvage operations (with the volume and length of salvage time made possible through the state and federal Government support), as well as the increase in the value of the raw fibre, labour and sawn timber output (heightened by COVID stimuli applied to the construction sector by Government increasing demand at a time of limited supply).

Table 2 summarises expenditure generated at different stages of growing (silviculture, nurseries, road construction and other services reported separately), harvest and processing. It then shows expenditure net of transfers within the industry – this net figure ensures there is no double counting by ensuring that payments made from one part of the industry to another (and then expended in that other part of the industry) are not included. The transfers excluded from this net figure include payments made to harvest, haulage, roading, earthworks and silvicultural contractors by plantation managers, and payments made to plantation managers or to other processors for fibre inputs used by wood and paper processors.

Table 2 Direct expenditure generated by the MRFH plantation industry, 2021/22, by supply chain stage

Supply chain stage	Gross total expenditure in 2015/16 (\$m)	Net expenditure excluding transfers to other plantation sectors (\$m)
Growers (forest management companies)	408.3	91.1
Wood and paper processing	1,667.5	1,073.2
Harvest & haulage contracting businesses	218.2	218.2
Other (including consultants, equipment sales, training)	4.4	4.4
Nurseries, silvicultural & roading contracting businesses	64.9	64.9
TOTAL	N/A (includes 'double counting' if summed)	1,451.8

Businesses were asked to identify key expenditure items, including spending on wages and salaries, inputs and supplies, and other key items. This was further analysed through use of input-output modelling (see Appendix 1 for details). Table 3 summarises the total spend on key items across the industry within the MRFH. Wages and salaries account for around 27% of total industry expenditure, and is the largest single item of expenses recorded by the industry survey.

Table 3 Expenditure of the MRFH plantation industry, 2021/22

Expenditure within the MRFH region	Value (\$m)	Proportion of total (%)
Wages and salaries	391.7	27%
Electricity, Gas, Water and Waste Services	118.3	8%
Rental, Hiring and Real Estate Services	132.1	9%
Manufacturing	110.3	8%
Wholesale Trade	73.2	5%
Information Media and Telecommunications	13.4	1%
Other Services	35.4	2%
Transport, Postal and Warehousing	38.6	3%
Agriculture, Forestry and Fishing	28.0	2%
Public Administration and Safety	23.6	2%
Financial and Insurance Services	21.3	1%
Accommodation and Food Services	20.1	1%
Professional, Scientific and Technical Services	18.3	1%
Education and Training	11.1	1%
Administrative and Support Services	10.8	1%
Construction	9.0	1%
Retail Trade	9.7	1%
Other	7.3	1%
Sub-total	1,072.2	74%
Expenditure outside the MRFH	379.6	26%
Total	1,451.8	100%

Flow-on effects include the economic activity generated in many businesses that are dependent on the plantation industry, for example a small business supplying specialty parts to the industry. As a supply business, the employment and economic activity generated in this business is considered a

‘flow-on’ effect of the industry, and they are an example of the many businesses on which the success of the industry depends.

Table 4 summarises the economic contribution of the MRFH softwood plantation industry, by sector, to the region, including total value of output, contribution to Gross Regional Product (GRP), and contribution to household income. The industry generated a total of \$3,823 million of gross value of output for the region in 2021/22, including \$1,985 million from flow-on effects. Contribution to GRP (or the ‘value-added’ to the economy) in the region was \$1,741 million, including \$962 million from flow-on effects.

The largest single component of expenditure for the industry overall was wages and salaries, with \$392 million injected directly into the regional economy via household incomes. Including flow-on effects, the total contribution of the industry to household income in the region was \$929 million in 2021/22.

Table 4 Economic contribution of the MRFH plantation industry, by sector – value of output, Gross Regional Product, and household income, 2021/22

	Growers (forest management companies)	Primary wood and paper processing	Harvest & haulage contracting businesses	Other (including consultants, equipment sales, training)	Nurseries, silvicultural & roading contracting businesses	Whole Industry (excludes transfers)¹
Output (\$m)	665.8	3,390.1	490.7	10.8	176.7	3,822.7
Direct (\$m)	549.0	1,861.9	243.6	4.8	89.5	1,837.6
Production-induced (\$m)	52.2	888.1	115.7	2.1	39.4	1,097.5
Consumption-induced (\$m)	64.6	640.0	131.4	3.9	47.8	887.7
Gross Regional Product (\$m)	234.7	1,193.9	222.3	5.8	84.7	1,741.4
Direct (\$m)	175.6	462.9	98.1	2.6	40.5	779.8
Production-induced (\$m)	23.7	381.4	52.4	1.0	18.1	476.6
Consumption-induced (\$m)	35.3	349.6	71.8	2.1	26.1	485.0
Household Income (\$m)	67.0	672.1	136.7	4.0	49.5	929.3
Direct (\$m)	33.2	268.0	64.6	2.2	23.9	391.9
Production-induced (\$m)	16.3	231.8	36.5	0.7	12.7	298.1
Consumption-induced (\$m)	17.5	172.2	35.6	1.1	12.9	239.3

¹ The totals for the whole industry excludes transfers between industry sectors. This ensures no double counting of payments made from one part of the industry to another (and then expended in that other part of the industry).

The contribution of the industry to the economy of New South Wales and Victoria is larger than its contribution to the MRFH region, and the contribution to Australia is larger again, because flow-on effects for New South Wales, Victoria and Australia include spending outside of the region by businesses in the MRFH. Some examples of these expenditures are fuel, communication services, some wood inputs to processors and other services. The contribution of the MRFH softwood

plantation industry to the economy of New South Wales and Victoria in 2021/22 was approximately \$1,927 million in GRP and \$1,010 million in household income (see Appendix 1).

The direct value of output from the industry within the MRFH increased by 44%, GRP by 45% and household income by 85% since previously reported (using data from 2016/17 financial year in Schirmer et al. 2020). This is likely because the data for the 2021/22 financial year was still strongly influenced by salvage and other recovery activities, which were higher than 'normal' levels of activity for the industry, as well as by the higher demand for, and price of, sawn timber output as a result of COVID stimuli applied to the construction sector by Government.

The provision of Government assistance (via various bushfire recovery grants) also allowed processors to continue to operate at higher levels than expected throughout this period despite the large-scale resource loss (for example through providing funding to stockpile more than usual and invest in the restructure of processing operations).

5. Employment generated by the industry

The softwood plantation industry in the Murray Region Forestry Hub generates a large number of jobs in a range of businesses, including nurseries growing seedlings, silvicultural contractors preparing ground for plantings and planting, forest growers managing plantations, harvest and haulage of logs to processors, processing of logs and residues into wood and paper products, and various businesses in between like consultants, mechanics and suppliers of specialty equipment. As well as generating employment locally, the jobs of some people living in other regions depend on the softwood plantations in the Murray Region Forestry Hub.

There have been some complex changes in the industry in recent years, including closures of some processing facilities and reduction of staff due to more advanced technologies being introduced in the processing sector, and an increase in the need for staff in other sectors after the bushfires, particularly in silviculture and nurseries. The employment generated by the softwood industry in the MRFH up to and including primary processing is detailed in this section, focusing on:

- The total number of direct and indirect jobs generated by the industry
- Jobs generated at different points in the supply chain
- Jobs generated in different local government areas (LGAs)

Direct and indirect employment

The MRFH softwood plantation industry generated a total of 2,189 direct jobs up to and including primary processing. This includes all jobs up to and including primary processing located within the region that depend on the softwood plantation industry, as well as those jobs generated outside the region as a result of the growing, harvest, haulage or initial processing of products from plantations located in the MRFH region. A further 9,239 flow-on or indirect jobs were generated as a result of (i) the demand created by the plantation industry for supplies and inputs, and (ii) spending by workers. A total of 11,429 jobs in Australia were therefore supported by the operations of the softwood industry in the MRFH (Table 5).

Table 5 Direct and flow-on employment generated by the MRFH plantation industry, by sector

	Growers (forest manage- ment companies)	Primary wood and paper processing	Harvest & haulage contracting businesses	Other (including consultants, equipment sales, training)	Nurseries, silvicultural & roading contracting businesses	Whole industry
Direct employment	173	1,154	524	29	309	2,189
Production-induced employment	312	3,176	606	14	223	4,189
Consumption-induced employment	405	3,718	771	24	302	5,050
Total employment (direct and flow-on)	890	8,048	1,901	68	834	11,429

Employment by industry sector

Of the 2,189 direct jobs, 22% were generated at the 'growing' stage (in the establishment and management of growing plantations), predominantly in nurseries, silvicultural contracting firms and forest management companies (Table 6). A further 24% was generated by the harvesting of plantations and the transport of logs to processing facilities: this was generated in harvest and haulage companies based within the region. The majority of the direct industry employment – 54% – was generated by the processing of logs into a wide range of products in the multiple wood and paper processors located in the region. Other direct employment (just over 1% of total direct jobs) included jobs in forestry education and training, consulting and jobs in the sale of specialised forest industry equipment.

This survey was undertaken at the tail end of the salvage operation after the 2019/20 bushfires, and as such it is difficult to compare the number of workers with any period where data has been collected previously. Since the previous report (Schirmer et al. 2020), there was a reduction in workers in the processing sector, mainly due to the closure of Norske Skog and Big River Group, the repurposing of one of the CHH sites in Tumut to a log holding facility, and predicted labour efficiencies and productivity improvements. However, the number of workers in the growing of timber (forest managers, nurseries, silvicultural and roading contractors) increased as the replanting efforts began, and workers in the harvest and haulage sector remained relatively stable as salvage continued. The number of workers in each sector was expected to be inconsistent with previous reports, and not what will be expected moving forward after the salvage and recovery operation is complete. It is expected there will be a reduction in workers, particularly in the harvest and haulage sector where the number of contracts available from the main grower in the region has reduced substantially, and possibly further reduction in jobs at processing facilities as sawlog volumes from local growers reduce substantially.

Table 6 Employment generated by the MRFH plantation industry, by industry sector

Industry sector	Employment generated in MRFH region (persons)	Employment generated outside MRFH region (persons)	TOTAL employment generated by MRFH region softwood plantations
Growers (forest management companies) ¹	162	11	173
Nurseries, silvicultural & roading contracting businesses	294	15	309
Harvest & haulage contracting businesses	522	2	524
Primary processing ²	1,149	5	1,154
Other (including consultants, equipment sales, training) ²	27	2	29
TOTAL	2,154	35	2,189

¹Data includes some jobs in nursery sector where a grower had an integrated nursery operation
²The jobs generated in these sectors includes people involved in wholesaling of products produced by these processors.

The flow-on employment generated by the softwood plantation industry in the MRFH includes a wide range of jobs. Economic modelling using the BDO EconSearch RISE model identified employment multipliers generated by the industry (Table 7). The Type II multiplier estimates that for

every direct job supported by the industry in the SWS region a total of 4.0 jobs were supported in the region through a combination of production-induced and consumption-induced effects. This means that a total of 8,646 jobs are directly or indirectly dependent on the softwood plantation industry in the MRFH. This is a notable increase from previous reports (Schirmer et al. 2020) which had a Type II multiplier of 2.8 jobs. The increase was due to a reduction in direct jobs in conjunction with an increase in flow-on jobs. This was a result of an increase in total expenditure by the industry, which supports flow-on jobs, and a decrease in employment within the processing sector.

Table 7 Employment multipliers: indirect employment generated by the MRFH plantation industry

Type of multiplier	Description	Multiplier estimate	Total employment
None	Direct jobs in MRFH only	1.0	2,154
Type I	Direct jobs + production-induced jobs	2.5	5,400
Type II	Direct jobs + production-induced jobs + consumption-induced jobs	4.0	8,646

Employment by local government area

The direct employment generated by the softwood plantations located in different local government areas (LGAs) within the MRFH is shown in Table 8. It also shows the number of jobs generated in NSW and Victoria more broadly, and in regions located further away. The jobs shown are in the number of persons (not FTE) and are based on the worker’s place of residence – in other words, it shows where workers live. This has been done rather than showing jobs based on where a person works, because much of the spending and social activity undertaken by workers occurs near their residence, rather than near their workplace.

The largest number of jobs were located in the Snowy Valleys Council in NSW, with 1,120 jobs directly dependent on the softwood plantation industry, a result of both a large number of jobs in primary wood and paper processing and many forest management and harvest and haulage workers being based in Tumut and Tumbarumba. This was followed by Wangaratta Rural City Council in Victoria (262 workers) and Alpine Shire Council in Victoria (246 workers).

There was a reduction in workers since the previous report (Schirmer et al. 2020) in the City of Albury, Wodonga Council and City of Wagga Wagga, predominantly due to the closure of the Norske Skog mill in Albury and Big River Group in Wagga Wagga. There was also a reduction in workers in the processing sector in the Snowy Valley Council due to both more advanced technology requiring less manual labour at the mills, but also one CHH processing site in Tumut being converted to a log yard with minimal workers.

Table 8 Direct employment generated by the MRFH plantation industry, by local government area

Local government area	Employed in establishing and managing MRFH plantations to point of harvest (nurseries, managers, silvicultural contractors, 'other')	Employed in harvest & haulage of MRFH plantations	Employed in MRFH wood or paper processing	Total number of people directly employed in the MRFH plantation industry	Total size of workforce (ABS 2021)	% total labour force employed in the MRFH forest industry
City of Albury	2	10	0	12	26,344	0.1%
City of Wagga Wagga	7	10	35	52	33,283	0.2%
Greater Hume Shire	15	0	15	30	5,001	0.6%
Cootamundra Gundagai Shire Council	3	0	17	20	4,497	0.4%
Snowy Valleys Council	344	237	539	1120	6,549	17.1%
Other NSW	3	1	0	4	Not analysed	
Strathbogie Shire Council	2	0	15	17	4,925	0.4%
Benalla Rural City Council	4	0	187	191	6,251	3.1%
Wangaratta Rural City Council	34	83	145	262	14,043	1.9%
Indigo Shire Council	5	17	35	57	8,366	0.7%
Wodonga Council	8	63	5	76	20,689	0.4%
Towong Shire Council	25	16	1	42	2,856	1.5%
Alpine Shire Council	25	81	140	246	6,320	3.9%
Mansfield Shire Council	7	5	15	27	4,610	0.6%
Other Victoria	16	1	4	21	Not analysed	
Employment located in other regions (predominantly 'travelling' or non- local workers associated with planting crews)	11	0	1	12	Not analysed	
TOTAL	511	524	1154	2189	143,734	1.5%

Employment trends over time

There are limitations in identifying trends over time, mainly because the MRFH region is relatively new, and employment figures for the region using forestry business survey data has only been completed in 2020 (using 2017 data) and 2023 (this study). In 2017, a total of 2,638 people were dependent on the softwood forest industry in the MRFH region. In 2023, this figure had decreased to 2,189, predominantly due to closures of some large processing facilities and reduction in staff numbers at processing facilities with advanced technology use.

The only consistent employment estimates generated over time for the region are those from the ABS *Census of Population and Housing*; however, Census estimates include employment dependent on native forests and plantations, whereas this study examined plantations only, and Census data

often include haulage contracting employment in the transport sector, rather than in the forest, wood or paper industries. The figures also sometimes include employment in secondary and tertiary processing industries where it is not possible to separate them out. However, given the consistency of employment figures in *ABS Census of Population and Housing*, we have provided an overview of how they have changed over time (Table 9).

Overall, the data from both our study and ABS suggest that the total amount of jobs directly dependent on the forest industry in the Murray Region Forestry Hub has decreased slightly since 2016, from 2,508 to 2,282. This is consistent with the findings from the forest industry survey.

Table 9 Total forest industry employment in the Murray Region Forestry Hub over time – ABS 2006 to 2021

Source	Total forest industry employment: includes all jobs dependent on the softwood plantation, hardwood plantation and native forest industries			
	2006	2011	2016	2021
<i>ABS Census of Population and Housing</i>	2,954	2,593	2,508	2,282

6. Workforce sociodemographic characteristics

Recruiting and maintaining a strong workforce can be a challenge for industries that are based regionally, as many rural and regional areas have a smaller labour force compared to larger urban areas.

In this chapter we first explore the jobs that are offered by the softwood plantation industry in the Murray Region Forestry Hub, including the working hours and income offered compared to other industries, as these working conditions will have an influence on the ability of businesses to recruit new workers as well as to retain their existing workforce.

We then look at the socio-demographic characteristics of workers, focusing on the gender and age composition of the workforce, and employment of people who identify as Aboriginal and Torres Strait Islanders. This provides insight into whether the industry is successfully utilising and ‘tapping into’ all parts of the available labour force in the region.

This chapter uses both forest business survey data and ABS data.

Job characteristics: hours of work

Businesses in the region were asked to report on the proportion of their workforce working full-time, part-time and in casual positions as part of the survey of businesses. The majority of jobs were full-time, with 93% of workers employed in grower businesses being full-time employees, 93% of harvest and haulage contractors, 94% of wood and paper processing workers, and 62% of silvicultural and nursery workers employed full-time (Table 10). Overall, 91% of industry workers had full-time jobs¹, 2% worked part-time and 8% were casual workers. Casual work was more common than part-time work, predominantly in nursery and silvicultural businesses in which casual workers contribute to seasonal activities such as tree planting, but can be assumed that many/most casual workers are working part-time hours.

Table 10 Full-time, part-time and casual work in the softwood plantation industry

	Full-time	Part-time	Casual
Growers	93%	7%	0%
Harvest and haulage contractors	93%	3%	4%
Processors	94%	1%	5%
Silvicultural contracting and nurseries	62%	6%	32%
Whole industry	91%	2%	8%

This is consistent with data from the ABS *Census of Population and Housing for 2021*, which also shows a predominance of full-time workers in most parts of the industry. Table 11 shows that in 2021 a total of 12% of forest industry workers were employed part-time, compared to 37% of the broader workforce in the Murray Region Forestry Hub.

¹ This includes a small number of workers who were subcontracted rather than directly employed: subcontractors typically worked full-time hours.

Table 11 Proportion of workforce employed full-time and part-time, 2006-2021 – ABS Census of Population and Housing

Industry sector (ABS classification)	% workers employed full-time				% workers employed part-time			
	2006	2011	2016	2021	2006	2011	2016	2021
Forestry	85%	86%	85%	84%	15%	14%	15%	16%
Logging	86%	92%	89%	85%	14%	8%	11%	15%
Forestry Support Services	88%	68%	79%	73%	12%	32%	21%	26%
Wood product manufacturing	92%	91%	91%	89	8%	9%	9%	11%
Pulp and paper manufacturing	92%	92%	93%	93%	8%	8%	7%	7%
Forest industry workforce	91%	90%	90%	88%	9%	10%	10%	12%
Employed labour force (all industries)	67%	66%	64%	63%	33%	34%	36%	37%

Data source: ABS Census of Population and Housing, 2006, 2011, 2016 and 2021. TableBuilderPro *Place of Usual Residence* database. Workers who were away from work or did not report their working hours were excluded from the analysis.

Census data were also analysed to identify whether forest industry workers were working high numbers of hours per week: Working long hours (often defined as more than 49 hours per week) has been shown to contribute to negative health and wellbeing outcomes for many workers. Across MRFH workforce as a whole (including all industries, not just the forest industry), 16% of workers reported working more than 49 hours a week in 2021 (Table 12). In the forest industry, however, 29% of workers reported working more than 49 hours per week, with some sectors (logging, forestry and pulp/paper/paperboard manufacturing) having a workforce that worked particularly long hours (likely associated with the salvage operations at the time of the Census). This reflects both the relatively high proportion of people who work full-time in the industry, but also reflects long working hours being typical in some parts of the industry. These long hours can act as a disincentive to workers and reduce retention of workers.

Table 12 Working hours by industry sector, 2006-2021 – ABS Census of Population and Housing

Industry sector (ABS classification)	% workers who worked < 25 hours in week prior to Census				% workers who worked > 49 hours in week prior to Census			
	2006	2011	2016	2021	2006	2011	2016	2021
Forestry	11%	13%	15%	24%	22%	23%	25%	31%
Logging	16%	12%	14%	15%	48%	56%	58%	61%
Forestry Support Services	8%	18%	13%	28%	22%	20%	23%	14%
Wood product manufacturing	8%	8%	7%	13%	19%	15%	18%	17%
Pulp and paper manufacturing	10%	11%	10%	8%	33%	35%	34%	42%
Forest industry workforce	9%	10%	9%	13%	24%	24%	26%	29%
Employed labour force (all industries)	25%	26%	35%	33%	19%	17%	16%	16%

Data source: ABS Census of Population and Housing, 2006, 2011, 2016, 2021, TableBuilderPro *Place of Usual Residence* database. Workers who were away from work or did not report their working hours were excluded from the analysis.

Job characteristics: income

ABS Census data shows that forest industry workers in the Murray Region Forestry Hub generally earned higher incomes than the average for the region. In 2021, only 5% of forest industry workers earned less than \$650 per week, compared to 21% of all workers in the MRFH (Table 13). A total of

53% of forest industry workers in the MRFH earned \$1,250 or more per week, compared to 39% of the overall employed labour force. Much of this difference is due to the higher rates of full-time work in the forest industry, which result in overall higher income per worker on average. To identify whether income in the forest industry is higher than average after taking hours of work into account, the proportion of full-time workers earning low and high income was compared (Table 14). While differences were smaller when comparing only full-time workers, there was a difference in those earning low incomes. Forest industry workers were less likely to earn low levels of income (1% of full-time forestry workers earned less than \$650/week in 2021, compared to 6% of full-time workers across the workforce of the two regions). Some sectors of the forest industry recorded no full-time workers earning less than \$650/week, including the pulp and paper manufacturing sector and the forestry support services sector. There was less difference between full-time workers earning over \$1250/week, with 56% of forest industry workers earning a high wage compared to 54% of full-time workers overall.

Table 13 Income of forest industry workforce, 2006-2021 – ABS Census of Population and Housing

Industry sector (ABS classification)	% all workers earning <\$600/\$650 per week				% all workers earning > \$1299 or \$1250 per week			
	2006 (\$600/wk)	2011 (\$600/wk)	2016 (\$650/wk)	2021 (\$650/wk)	2006 (\$1299/wk)	2011 (\$1250/wk)	2016 (\$1250/wk)	2021 (\$1250/wk)
Forestry	25%	12%	14%	7%	21%	36%	48%	62%
Logging	18%	11%	9%	8%	11%	46%	61%	65%
Forestry Support Services	29%	22%	19%	15%	24%	28%	41%	43%
Wood product manufacturing	33%	14%	11%	4%	7%	16%	31%	38%
Pulp and paper manufacturing	9%	5%	4%	3%	45%	89%	75%	77%
Forest industry workforce	25%	12%	10%	5%	19%	37%	47%	53%
Employed labour force (all industries)	47%	34%	30%	21%	11%	21%	29%	39%

Data source: ABS Census of Population and Housing, 2006, 2011, 2016, 2021, TableBuilderPro *Place of Usual Residence* database. Workers who were away from work or did not report their working hours were excluded from the analysis.

Table 14 Income earned by full-time workers, 2006-2021 – ABS Census of Population and Housing

Industry sector (ABS classification)	% full-time workers earning <\$600/\$649 per week				% full-time workers earning > \$1299 or \$1250 per week			
	2006 (\$600/wk)	2011 (\$600/wk)	2016 (\$649/wk)	2021 (\$649/wk)	2006 (\$1299/wk)	2011 (\$1250/wk)	2016 (\$1250/wk)	2021 (\$1250/wk)
Forestry	20%	8%	4%	3%	21%	36%	54%	69%
Logging	10%	6%	6%	4%	11%	45%	63%	78%
Forestry Support Services	28%	0%	5%	0%	19%	40%	65%	63%
Wood product manufacturing	29%	10%	7%	2%	8%	15%	32%	39%
Pulp and paper manufacturing	5%	3%	2%	0%	48%	71%	77%	78%
Forest industry workforce	22%	7%	5%	1%	20%	35%	49%	56%
Employed labour force (all industries)	31%	17%	12%	6%	15%	29%	40%	54%

Data source: ABS Census of Population and Housing, 2006, 2011, 2016, 2021, TableBuilderPro *Place of Usual Residence* database. Workers who were away from work or did not report their working hours were excluded from the analysis.

Worker characteristics: Gender

The forest industry in Australia has traditionally predominantly employed men, with relatively few women working in the industry (ABARES 2015). Data collected from businesses in the softwood industry in 2023 is consistent with whole of industry proportions from the ABS. However there appears to have been some improvement, particularly with employing female workers who can work part-time or casual hours (however it is unknown if working part-time and casual hours are their choice or only what is offered to them). Shown in Table 15, 17% of the workforce was female (15% of full-time workers and 34% of part-time workers). Employment of women was highest amongst forest management companies (growers), where 23% of workers were female. Only 11% of harvest and haulage contractors were female.

Analysis of 2021 Census data showed that as of 2021 there has been little growth in the proportion of the forest industry workforce who are female, with only around 14% of female workers in the MRFH forest industry (Table 16). This is low in comparison to the broader workforce in the MRFH, with 49% female workers. This suggests the industry is still not successfully accessing the female labour force in the region, with very few of the workers available in the female labour force are being successfully recruited into the forest industry. The lack of attractiveness of the industry to female workers places constraints on the ability of the industry to successfully attract the best workers. The factors affecting female participation in the industry need to be better understood and addressed to enable the industry to more successfully recruit from the large proportion of the workforce that is female.

Table 15 Workforce characteristics: gender

	Male workers	Female workers	Full- time men	Full- time women	Part- time/ casua l men	Part- time/ casual wome n
Growers	77%	23%	80%	20%	20%	80%
Harvest and haulage contractors	89%	11%	93%	7%	25%	75%
Processors	83%	17%	84%	16%	59%	41%
Silvicultural contractors and nurseries	87%	13%	89%	11%	83%	17%
Whole industry	83%	17%	85%	15%	66%	34%

Data source: 2023 survey of MRFH softwood plantation businesses

Table 16 Workforce by gender composition, 2006-2021 – ABS Census of Population and Housing

Industry sector (ABS classification)	% male				% female			
	2006	2011	2016	2021	2006	2011	2016	2021
Forestry	88%	82%	83%	79%	12%	18%	17%	21%
Logging	88%	93%	93%	88%	12%	7%	7%	13%
Forestry Support Services	88%	83%	74%	73%	13%	17%	26%	27%
Wood product manufacturing	86%	87%	89%	86%	14%	13%	11%	14%
Pulp and paper manufacturing	87%	89%	91%	92%	13%	11%	9%	8%
Forest industry workforce	87%	88%	89%	86%	13%	12%	11%	14%
Employed labour force (all industries)	54%	53%	52%	51%	46%	47%	48%	49%

Data source: ABS Census of Population and Housing, 2006, 2011, 2016, 2021, TableBuilderPro *Place of Usual Residence* database. Workers who were away from work or did not report their working hours were excluded from the analysis.

Worker characteristics: Age

Australia's population and its workforce is ageing. Census data in Table 17 suggests that between 2006 and 2021 there has been a faster trend towards an ageing workforce in the forest industry in the MRFH compared to the workforce as a whole in the MRFH. In 2021 the industry had less workers aged under 35 years (28%) compared to the workforce as a whole (35%), and some sectors of the forest industry had more workers aged 55 and older compared to the workforce as a whole, particularly the logging industry with 31% older workers compared to 26% for the workforce as a whole in the region. These trends are consistent with discussions with forest industry businesses in the MRFH, where some businesses highlighted the difficulty in recruiting a younger workforce to continue in the business after existing staff retire.

Table 17 Workforce by age, 2006-2021 – ABS Census of Population and Housing

Industry sector (ABS classification)	% aged < 35 years				% aged 55 and older			
	2006	2011	2016	2021	2006	2011	2016	2021
Forestry	32%	25%	32%	31%	16%	20%	23%	28%
Logging	33%	32%	26%	21%	9%	16%	23%	32%
Forestry Support Services	33%	40%	27%	27%	17%	21%	19%	31%
Wood product manufacturing	37%	34%	30%	27%	13%	17%	11%	30%
Pulp and paper manufacturing	32%	32%	30%	29%	8%	12%	18%	19%
Forest industry workforce	35%	33%	30%	28%	12%	16%	15%	28%
Employed labour force (all industries)	35%	33%	34%	35%	18%	22%	25%	26%

Data source: ABS Census of Population and Housing, 2006, 2011, 2016, 2021, TableBuilderPro *Place of Usual Residence* database. Workers who were away from work or did not report their working hours were excluded from the analysis.

Aboriginal and Torres Strait Islanders

Employment of Aboriginal and Torres Strait Islander peoples was similar in the forest industry to the overall workforce in the Murray Region Forestry Hub (Table 18), and increased slightly between 2006 and 2021.

Table 18 Aboriginal and Torres Strait Islander participation in workforce, 2006-2021 – ABS Census of Population and Housing

Industry sector (ABS classification)	% workforce identifying as Aboriginal or Torres Strait Islander			
	2006	2011	2016	2021
Forestry	0%	4%	1%	4%
Logging	2%	0%	1%	3%
Forestry Support Services	0%	0%	5%	5%
Wood product manufacturing	1%	1%	1%	3%
Pulp and paper manufacturing	0%	1%	2%	3%
Forest industry workforce	1%	1%	1%	3%
Employed labour force (all industries)	1%	1%	2%	3%

Data source: ABS Census of Population and Housing, 2006, 2011, 2016, 2021, TableBuilderPro *Place of Usual Residence* database. Workers who were away from work or did not report their working hours were excluded from the analysis.

7. Industry recruitment challenges and skills needs

This chapter examines the workforce needs of the softwood plantation industry in the Murray Region Forestry Hub region, focusing on recruitment of skilled workers and contractors, and the skills and training needs in the industry. First, a description of the recruitment needs and key recruitment challenges for businesses is examined (based on survey results and discussions with forest industry businesses), followed by a summary of the key skills and training needs for the industry (based on a study conducted by ForestWorks, 2023).

Recruiting workers and contractors

Businesses were asked about the positions that they had open at the time of the survey (2023), whether they had been advertised or not and for how long, and how easy or difficult they found it to recruit different types of workers and contractors. They were also given the opportunity to further describe the vacancies in more detail, or the difficulties in filling positions currently or in the future.

Across the different businesses surveyed there were several positions advertised but not filled at the time of the survey:

- Growers: There were approximately 20 positions that had been advertised but not filled. This includes managers, foresters, forest operations supervisors, machine operators, field staff and finance managers/book-keepers, along with some positions for managers and field staff that were not yet advertised. The advertised positions had been open for between 4 weeks and 2 years. It is estimated that there will be over 30 further positions that will need to be filled by 2030.
- Processors: There were over 35 positions that had been advertised but not filled, including managers, sawmill/paper and pulpmill operators, specialised technicians, finance managers/book-keepers and WHS staff. These positions had been advertised for between 3 weeks and 9 months. There were also approximately 10 positions that had not yet been advertised, and an estimate of over 80 positions that will need to be filled by 2030.
- Contractors: There were several heavy machine operator positions advertised across harvest, haulage, roading and silvicultural contractors. They were advertised for between 3 and 12 months, with some not yet advertised. It is estimated there will be a need for a variety of positions to be filled in this sector by 2030, from managers through heavy machine operators and field staff, and administrative staff and finance managers.

The types of staff that were most challenging to recruit amongst businesses that were surveyed were managers and high level professional staff, foresters and forest operations supervisors, with 100% of relevant businesses reporting that it is very difficult or difficult to recruit these types of workers (Figure 4). Specialised technicians (such as mechanics and machinists) and heavy machine operators were also reported as being particularly difficult to recruit, followed by transport/drivers, finance managers/book keepers, IT staff and sawmill/paper and pulpmill operators. Field staff/forest workers and administrative staff were least difficult to recruit across the businesses surveyed.

When asked to elaborate on any challenges with recruiting the following points were highlighted:

- There was a general consensus about the difficulty across all sectors in finding suitably qualified staff for the positions that need to be filled.

- There will be difficulty in the future in attracting and retaining younger employees
- There is a need for an increased focus on training and developing skills in existing staff
- There are increasing issues with accommodation and high school opportunities in the region, which is a limiting factor in attracting skilled staff with families to the MRFH
- Processors in particular reported that finding managers or high level staff was difficult, while growers reported that finding foresters was difficult.
- Contractors overall highlighted the need for machine operators across harvesting, haulage, roading and silviculture. While Silviculture contractors find it easy to recruit field staff, they find it more difficult to recruit suitably qualified staff with specialist skills. While some haulage contractors said that it was easy to recruit drivers, it is much harder to retain good ones.

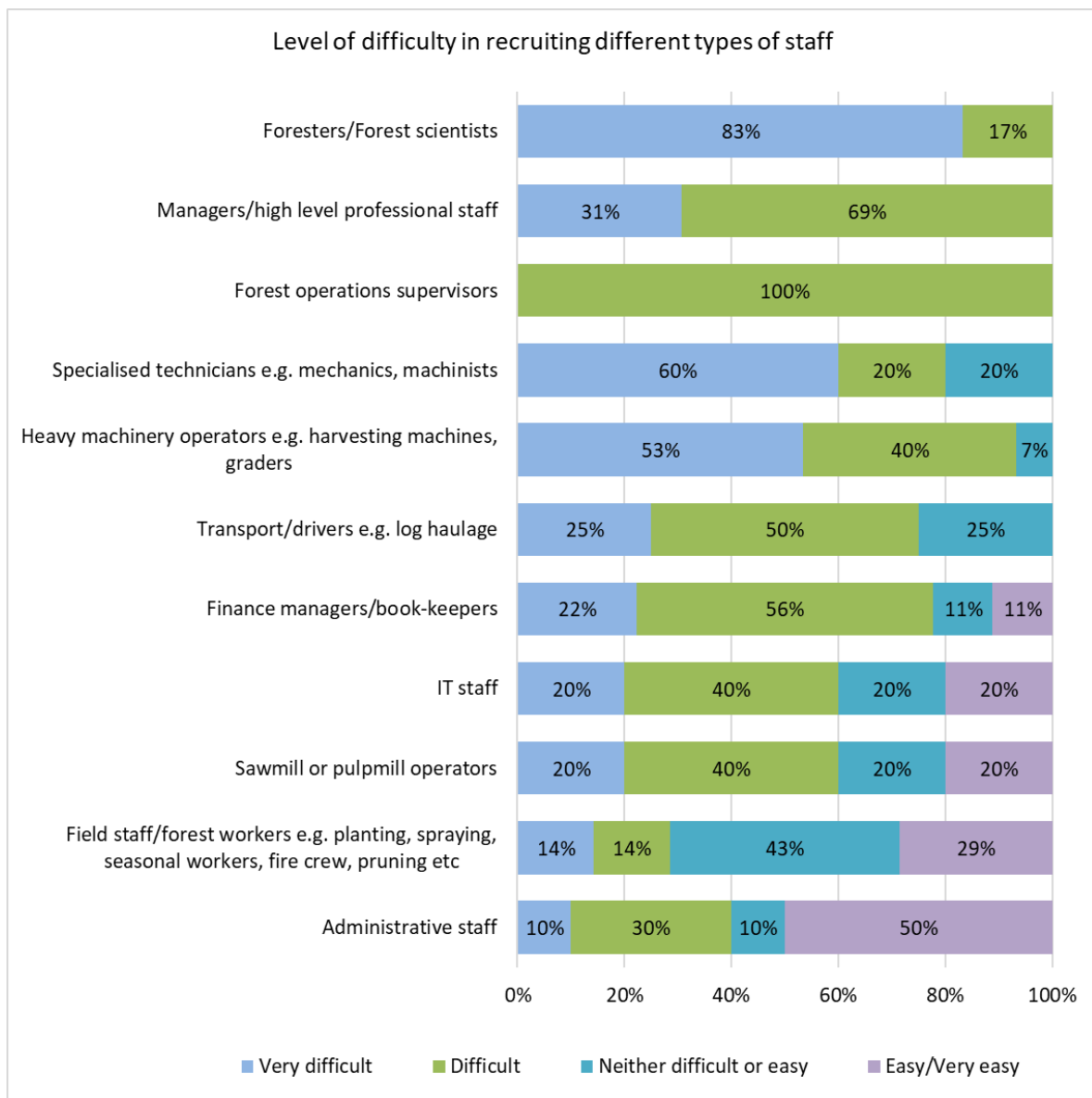


Figure 4 Level of difficulty involved in recruiting different types of workers, as rated by softwood industry businesses in the MRFH region

Industry skills and training needs

The softwood plantation industry needs workers with a diverse range of skills in order to function effectively. ForestWorks (2023) was engaged by the Murray Region Forestry Hub to examine the current and future skills and training needs of the forestry and wood products industry within the MRFH. ForestWorks used both qualitative interviews and quantitative survey data, as well as a desktop review, to identify gaps in the workforce, skills needs and training opportunities, and the challenges associated with recruiting and retaining workers. As the ForestWorks project was completed around the same time as this project, questions about skills and training needs were not included in the forest business survey. Instead, we provide a summary of the findings:

- Consistent with the findings from the forest business survey, ForestWorks (2023) found that the industry is currently struggling to fill essential skilled positions, particularly in roles such as qualified foresters/forest managers, heavy machine operators, diesel mechanics, truck drivers, boiler operators, engineers and mechanical fitters.
- Key challenges in recruiting required labour include competition for labour in other industries in the region, an ageing workforce and difficulty recruiting younger workers, and challenges associated with the COVID pandemic. Businesses will increasingly need to recruit from outside the region, but attracting people into the MRFH has its own challenges.
- In future years the main need for labour will be in the nursery, silviculture/planting and forest growing sectors, as the large area of burnt land will need to be replanted. Meanwhile, demand for harvest and haulage positions is unlikely to increase.
- The ageing forest industry workforce creates a particularly challenging situation, where businesses need to attract a younger workforce while slowly losing the current skills, knowledge and relationships as more forest industry workers retire.
- Over the coming years businesses identified the need for particular training and skills development within the industry, particularly around technology and digital skills in the forest management, harvest and haulage and silviculture sectors (for example use of GIS, remote sensing and other digital software/interfaces), leadership skills in the forest management sector and quality control skills in the processing sector. Other skills that require constant renewal across the sectors (for existing and new staff) include first aid, WHS, firefighting, chemical application, chainsaw operation and 4WD.
- Industry training is often guided by legislative, regulatory or licencing requirements, but forest businesses also considered skills development important for career development, to ensure a quality product/service and to ensure a flexible and efficient workforce.
- New workers usually receive on-the-job training, as well as external training where needed. Harvest and haulage operators place less emphasis on external accreditation, and more on building skills internally from existing skilled operators. There are a number of challenges faced by employers when it comes to training requirements, including the time cost associated with training, a lack of locally available courses and qualified trainers for what is needed, changes in training needs and a lack of numbers to run courses.
- Key recruitment challenges include a shortage of qualified applicants, public perception of the industry, poor access to housing, schools and suitable employment for family members. Seasonal work presents its own challenges in recruiting a seasonal workforce, and some professions require a long period of time to gain the skills needed to become qualified/experienced.

8. Business and market outlook, needs and challenges

Businesses were asked about the business and market conditions and challenges they were experiencing at the time of the survey. These questions help identify the key areas in which the industry is going well versus experiencing some challenges, and provide some insight into the areas in which investment may be needed to maintain a successful industry into the future post-bushfire.

Overall business conditions

First, businesses were asked 'how would you describe business conditions for your business at the moment?' Of the 21 businesses who completed this question, only 9% felt that conditions were 'easier than usual', while 52% reported they were 'more challenging than usual' and 38% that they were 'about the same as usual'. Growers and harvest and haulage contractors were most likely to indicate that business conditions were more challenging than usual, while all but one of the processors indicated that conditions were about the same. Roading and silvicultural contractors reported a mix.

For some businesses, particularly silvicultural businesses, the bushfires had a positive impact on the types of services they provide. When asked what was going well for businesses where conditions were easier than usual, businesses indicated that there was more work since the bushfires as there is still cleanup work to do, and there is good cash flow.

Businesses who indicated that conditions were more challenging than usual were asked to describe what challenges they were facing. The responses were varied, and included loss of mature resource/log supply, staff recruitment and retention, challenges experienced across the supply chain caused by COVID-19 and rising input costs.

Business performance

Businesses were asked to self-rate their business profitability, ability to service their business debt, and cash flow. When asked to rate their profitability, on a seven point scale from 'making a large loss' to 'making a large profit' with 'breaking even' in the middle:

- None of the businesses reported making a large or small loss
- One business reported making a moderate loss
- Four reported they were breaking even
- Seven reported making a 'small profit'
- Seven reported making a 'moderate profit'
- None reported making a 'large profit'.

All industry sectors were similar in their response, although the harvest and haulage sector reported less profit, and more 'breaking even'.

When asked to rate how easy or difficult it was to service their business debt, a measure of the financial stress a business may be under, 18 businesses chose to answer the question. One business reported that it was difficult to service their debt, and 7 businesses reported that it was easy or very easy to service their debt. Ten businesses reported that it was neither difficult or easy to service their debt.

When asked about cash flow, another useful measure of short-term financial stress, eight of the 17 businesses who answered this question reported having 'good' or 'very good' cash flow. Five businesses reported having neither good or bad cash flow, and three reported having poor cash flow.

Overall this suggests that most businesses are reasonably confident in their profitability and not experiencing substantial financial stress.

Future business expectations

Businesses were asked how likely or unlikely it was that in the next year they would invest in new business systems or new capital equipment; reduce or increase their workforce; grow their business revenue or increase business profitability. In total, 20 businesses answered these questions (Figure 5):

- A total of 47% of businesses felt they were likely to grow their profitability, and 44% that revenue would grow, with only 16% and 22% respectively feeling their business was unlikely to achieve these two things in the next 12 months.
- Most businesses felt their workforce would remain stable over the next 12 months, although there may be a slight reduction in the overall workforce as only 16% of businesses expected to increasing workforce size while 25% expected to reduce their number of workers.
- Only 47% of businesses were likely to invest in new capital or new business systems in the next 12 months.

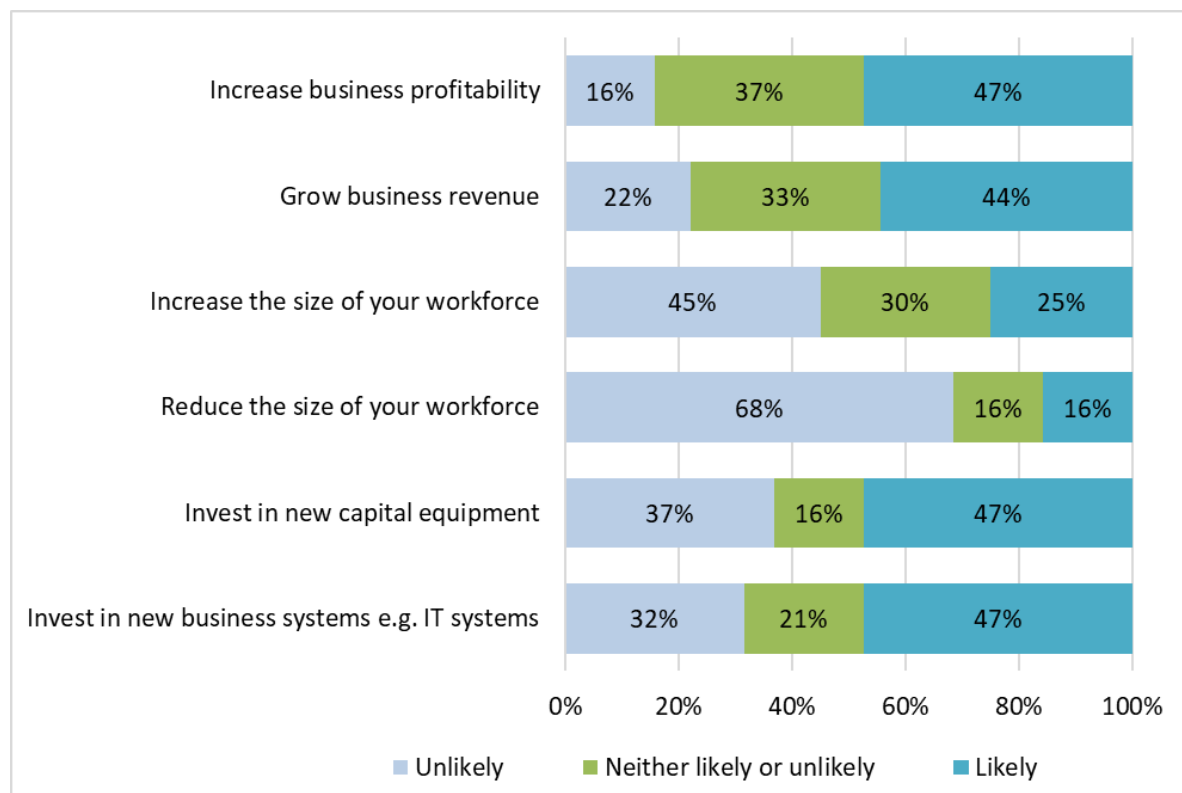


Figure 5 Expectations for business revenue, profitability, workforce size and investment over the next 12 months

When businesses were asked what factors would enable them to invest more in their business, growers reported that increased availability of agricultural land to grow more plantation would

enable them to invest more, while processors reported a growth in market demand and improved prices for product would enable them to invest more. Contractors reported that new/more contracts as well as subsidies and training opportunities locally would help them invest more in their business.

Businesses were also asked whether they felt that, over the next 12 months, demand for their services or products were likely to grow, remain about the same, or shrink. Of 20 businesses who answered this question:

- Only 3 felt demand would grow
- 12 felt demand would remain the same
- 5 felt demand would shrink.

Businesses were also asked whether they would expect to see their revenue and their number of employees decrease, increase or have no change (given the adjusted long-term log volumes available from the region). Of the 20 businesses that answered this question:

- 58% reported that they would expect a decrease in revenue, and 26% a decrease in the number of employees
- 26% reported that they would expect no change in revenue, and 63% expected no change in number of employees
- 16% reported that they would expect an increase in revenue, and 11% expected an increase in the number of employees.

Businesses that expected an increase in revenue or employees were mostly silvicultural businesses.

Business challenges

Businesses were asked 'what factors would trigger you to downsize or close your business?'. Answers to this question were related to decreased demand for products or services, increasing wood prices being too high for the product, reduction in resources after the bushfires, an ageing workforce, and a decreasing employee base.

Businesses were then asked to rate the extent to which different factors had been a challenge or problems for their business in the last three years. Of the 20 businesses who completed these questions, including most of the largest employing businesses in the MRFH softwood plantation industry, the most common challenges in the last three years were the 2019/20 bushfires (70% of businesses saying this was a big problem) difficulty obtaining labour (63%), rising input costs (55%), rising labour costs (47%) and lack of supply of resource due to the bushfires (47%) (Figure 6). Difficulty accessing some markets and lack of demand for goods produced were not reported as a big problem by any businesses.

Bushfire impacts and lack of resource due to the bushfires were reported as a challenge for businesses fairly equally across all sectors of the industry, while rising input costs and rising costs of labour were more commonly reported by wood and paper processors and contractors than by growers.

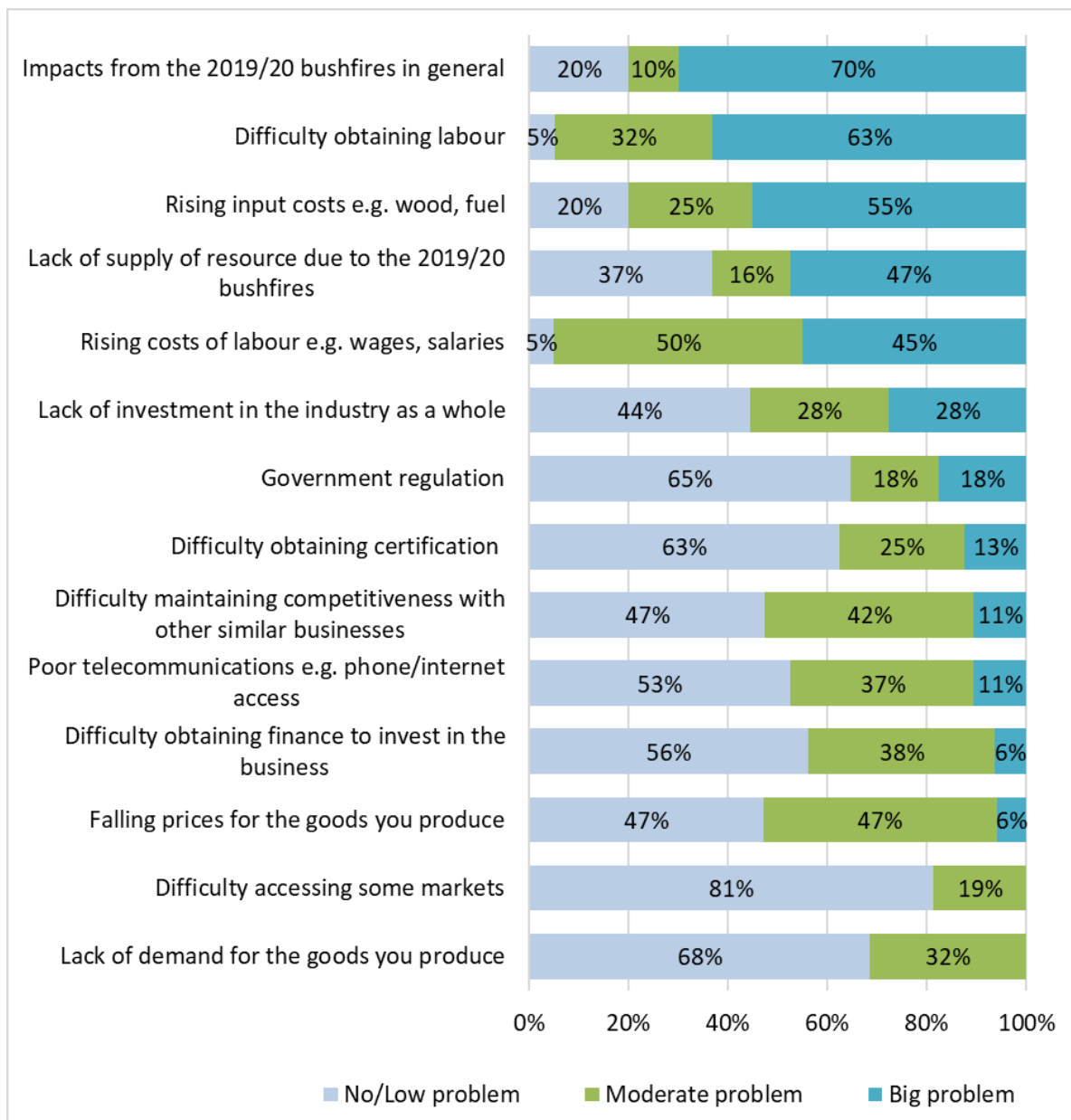


Figure 6 Challenges experienced by softwood plantation businesses in the MRFH

Future business needs

At the tail end of the salvage period the softwood plantation industry in the Murray Region Forestry Hub area is overall looking positive, with most businesses reporting good business conditions and future outlook. However, as the reality of a reduced resource becomes clearer, it is important to gain a deeper understanding about what the business needs are moving forward into the future. Businesses will be interviewed in more depth as part of this study to better understand what businesses in the industry see the future looking like, what their particular business needs are moving forward, what they would like to be able to do for their business in the future, how they can be helped to achieve those goals, and any resourcing challenges that might prevent this from happening. A subsequent short report will include the results from this qualitative collection of future business needs data. In addition, an update of the social and economic data is proposed to capture how businesses are going after the salvage period is complete.

9. Conclusions

The Black Summer bushfires of 2019/20 had significant impacts on the softwood plantation industry in the Murray Region Forestry Hub, as well as having a variety of impacts on businesses, individuals and communities within the region. There is limited understanding about what the industry looks like during a large-scale salvage operation, with this report providing insight into the social and economic contributions of the Murray Region Forestry Hub soon after the bushfires. This report also provides some initial insight into how businesses in the various sectors of the forest industry are regarding the future for their operations. A subsequent proposed study will examine how the industry is going once settled into a 'new normal' state of restricted resource supply, before replanted trees begin to provide any product.

The findings of this report reinforce the importance of the softwood plantation industry to the Murray Region Forestry Hub economy, particularly during challenging conditions after the 2019/20 bushfires when many other industries were struggling. With support from state and federal Governments after the bushfires, the forest industry generated significant numbers of jobs and economic benefit within the MRFH during the salvage operations, directly employing 2,189 people and bringing in an estimated \$1,452 million in direct net expenditure.

The industry in the Murray Region Forestry Hub continues to employ more people full-time and with higher overall wages than the workforce as a whole but is still not successfully accessing the female labour force in the region, with very few of the workers available in the female labour force are being successfully recruited into the forest industry. Another challenge for the industry is the ageing workforce and difficulty in attracting and retaining younger people, particularly in the harvest and haulage, and silviculture sectors.

There is ongoing difficulty in finding suitably qualified staff locally, and when they are employed, retaining them. This increases the need to use outsourced professionals from outside the region, unless the industry can overcome the challenges of getting these professionals into the region. Being able to provide employment opportunities for partners/spouses as well as quality housing and schooling when relocating employees into the region is needed in order to attract more high-level skilled workers in to the region, and encourage existing workers to remain in the region. The types of staff most challenging to recruit amongst forest industry businesses were managers and high-level professional staff, foresters, forest operations supervisors, specialised technicians, heavy machine operators and transport/drivers.

Most businesses reported confidence in business outlook despite the 2019/20 bushfires, however many businesses are still going through the recovery process, with many reporting that they are not likely to invest in the business in the next few years. Some sectors of the industry have seen a significant expansion and investment in their businesses as a result of the bushfires, particularly nurseries and silviculture contractors. One of the key challenges facing the industry into the future is difficulty sourcing fibre inputs from plantations in the region, with the transport costs of bringing in fibre from other regions a significant challenge. Lack of additional fibre within economic transport distance reduces the ability of mills to invest and expand in order to maintain competitiveness.

While harvesting of the timber resource and processing of locally sourced timber in the region will be reduced for some time, and many businesses are continuing to face challenges associated with

the bushfire impacts, recruitment of workers and increasing input costs, businesses overall are reporting good business conditions and are confident in their business outlook.

Overall, this study has revealed that the industry responded strongly to the resource losses imposed by the 2019/2020 bushfires. Levels of activity increased during the salvage and recovery phase, with increased levels of resource throughput for all sectors. Support from state and federal Governments was designed to assist a level of restructuring to enable the industry to adjust to a 'new normal' phase of operations with reduced levels of fibre resource available. The industry has demonstrated resilience and innovation after the bushfires and is facing the future with a degree of optimism.

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Appendix 1 Study methods

This Appendix describes the methods used to collect and analyse data in the study, focusing on the three key methods used:

- Survey of the Murray Region Forestry Hub softwood plantation industry (SE NSW and NE Vic)
- Analysis of data from the Australian Bureau of Statistics
- Economic modelling.

Industry survey

Questionnaire design

Most of the content of the questionnaire was designed for the 2017 studies, and described in more detail in Schirmer et al. (2018a). The survey was revised for this project after consultation with (i) the Murray Region Forestry Hub and (ii) BDO Econsearch. Consultation with local industry representatives ensured the questions were designed to be relevant to the Murray Region Forestry Hub and captured experiences from the 2019/20 bushfires.

The questionnaire included questions on the following topics:

- Dependence on softwood plantations: This enables identification of the amount of employment and economic activity generated by each of these sectors
- Employment by local government area. This enables identification of how much the economy of different LGAs depends on the forest industry
- Key business activities including area of forest/plantation managed, harvested, hauled, and volume of wood and fibre inputs and outputs. This enables analysis of different sectors of the industry
- Supply chain linkages, with businesses asked to identify their key suppliers and customers. This enables spatial tracing of the flow of wood and paper products
- Worker recruitment needs
- Business and market outlook, including plans for investment or downsizing, to identify the overall likely near-term future for the industry
- Impacts from the 2019/20 bushfires.

Survey scope

To produce robust and up-to-date data on employment and economic value of the industry, all businesses involved in the growing, managing, harvesting, transporting or primary processing of commercial softwood wood or paper products in the region were asked to take part in the survey. The survey was designed to capture all initial processing of logs into wood and paper products, as well as processing of log residues produced as part of one manufacturing process into wood or paper products. It did not include jobs dependent on native forests or on already manufactured wood or paper products imported from other regions into the Murray Region Forestry Hub.

Sampling

As at 5 May 2023 a total of 103 businesses were attempted to be contacted in the Murray Region Forestry Hub area. These were all the businesses believed to possibly be within the survey scope (operating in the softwood industry within the Murray Region boundaries, up to and including primary processing). These included:

- Plantation management agencies/businesses
- Nurseries
- Silvicultural contractors
- Harvest and haulage contractors
- Wood and paper processors
- Other businesses, including sales, consultants and training.

The list of businesses was obtained via past business lists, ForestWorks business lists, observing responses to early surveys (e.g. where processors source their timber, or where growers send their timber), discussions with forest businesses, and review from the Hub. Not all initial businesses were expected to be within the scope, as some businesses were expected to have closed down, or some would not be within the project boundaries or scope. The business list evolved throughout the data collection period as businesses were contacted and spoken to.

A total of 17 of these businesses confirmed they were no longer working in the industry or were outside the scope of the study, and 5 had their data captured elsewhere (e.g. where a company manages on behalf of another). A further 18 businesses are suspected not to operate in the industry or are outside the scope of the study through second hand information, because their phone number no longer worked and there were no alternatives, or an online search indicated that the business had closed.

A total of 63 businesses were considered within the scope of this study, of which 51 were spoken to directly. The remaining were uncontactable, despite several attempts at contact via phone, email and post, where possible.

Of the 63 businesses believed to be operating in the industry in the region, 37% completed the full survey or most of the survey, including all but 2 large businesses employing more than 50 people. Of the 40 who did not complete the full survey (predominantly small businesses employing fewer than 10 people), 40% provided partial information or verbal information by phone. Information on the remaining businesses were estimated based on information provided by industry experts and industry research.

Analysis

Survey data were analysed using Microsoft Excel and SPSS. A key part of the analysis process was using available data to impute employment and expenditure data for those businesses who did not participate in the survey.

To ensure employment and expenditure estimates could be accurately imputed for those businesses who did not participate in the survey, we prioritised surveying those businesses whose answers could enable estimation of economic activity in businesses that did not participate in the survey. In particular, the survey was designed to capture data enabling estimation of employment in the

contracting sector, as contracting businesses were least likely to take part in the survey. Plantation managers were asked to identify their level of spending on silvicultural, harvest and haulage contracting. Plantation managers and others with expertise in the contracting sector were also asked to provide information on the size of different contracting businesses. These data were used to impute employment and expenditure estimates for the contracting businesses who did not complete these questions on the survey.

Economic modelling

The estimates of regional economic contribution presented in this report use a model known as the RISE model (Regional Industry Structure and Employment).

The RISE model has input-output analysis at its core. Input-output models provide a detailed picture of the structure of an economy at a particular point in time. The model provides a basis for analysis of inter-sectoral relationships within the economy. Accordingly, this makes the model ideal for regional impact and regional contributions analysis.

The RISE model format was originally developed by BDO EconSearch Pty Ltd as a user-friendly Excel based tool for use by regional development analysts in South Australia. BDO EconSearch was contracted to develop a set of easy to use regional impact models that could assist regional planning at both a state and regional level.

The first set of South Australian models were commissioned by the Regional Communities Consultative Council in 2004. They were updated in 2007 for the SA Department of Trade and Economic Development, and updated again in 2010, 2013 and annually since for the SA Department of Premier and Cabinet.

BDO EconSearch also developed a set of RISE models at the local government area (non-metropolitan) and regional level for the Victorian Department of Primary Industries in 2010. These models were updated in 2013 for the Department of Environment and Primary Industries.

BDO EconSearch has also developed many one-off, single region RISE models for a range of socio-economic impact analysis projects throughout Australia including a number in NSW. RISE models of the Murray Region Forestry Hub area in 2018-19 were used in this project to assess the economic contribution of the forestry industry in the Murray Region Forestry Hub and at state level.

The Murray Region Forestry Hub region model consists of the local government areas of the City of Albury, City of Wagga Wagga, Greater Hume Shire, Gundagai Shire Council, the Snowy Valleys Council (amalgamated from the former Shires of Tumut and Tumbarumba) in NSW, and Alpine Shire Council, Benalla Rural City Council, Indigo Shire Council, Mansfield Shire Council, Strathbogie Shire Council, Towong Shire Council, Wangaratta Rural City Council and Wodonga Council in Victoria.

RISE Model Extensions

The RISE model can be distinguished from the standard input-output model through a number of features or add-ons that allow for more realistic assessments of regional economic impacts. These include the following:

Price Response Model - One of the key limitations of a standard input-output model is its lack of flexibility to take into account different scenarios of market response and regional adjustment for impact analysis. The price sensitive RISE model is a development of the conventional input-output model which provides for non-linearity in production in both primary and intermediate inputs. The model extension delivers results (e.g. multipliers and simulated impacts) that are more closely aligned with CGE modelling yet with greater rigour and credibility for analysis at a local scale.

Demographic Economic Model - The RISE model has also been extended as demographic-economic (DECON) models. The two key characteristics of the DECON model, when compared with a standard economic model, are as follows.

1. The introduction of a population 'sector' (or row and column in the model) makes it possible to estimate the impact on local population levels of employment growth or decline.
2. The introduction of an unemployed 'sector' makes it possible to account for the consumption-induced impact of the unemployed in response to economic growth or decline.

Tourism Satellite Accounts – The tourism industry is not defined as a separate industry in the standard industry classification system used by ABS and others. The ABS has developed a set of "satellite accounts" at the national level and a process that can be adopted at the regional level to better define the tourism industry. This process has been adopted in the RISE model so that tourism industry impacts can be directly assessed.

Overview of economic concepts

Economic activity indicators: the primary focus of this report is the generation of economic activity resulting from the forestry industry. The key economic activity indicators considered in the analysis are gross regional product (GRP) and employment.

Gross regional product (GRP): is a measure of the contribution of an activity to the regional economy. The direct GRP of an industry is measured as value of gross output (business revenue) less the cost of goods and services (including imports) used in producing the output. In other words, it can be measured as the sum of wages and profits. It represents payments to the primary inputs of production (labour, capital and land). Using GRP as a measure of economic impact avoids the problem of double counting that may arise from using value of output for this purpose.

FTE: is an indicator of employment and measures a worker's involvement in a project or industry activity. An FTE of 1.0 means that the person is equivalent to a full-time worker, while an FTE of 0.5 signals that the worker is only half-time.

Categories of economic activity in the forestry supply chain

A useful way to think about economic activity and economic impact (as measured by GRP and employment) is to refer to the supply chain (Figure A1.1).

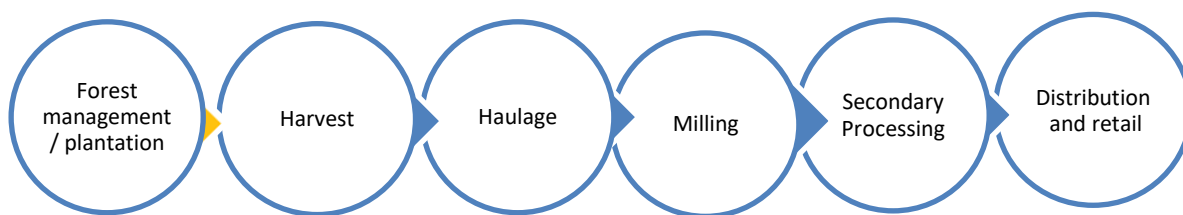


Figure A1.1 Forestry industry supply chain

Broadly speaking, each economic indicator has four levels of economic impact across the economy. For example, with respect to employment:

1. Direct employment – this is employment in those firms, businesses and organisations that are directly engaged in forestry activity. In this study this includes:
 - a. Plantation/ Forest management
 - b. Harvesting & haulage
 - c. Paper production and sawmilling
2. First round employment – refers to employment in firms that supply inputs and services to the ‘direct employment’ businesses, i.e. those categorised under point 1 above.
 - a. Forestry-input sectors including all inputs used by forestry such as fuel, electricity, water and chemicals
 - b. Forestry service sectors
 - c. Packaging for timber processing
 - d. Business support services
 - e. Other inputs.
3. *Industrial-support employment* – is the term applied to ‘second and subsequent round’ effects as successive waves of output increases occur in the economy to provide industrial support, as a response to the original forestry industry expenditure, i.e. the activity in sectors that provide goods and services to those businesses that supply directly to the forestry industry. This category excludes any employment associated with increased household consumption.
4. *Consumption-induced employment* – is the term applied to those effects induced by increased household income associated with the original forestry industry expenditure. The expenditure of household income associated with all three categories of employment (direct, first round and industrial-support) will generate economic activity that will in itself generate jobs.

In this report we use the terms ‘direct’, ‘production-induced’, ‘consumption-induced’, ‘flow-on’ and ‘total’ to describe the economic impacts across the economy:

- ‘production-induced’ = the combination of the first round impact and the industrial support impact (2+3)
- ‘consumption-induced’ = the consumption-induced impact (4)
- ‘flow-on’ = the combination of the consumption-induced and production-induced economic impacts (2+3+4)

- ‘total’ = the combination of all the economic impacts in the economy, i.e. the combination of the direct and flow-on economic impacts (1+2+3+4)

These categories are illustrated in Figure .

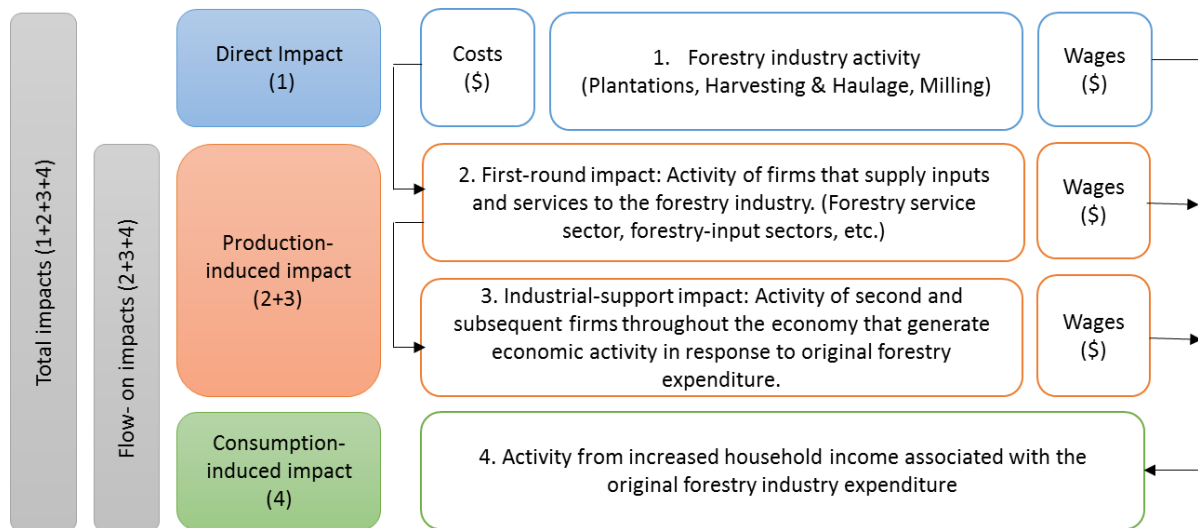


Figure A1.2 Levels of economic impact across the economy

The direct, flow-on and total economic contributions (GRP and employment) are provided for 5 sectors of the forestry industry and the industry as whole:

1. Growers (forest management companies)
2. Harvest & haulage contracting businesses
3. Wood and paper processing
4. Other (including consultants, equipment sales, training)
5. Nurseries, silvicultural & roading contracting businesses
6. Whole Industry (excludes transfers)

Limitations

The economic consequence of the presence of the forestry industry will be felt in many aspects of activity in the regions, ranging from levels of regional output, income and employment, to land prices (including residential, commercial and industrial land), house and building prices, local government rates, supply and demand of labour, demand and supply of urban infrastructure and so on. Unfortunately, fully comprehensive models that include all aspects of regional economic activity and economic phenomena have not been satisfactorily developed for impact analysis at a regional level in Australia.

Results

Table A1.1 Economic impacts of the MRFH plantation industry, by sector, on the MRFH region, on New South Wales and Victoria, and on Australia

	Growers (forest management companies)	Wood and paper processing	Harvest & haulage contracting businesses	Other (including consultants, equipment sales, training)	Nurseries, silvicultural & roading contracting businesses	Whole Industry (excludes transfers)
Murray Region Forestry Hub						
Output (\$m)	665.8	3,390.1	490.7	10.8	176.7	3,822.7
Direct (\$m)	549.0	1,861.9	243.6	4.8	89.5	1,837.6
Production-induced (\$m)	52.2	888.1	115.7	2.1	39.4	1,097.5
Consumption-induced (\$m)	64.6	640.0	131.4	3.9	47.8	887.7
GRP (\$m)	234.7	1,193.9	222.3	5.8	84.7	1,741.4
Direct (\$m)	175.6	462.9	98.1	2.6	40.5	779.8
Production-induced (\$m)	23.7	381.4	52.4	1.0	18.1	476.6
Consumption-induced (\$m)	35.3	349.6	71.8	2.1	26.1	485.0
Household Income (\$m)	67.0	672.1	136.7	4.0	49.5	929.3
Direct (\$m)	33.2	268.0	64.6	2.2	23.9	391.9
Production-induced (\$m)	16.3	231.8	36.5	0.7	12.7	298.1
Consumption-induced (\$m)	17.5	172.2	35.6	1.1	12.9	239.3
Employment (total)	664	6,655	1,510	51	620	8,649
Direct (total)	162	1,149	522	27	294	2,154
Production-induced (total)	223	2,842	456	8	145	3,246
Consumption-induced (total)	279	2,664	532	15	181	3,248
New South Wales and Victoria						
Output (\$m)	713.1	3,479.6	537.1	13.3	209.3	4,041.0
Direct (\$m)	558.3	1,865.1	244.2	5.2	95.4	1,856.7
Production-induced (\$m)	75.6	876.0	138.6	3.2	51.8	1,145.1
Consumption-induced (\$m)	79.2	738.5	154.3	5.0	62.2	1,039.2
GRP (\$m)	258.5	1,311.3	247.6	7.3	102.3	1,927.0
Direct (\$m)	181.4	498.0	100.5	2.9	44.2	827.0
Production-induced (\$m)	33.4	406.3	62.4	1.6	24.0	527.7
Consumption-induced (\$m)	43.7	407.0	84.7	2.8	34.1	572.2
Household Income (\$m)	77.5	721.1	147.5	4.9	59.3	1,010.3
Direct (\$m)	34.2	269.2	64.9	2.3	26.4	397.0
Production-induced (\$m)	21.8	250.8	40.5	1.2	15.8	330.0
Consumption-induced (\$m)	21.5	201.1	42.2	1.4	17.0	283.2
Employment (total)	778	7,269	1,710	62	767	10,311
Direct (total)	173	1,154	524	29	309	2,189
Production-induced (total)	267	2,978	523	12	195	3,844
Consumption-induced (total)	337	3,137	663	20	263	4,277
Australia						
Output (\$m)	762.7	4,054.4	648.9	15.9	250.4	4,820.8
Direct (\$m)	558.3	1,865.1	244.2	5.2	95.4	1,856.7

Production-induced (\$m)	96.9	1,191.8	196.6	4.1	72.2	1,561.6
Consumption-induced (\$m)	107.4	997.5	208.1	6.6	82.9	1,402.5
GRP (\$m)	283.7	1,558.1	302.8	8.5	123.0	2,276.2
Direct (\$m)	180.4	463.1	98.5	2.8	43.7	788.5
Production-induced (\$m)	44.6	550.3	90.7	2.1	34.0	721.6
Consumption-induced (\$m)	58.7	544.7	113.7	3.6	45.3	766.0
Household Income (\$m)	90.8	847.8	176.1	5.5	69.9	1,190.0
Direct (\$m)	34.2	269.2	64.9	2.3	26.4	397.0
Production-induced (\$m)	27.9	313.7	55.7	1.4	21.3	420.0
Consumption-induced (\$m)	28.7	264.9	55.5	1.8	22.2	373.0
Employment (total)	890	8,048	1,901	68	834	11,429
Direct (total)	173	1,154	524	29	309	2,189
Production-induced (total)	312	3,176	606	14	223	4,189
Consumption-induced (total)	405	3,718	771	24	302	5,050