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Faculty of Science
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Culture, Training and Skills Assessment Report

Prepared for the North-North West Tasmania Regional Forestry Hub

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Key terms and acronyms

Term/acronym	Definition
ABARES	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
AFEA	Australian Forest Education Alliance
AFPA	Australian Forest Products Association
AISC	Australian Industry and Skills Committee
ANZSIC	Australian and New Zealand Standard Industrial Classification
AQF	Australian Qualification Framework
ARC	Australian Research Council
ASQA	Australian Skills Quality Authority
Assessment requirements	Used to assess satisfactory completion of units of competency
CAR	Comprehensive, adequate and representative
CFV	ARC Centre for Forest Value
CISC	COAG Industry and Skills Council
CNC	Computer numerical control
COAG	Council of Australian Governments
CSAW	Centre for Sustainable Architecture in Wood
Endorsed components	Training packages components having a qualification, units of competency, assessment requirements and credit arrangements
FEF	Forest Education Foundation Inc.
FPA	Forest Practices Authority
FSC	Forest Stewardship Council
FWP	Forest and wood products
FWPA	Forest and Wood Products Australia
GIS	Geographic information system
IRC	Industry reference committee
IT	Information technology
LFS	Labour Force Survey

LVL	Laminated veneer lumber
MIS	Managed investment scheme
NASP	New Apprenticeship Scholarship Program
NCC	National Construction Code
NHVR	National Heavy Vehicle Regulator
NIFPI	National Institute for Forest Products Innovation
NRM	Natural Resource Management (region)
PFT	Private Forests Tasmania
Qualification	Aligns with the AQF - Certificate I to Advanced Diploma, and Graduate Certificate and Graduate Diploma
RTO	Registered training organisation
SSO	Skills services organisation
STEM	Science, technology, engineering and maths
TAEN	Tasmanian Agricultural Education Network
TAFE	Technical and further education
TFFPN	Tasmanian Forest and Forest Products Network
Training package	Occupational skills standards defining skills and knowledge needed to effectively perform workplace job
TSDS	Training and Skills Development Service
Units of competency	Specifies standard of performance required in the workplace
UAV	Unmanned aerial vehicle
UTAS	University of Tasmania
VET	Vocational education and training
VR	Virtual reality
WFTN	Women in Forests and Timber Network
WHS	Work health and safety

Executive summary

The North-Northwest Tasmania Regional Forestry Hub (the Hub) was established in 2019 as part of the Australian Government's 2018 National Forest Industries Plan: *Growing a Better Australia – A Billion Trees for Jobs and Growth*¹ to support growth in the renewable timber and wood fibre industry. The Hub, in consultation with industry, community and government stakeholders, has identified four priority themes aimed at delivering against the Commonwealth's objectives under the Plan.

Priority Themes

1. Access to land and land use policy for plantation forest investment
2. Supply chain and infrastructure
3. Climate change and carbon policy
4. Culture, skills and training

The University of Melbourne has been engaged by the Hub to deliver this report addressing the fourth of the four priority themes: ***Culture, skills and training***.

The Hub has advised that it will consider the opportunities and recommendations identified in this report alongside any recommendations identified in relation to the remaining three priority themes. The Hub will then develop implementation plans commensurate with priority opportunities and funding.

The objective of this report is to assess how factors relating to industry culture, skills and training impact the current state, opportunities and barriers to expansion within the forest growing and forest processing sectors in Tasmania. The study involved extensive analysis of published and unpublished literature, and stakeholder consultation through an online survey and interviews with people from key parts of the sector.

The analysis found those leading Tasmania's forest sector aspire for it to be a high-quality, high-technology industry employing more highly skilled workers. This suggests that the sector can build on Tasmania's strong positive association with forests and the timber industry, and the global view of timber as a renewable, environmentally friendly and low-carbon product, to attract investment capital and a new generation of more highly qualified workers. A strong and vibrant forest management and forest products sector can contribute towards creating more resilient and secure employment opportunities for communities across Tasmania while contributing towards Australia's greenhouse gas reduction and environmental sustainability goals.

Challenges

Achieving this vision will require a major transformation from the current workforce, which is older, less educated and lower skilled than the forest sector workforce in other states or other Tasmanian industries. Levels of educational attainment in some regions of Tasmania are substantially lower than the Australian average. To attract more highly skilled, knowledge-based staff the sector faces strong competition for qualified personnel in an increasingly mobile national workforce with evolving expectations of their workplace. The sector also faces challenges receiving public recognition for the positive contributions it makes to the Tasmanian economy and society. This includes challenges in meeting changing community

¹ DAWR, "Growing a Better Australia – a Billion Trees for Jobs and Growth," (Canberra 2018).

expectations on environmental issues, including community concerns about native forest management and conversion of agricultural land to plantations.

Employment in the forest sector in Tasmania has declined substantially. Approximately 5175 people were employed directly and indirectly in the sector in 2016, which is 55% below 2006 levels (Table 18). Decline in sector employment varied between regions, for example, reductions in people working in wood and paper product manufacturing were highest in the Cradle Coast region, largely due to closure of the Burnie and Wesley Vale paper mills. Tasmania currently has a lower proportion of jobs in timber processing than other states due to the relatively small amount of secondary processing in the state². According to an industry survey conducted in 2017-2018, 41% of jobs in the forest industry in Tasmania depend on the growing, harvest and transport and processing of native forest timber³.

Uncertainty over the future of the sector has been an issue in attracting and retaining staff. In the early 2010s, many machine operators and labourers left for higher paid jobs in mining or construction. This trend may restart with major investment in infrastructure announced in the 2020-2021 Federal Government budget.

The retention of older workers and delayed retirement means there are limited career progression opportunities for younger workers, further reducing the pool of management ready skilled workers as older workers retire or reduce their work hours. Low literacy and numeracy skills in the current workforce are a barrier to accessing skills and training opportunities and improving productivity and performance. Lack of diversity in the industry workforce was identified as having a negative effect on attracting new staff and on prospects for growth within the industry. Attracting younger people to the sector is vital. However, the industry does not effectively promote the benefits of forest-relevant training in developing a broad skill set applicable to other workplaces. Negative perceptions of forestry mean it is not seen by many as a preferred career.

Wood supply and capital investment in processing drive industry activity and employment. Native forest timber production has declined, and hardwood and softwood plantations now provide 78% of wood to industry in Tasmania. Much of this plantation wood is exported as semi-processed woodchips. The plantation area in Tasmania has remained stable over the last 10 years. Plantation log supply is forecast to rise to 4.8 million m³ over the next 10 years and then to decline if no new plantations are established.

Maintaining the plantation area and wood supply will be a major challenge on less productive areas where some landowners have options to convert plantation land to agricultural use after harvesting. Adding value and generating employment opportunities through processing lower quality plantation and native forest logs will require new technology and investment.

Community attitudes towards forestry practices remain mixed. People like wood but the production process is often hidden with misconceptions about management practices and harvesting technologies, and environmental impacts. Current environmental accreditation standards do not carry much weight

² J. Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania," (Canberra: Forest and Wood Products Australia 2018).

³ Ibid.

with the broader population. While many in the industry believe the industry does not promote itself very well, this is not simply an ‘information deficit’ problem.

Opportunities

The sector can work together to promote its ecological stewardship and fit with Tasmania’s branding as a low-carbon, clean, green producer of natural products, involving creative and entrepreneurial people to drive economic growth. This can be supported by integrating timber production with agriculture and conservation, investing in innovation, and demonstrating and measuring the sector’s contribution to restoring and enhancing ecological functions of landscapes through natural capital accounting.

Improving employment and environmental outcomes in regional areas can attract new capital from investors focused on positive social and environmental impacts. In doing so, the sector needs to move beyond rhetoric, and encourage society to do the same, by demonstrating its genuine commitment to continuing change based on evidence and proactive engagement with all stakeholders. Moving beyond the ‘culture of conflict’ over forests in Tasmania will be important in creating a positive environment for investment and employment.

Moving beyond the ‘culture of conflict’ over forests in Tasmania will be important in creating a positive environment for investment and employment

Increasing participation by women and underrepresented minorities can attract a greater pool of talent, increase productivity and efficiency, generate new perspectives and opinions, and increase profitability and workforce resilience. The Australian Forest Industry Diversity and Inclusion Charter developed by the Australian Forest Products Association is a positive model for developing supportive and inclusive workplaces for people from diverse backgrounds.

Attracting younger workers to the sector can be promoted by building on successful collaborations between industry partners on programs to showcase forests and the forest industry to school age children, educators and career path planners, and by providing opportunities for school leavers to enter the industry.

Tasmania, and the sector, can take advantage of the COVID-19 situation, which is driving a trend for city-based workers to move to regional communities for greater personal freedom and quality of life. The sector can provide more flexible work opportunities and bring new people and thinking, encouraging local innovation.

Skill gaps and future needs

Across the sector, heavy machine operators and managers and high-level professional staff are the most difficult to recruit and retain, while it is easier to find and retain administrative workers and finance manager/bookkeeper positions. There is a need for staff with advanced information and communication technology skills specialised to the industry, high-level business management and financial skills, and high-level cognitive and interpersonal skills, including critical thinking, problem solving and systems thinking. Other skill gaps include community relations and engagement capacity, occupational health and safety,

and ecology and silviculture skills in growing and forest management. Compliance training and marketing and sales skills are the most needed skills within post-harvest/processing operations.

Future skill development needs identified in the assessment included:

- Digital technologies in forest management and harvesting, including mobile applications to access digital maps and other forestry field data and the collection and integration of forestry data using unmanned aerial vehicles (UAV)
- Competency for applying environmental care principles and procedures in forest operations to achieve outcomes sought by native and plantation forest management organisations
- Skills in farm forestry and agroforestry that are required to meet expectations for increased integration of trees in rural landscapes and farm operations.

Training

Tertiary-level training opportunities in Tasmania are limited. For example, the sector has difficulty recruiting trained forestry graduates to work in the state and some are recruiting graduates from non-traditional areas such as agricultural science or plant sciences.

Accredited vocational training options are provided in a national system covering Timber and Wood Processing, Forest Management and Harvesting, Timber Building Solutions and Pulp and Paper Manufacturing. This is not meeting industry needs. Enrolments in forest sector related vocational qualifications more than halved between 2015 and 2019, from around 3090 enrolments in 2015 to around 1500 enrolments in 2019. Stakeholders indicated the need for major curriculum review with concerns that the system is complex and difficult to navigate, presenting many obstacles and impediments to formal skill development. Cost, time and location are also significant barriers to accessing training, particularly for smaller operators. Interstate training has been affected by COVID-19 restrictions.

Low retention rates for Tasmanian high school students to year 12 constrain capacity to train locally-recruited staff for positions requiring higher levels of literacy or numeracy. Many staff are trained 'on the job', reflecting lower levels of post-school education. Availability of skilled trainers is a significant barrier to accessing training. On-the-job training is becoming increasingly challenging with technological change and the growing need for more complex management skills.

Recommendations

The following recommendations reflect the findings from this report, particularly around opportunities and barriers to expansion of Tasmania's forestry sector.

1. Identify and engage with key stakeholders to promote the sustainability of wood and timber products and to demonstrate commitment to continuing improvement based on evidence and positive public engagement. This will improve the profile of forestry and promote the diversity of employment opportunities available within the industry.
2. Encourage industry awareness of community attitudes towards forestry and the need for compliance with environmental care and sustainability principles and active promotion of training in these areas in forest management and harvesting.
3. Support the collection of more contemporary data on workforce and employment to inform industry decisions on employment and skills needs, and to identify factors leading to loss of skilled operators.
4. Support a review of the curriculum and provision arrangements for the vocational training sector and the development of a Workforce Development Plan. This would ensure training is relevant to industry needs and aligns with career pathways. Additionally, support the provision of more flexible training delivery arrangements, including modular training programs and remote learning. The Workforce Development Plan could also support the case for more investment in qualified trainers. In this context, continue and enhance industry support for the Arbre Hub.
5. Within the Workforce Development Plan align training to future jobs and export markets involving more on-island processing, and more innovation and sale of value-added products. This will mean the development of skills and training pathways that do not currently exist, for example analysis of big data, new processing technology, changes to supply chain operations, as well as marketing and management skills.
6. To address the projected demand for forestry workers with high level tertiary skills, investigate options for embedding forestry relevant units and streams within allied degrees within the School of Natural Sciences and Tasmanian Institute of Agriculture at the University of Tasmania. Additionally, investigate options for introducing graduate certificate level qualifications in forestry, especially given the scarcity of tertiary undergraduate places.
7. Support the further development of the ForestWorks Training and Skills Development Service (TSDS); funding currently terminates in 2021.
8. Support maintaining and expanding funding for school-based programs, for example, Cadet Forester and Forest Education Foundation, and pre-vocational programs with primary and secondary schools to improve understanding of the breadth of employment opportunities in the sector and to build a connection to future employees at all levels.
9. To address the lack of diversity in the workforce and encourage greater participation by women, encourage promotion of the benefits of diversity across the forestry sector and a culture within the industry that is supportive of diversity. Promote the forest industry within the wider community as a diverse, inclusive and innovative workplace.

10. Support development of a website where information about forests and forest careers is attractive and easy to access (see for example the New Zealand forestry careers website <https://www.forestrycareers.nz/about-us/the-forestry-story/>).
11. Support staff participation in programs to develop leadership skills, such as the Australian Rural Leadership Foundation, and use alumni to promote the benefits of forest training for a broad skill set applicable to other workplaces. Support the integration of training in people management, commerce, financial literacy and business management.
12. Support training for rural landowners and others in agribusiness about the financial and farm benefits of integrating trees on farms. This could include farmer-based peer learning programs such as the Master TreeGrower Program, online programs, seminars and briefings for farm agronomists and advisors. Support the incorporation of farm forestry and basic forestry concepts in university agricultural degrees and investigate options to introduce graduate certificate level qualifications in forestry.
13. Support an increase in postgraduate research in Tasmania as part of a broader knowledge and innovation system with the University of Tasmania (UTAS) and CSIRO.
14. Support industry to pursue government funding opportunities such as the \$1.2 billion funding announced in the 2020-2021 Federal Government Budget to support new apprenticeships and traineeships.

1. Introduction

The North-Northwest Tasmania Regional Forestry Hub (the Hub) was established in 2019 as part of the Australian Government's 2018 National Forest Industries Plan: *Growing a Better Australia – A Billion Trees for Jobs and Growth*⁴ to support growth in the renewable timber and wood fibre industry.⁵ The objective of the Hub is to support the capacity of the forest industry in north and northwest Tasmania to meet long-term increases in demand for timber by consulting with stakeholders across the forest value chain to identify and progress industry and regional priorities. This report was commissioned by the Hub to strategically assess how factors relating to industry culture, skills and training impact the current state, opportunities and barriers to expansion within the forest growing and forest processing sectors in Tasmania.

The forest industry in general faces challenges arising from changing community attitudes and increased community concern about native forest management and the conversion of land formerly used for agriculture to plantations,⁶ as well as labour and workforce challenges including an increasingly mobile workforce, competition for high-quality personnel and evolving expectations of a modern workplace.⁷

This report provides a strategic assessment of culture, skills and training for the Hub. The approach involved extensive analysis of published and unpublished literature, and stakeholder consultation through an online survey and interviews with people from key parts of the sector including forest growing and management, harvesting and haulage, processors, training providers (including school-based programs), industry service bodies, industry associations and the state government. Secondary timber processors, such as furniture and cabinet-makers, were outside the scope of the assessment.

1.1. Objectives

The objectives of this assessment were to:

- (a) Report on the current state of culture, skills and training within the forest and wood products industry in Tasmania and identify factors limiting growth for the future
- (b) Identify the culture, skills and training opportunities and barriers for the forestry and wood products industry in Tasmania
- (c) Analyse and report on the constraints within culture, skills and training that affect the productivity and efficiency of the forestry and wood products industry in Tasmania.

Factors examined in this assessment include:

- (a) Demographics and trends in the labour market
- (b) Current education, training and skills programs and future requirements for workforce development and career pathways to attract and retain employees and promote growth

⁴ DAWR, "Growing a Better Australia – a Billion Trees for Jobs and Growth."

⁵ Braden Jenkin, R. Keenan, and L. Bull, "Tree Plantation Investment and Partnerships in Australia: An Analysis of Past Experiences," (Melbourne 2018).

⁶ N. M. Anderson, K. J. H. Williams, and R. M. Ford, "Community Perceptions of Plantation Forestry: The Association between Place Meanings and Social Representations of a Contentious Rural Land Use," *Journal of Environmental Psychology* 34 (2013). <https://doi.org/10.1016/j.jenvp.2013.02.001>.

⁷ Forest and Wood Products Australia, "Strategic Plan 2019 – 2024," (2019).

- (c) Constraints on the labour market
- (d) Emerging opportunities for new skills and employment based on new technologies
- (e) Current knowledge of community attitudes, social licence and industry culture and stakeholder perceptions of how these impede or promote growth in the forest industry.

The forest and wood products industry in Australia is comprised of six sub-sectors organised within two broad sectors, the Forestry sector and the Timber Processing and Products sector.⁸ Sub-sectors within the Forestry sector include:

- Forest Growing and Management – the management of commercial plantation estates, native forests and farm forests primarily to produce wood and wood fibre
- Harvesting and Haulage – the harvesting of forests for timber products and pulpwood, rough-hewn products and firewood. This sub-sector includes businesses that haul or transport logs and other forest products, produce woodchips in the field or gather forest biomass.

The Timber Processing and Products sector has four sub-sectors:

1. Sawmilling and Processing – includes primary processing of harvested logs into a range of products using sawing, peeling and chipping processes. Products include sawn timber, woodchips and basic pulp and paper products
2. Timber Manufactured Products – primary processing of timber sourced from sawmills and other upstream timber processing enterprises to manufacture wooden structural components/systems and other timber products, including prefabricated timber building systems for the construction market
3. Wood Panel and Board Production – also referred to as secondary processing, includes the manufacture of wood panel from woodchips, sawdust, wood shavings, slabwood or off-cuts. The manufacture of products from logs or sawn timber, such as laminations of timber (glulam and I-beam) from veneer and sawn timber is included in this sub-sector
4. Timber Merchandising – this sub-sector has two channels of operation: (1) the retail and trade merchants selling and providing advice to the public, DIY market and builders, and (2) wholesalers, manufacturers, importers and exporters selling, importing and/or exporting large volumes of hardwood and softwood products for distribution through the merchant sector or directly to the building industry.

Enterprises within the industry vary in size and scale, from small to large enterprises, and from those operating in one sector alone, to those with a high degree of vertical integration operating across multiple sectors.⁹

⁸ Skills Impact, "IRC Skills Forecast and Proposed Schedule of Work 2019-2022," (Prepared on behalf of Forest Management and Harvesting IRC, Timber and Wood Processing IRC and Timber Building Solutions IRC for the Australian Industry and Skills Committee (AISC), 2020).

⁹ ForestWorks, "Companion Volume Implementation Guide Fwp Forest and Wood Product Version 6.0 " (July2020).

1.2. Tasmanian context

Tasmania has a population of 510,000, located in 29 local government areas, with a median age of 42.¹⁰ On average, the population is older, with lower education attainment and a higher proportion born in Australia than the national average. Population is more regionally distributed than most mainland states. About half of the state's population lives in southeast Tasmania, in the greater Hobart area. The state's economy depends heavily on mining, tourism, fisheries and aquaculture, forestry, and primary industries.¹¹ Manufacturing (including secondary forest products) makes the greatest contribution to economic output in the region (\$10.7 billion per annum or 16.6% of total output). Tourism directly and indirectly generates \$2–3 billion per annum, about 10% of the state's gross state product. Health Care and Social Assistance is the largest employer (31,714 jobs, 14.7% of total employment). Real economic growth was relatively stagnant until 2015 but increased between 2015 and 2019. Unemployment has fluctuated at between 6% and 7% of the workforce in the past few years, about 1% higher than the national average.¹² In September 2020 total employment across all industry sectors in Tasmania was estimated to have fallen by 2%¹³ following the introduction of social lockdown measures to manage the COVID-19 pandemic, although the negative impacts of the pandemic are expected to lessen as lockdown measures are eased.¹⁴

Seventy-three percent of Tasmania is under native vegetation cover, with high connectivity across the landscape compared with other parts of Australia. With 1900 native plant species, 34 native terrestrial mammals, 159 resident terrestrial bird species, 21 land reptiles, 11 amphibians and 44 freshwater fish, Tasmania is a hotspot of botanical diversity and endemism (the restriction of native flora and fauna species to a specified region or locality).¹⁵ Conservation of biodiversity is provided for in a systematic reserve system on public land, a voluntary private land reserve system and management prescriptions in production forests. Over 40% of the state is formally protected in reserves, including the Tasmanian Wilderness and Macquarie Island World Heritage areas. More than 600 plant and animal species are listed under the *Threatened Species Protection Act 1995* (Tas).

¹⁰ ABS

https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/6?opendocument

¹¹ REMPLAN <https://app.remplan.com.au/eda-tasmania/economy/industries/value-added?state=QbYZha!Vv5whZXg6Uam7lllwxDO0lzTOfpE4hkE0EAta989GfWfOdHJfelww3GS1Qx>

¹² Ibid.

¹³ Total employment across all local industry sectors in Tasmania was estimated to be 215,294 prior to the introduction of social lockdown in response to the COVID-19 pandemic. Total employment across all industry sectors in Tasmania was estimated to be 211,072 in September 2020.

¹⁴ REMPLAN <https://app.remplan.com.au/eda-tasmania/economy/covid-19/impact-on-employment?state=jw1zhv!3MLrcBMp0CBpALLH9zMBJh3TAflqzFafOfzObHefBI114qIZ1M>

¹⁵ DPIPWE, "Vulnerability of Tasmania's Natural Environment to Climate Change: An Overview," (Hobart: , 2010).

1.3. The Tasmanian forest industry, current and future trends

In 1997 the Regional Forest Agreement established the comprehensive, adequate and representative (CAR) reserve system. Policy agreements between national and state governments recommended that at least 15% of the pre-1750 distribution of each forest ecosystem should be reserved within the CAR reserve system.¹⁶

In June 2016, Tasmania had 3,052,000 ha of native forests, which was estimated to be 63% of the extent of native forests in 1750. Twenty-seven per cent of native forest is in private ownership and 58% of forests are protected in formal or informal reserves on public and private land. Fifty native forest communities have been classified and mapped of which 39 have at least 15% of their estimated pre-1750 extent protected in reserves. Seven communities, mainly dry eucalypt types on private land, have less than 7.5% of their pre-1750 extent protected in reserves.¹⁷

In 2018–2019 the plantation estate in Tasmania was 309,700 ha, of which 233,900 ha was hardwood (89% shining gum (*Eucalyptus nitens*), 8% Tasmanian blue gum (*E. globulus*) and 3% blackwood (*Acacia melanoxylon*)) and 75,800 ha softwood plantations (primarily *Pinus radiata*).¹⁸ Total plantation area has remained relatively constant over the past decade, increasing by just 500 ha between 2008–2009 and 2018–2019. In 2018–2019 almost all plantations in Tasmania were privately owned (83%), primarily institutional owners, with 11% publicly owned, and the remaining in joint-venture or lease arrangements with rural landowners.¹⁹ The private estate contributed 75% to the state's forestry production in 2018–2019.²⁰ While the state has been less cleared than other parts of Australia, significant areas of cleared land in the state are potentially suitable for expanding forests.²¹

The forest production sector is diverse, including wood and fibre production from public and private native forest, hardwood and softwood plantations, and farm trees and agroforestry. Economic activities include primary production and processing into sawn timber, woodchips, pulp and paper and further processing into 'secondary' products, including glue laminated beams, cross laminated timber panels, veneers, glue laminated products, figure and craft timber, windows and doors, furniture and joinery, and hardwood flooring.²²

1.3.1. Trends in native forest harvesting

Timber production and timber processing have undergone considerable change since 2009. Due to changing market conditions and state government policies, public native forest available for harvest decreased by about 33% in the period 2011–2016, from 563,000 ha to 376,000 ha, with a significant

¹⁶ FPA, "State of the Forests Tasmania 2017," (Hobart, Tasmania: Forest Practices Authority, 2017).

¹⁷ Ibid.

¹⁸ R. Downham and M. Gavran, *Australian Plantation Statistics 2020 Update*, ABARES Technical Report (Canberra: Australian Bureau of Agricultural and Resource Economics and Science, 2020).

¹⁹ Ibid.

²⁰ Private Forests Tasmania Annual Report 2018-19

https://www.treealliance.com.au/_data/assets/pdf_file/0019/260542/PFT_Annual_Report_2018-19.pdf

²¹ A Lyons "Plantation Potential of Cleared Land in Tasmania. Report to Private Forests Tasmania, March 2011," (2011).

²² Tasmanian Timber <https://tasmaniantimber.com.au/products-applications/>

reduction in the volume of timber harvested from native forests.²³ Across all tenures, the average native forest area approved for harvesting annually under forest practices plans during 2011–2016 (7800 ha) was less than one-third of that reported during 2006–2011 (26,300 ha).²⁴

Between 2008–2009 and 2017–2018, total log removals from native forest declined from 3.7 million m³ to 1.3 million m³. Hardwood plantation removals increased from 1.2 million m³ to 3.0 million m³ and softwood plantation log removals from 0.9 million m³ to 1.5 million m³ during the same period. The proportion of wood for industry coming from native forests declined from 65% to 22% over the 10 years from 2008–2009 to 2017–2018.²⁵

In 2015–2016, the forest industry directly and indirectly contributed around \$615 million to Tasmania's gross regional product (\$314 million directly) and 3076 direct jobs and a further 2651 indirect jobs. The amount generated from native forest businesses was \$146 million, with a further \$244 million from softwood plantations and \$225 million from hardwood plantations. Regionally, \$151 million was generated in the northwest (Cradle Coast) region, \$235 million in the Northern region and \$171 million in the Southern region. While native forests provided 22% of wood supply, they supported 41% of direct and indirect jobs. Jobs in the forest sector declined by about 55–57% between 2006 and 2016.²⁶

Native forests are harvested and regenerated using a range of silvicultural systems. Systems for wet eucalypt forests include clearfelling followed by seed-based regeneration, seed-tree and/or habitat-tree retention, 'variable retention' retaining habitat clumps, and islands and shelterwood systems in high altitude areas. Dry native forests are managed using selection harvesting systems, including group or gap selection, thinning and potential sawlog retention.²⁷

Non-timber forest products include honey, tree ferns, seeds and game. In 2016 there were seven commercial honey operations and 215 registered beekeepers, a 23% increase on 2010.²⁸ Other important economic forest values include tourism, energy, and water and catchment services.

1.3.2. Trends in plantation log supply

Reports of plantation log availability in forestry regions in Australia are published every five years by the Australian Bureau of Agricultural and Resource Economics (ABARES) under the auspices of the National Plantation Inventory. Forecasts of the future availability of logs from plantations by region help understand the scale of activity in forest production, harvesting and processing and hence the likely demand for skills in the sector. The most recent report, which covers the period 2015–2059, considered the state of Tasmania as one region.²⁹

²³ FPA, "State of the Forests Tasmania 2017."

²⁴ Ibid.

²⁵ ABARES 2019 Australian Forest and Wood Products Statistics

<https://www.agriculture.gov.au/abares/forestsaustralia/australian-forest-and-wood-products-statistics>

²⁶ Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania."

²⁷ Montreal Process Implementation Group for Australia and National Forest Inventory Steering Committee, "Australia's State of the Forests Report 2018," (Canberra: ABARES, 2018).

²⁸ FPA, "State of the Forests Tasmania 2017."

²⁹ ABARES, *Australia's Plantation Log Supply 2015–2059* (Canberra: Australian Bureau of Agricultural and Resource Economics and Science, 2016).

The forecast plantation log availability for Tasmania, expressed as an average for each five-year period (in '000 m³ a year), is shown in Table 1.

Table 1 Forecast plantation log availability in Tasmania, average per year per five-year period from 2020 to 2059

Category	Average yearly plantation log availability per 5-year period ('000 m ³)							
	2020–24	2025–29	2030–34	2035–39	2040–44	2045–49	2050–54	2055–59
Hardwood								
Pulplog	3,106	4,357	2,335	2,808	4,287	2,002	2,261	2,648
Sawlog	117	370	449	429	513	480	480	474
Softwood								
Pulplog	647	590	597	640	572	649	614	546
Sawlog	580	651	681	1023	623	625	595	625
Overall total	4,450	5,968	4,062	4,900	5,995	3,756	3,949	4,293

Source: ABARES (2016)³⁰ p. 55

The 2015–2059 forecasts are based predominantly on 2014–2015 plantation areas and on the assumption that harvested areas will usually be replanted with the same type of plantation species. Potential changes in the productivity of future rotations (e.g. from reduced water availability and climate change) have not been considered in the forecasts.

For Tasmania, the modelled 2015–2059 forecasts indicate:³¹

- Total log availability is forecast to increase in the medium term, from 4.45 million m³ a year in 2020–2024 to just under 6 million m³ a year in 2040–2044
- Hardwood plantations managed for sawlog production are forecast to peak at around 513,000 m³ a year in the period 2040–2044
- The plantation hardwood pulplog availability is expected to vary widely in the period 2015–2059. Availability is forecast to be around 3.1 million m³ a year for the 2020–2024 period, rising to peak at 4.4 million m³ per year in the period 2025–2029. This rise is forecast to be followed by a period of decline before again peaking at 4.3 million m³ in 2040–2045
- The softwood sawlog availability is forecast at around 580,000 m³ a year in the 2020–2024 period, peaking in the 2035–2039 period at around 1 million m³ a year.

Given the forecast of an increase in plantation log supply in the medium term, it can be assumed that forest harvesting is likely to increase concomitantly. The forest industry therefore is likely to need greater access to skilled operators and new technologies for the harvesting and processing of plantation logs. At the same time, the increased level of harvesting will present an increased area for re-establishment for which skilled operators and improved technologies will be essential to maintain the productivity of the

³⁰ Ibid.

³¹ Ibid.

plantation estate. However, the above forecasts do not account for any impacts of the COVID-19 pandemic for the forestry and wood processing sectors (see Section 1.4).

1.3.3. Trend – climate change

Projections of future climate change in Tasmania indicate changes in rainfall patterns, temperature increases, increased intensity of extreme rainfall events and drought, increased potential evapotranspiration and elevated periods of high fire risk.³² While increased temperatures and drying climates are likely to negatively impact on tree growth and mortality in other parts of Australia, in Tasmania rainfall reductions are projected to be relatively modest and in areas with consistent rainfall timber production may increase, particularly if plantation species can increase photosynthetic rates under elevated CO₂.³³

Other potential impacts of climate change on Tasmania's forests include:³⁴

- In terms of future growth potential, marginal sites with lower rainfall and shallow soils and low fertility are likely to become more marginal, more susceptible to insect pests and experience higher mortality. It may be necessary to deploy alternative species or varieties of existing species better suited to future conditions, combined with suitable silvicultural management to achieve acceptable production on such sites. Alternative species may have less capacity to produce wood, but they may be less likely to completely fail or suffer from high mortality, presenting the grower with greater certainty. Research in this field is a gap for Tasmania
- Repeated fires in production native forests may drive a shift in species composition from current high value species like *Eucalyptus obliqua*, *E. regnans* and *E. delegatensis* to more fire tolerant, lower value species
- Increased days with high fire danger and reduced periods during the year to safely undertake prescribed burning will increase risks of losses due to bushfires in native forests and plantations. More effort will be needed for fire surveillance and rapid bushfire suppression. Alternative fuel reduction approaches will be required.

Such projections indicate the need for skilled scientists to research ways to mitigate the impacts of climate change on the extent and productivity of the forest estate designated for timber production, and the need for skilled operators to establish, manage and monitor the forest estate in the face of aforementioned challenges. New skills are required to develop different silvicultural strategies, and to improve the capacity of the industry to detect and manage pests and diseases and manage fire within forests.

1.3.4. Environmental sustainability and social licence

Wealth, education, increasing environmental consciousness and changing consumer demands have increased the need for businesses to demonstrate the environmental sustainability of their practices and the environmental integrity of their products. This issue has been expressed to some degree in the term

³² <https://www.climatechangeinaustralia.gov.au/en/>

³³ R. Keenan, Z. Ryan, and H. Stewart, "Climate Change and Carbon Policy: Assessment Report Project Plan. Report to the Northern Tasmania Regional Forestry Hub," (Melbourne: The University of Melbourne, 2020).

³⁴ Ibid.

'social licence to operate', which has gained prominence over the past decade to describe the activities that, although legal, require community approval to continue, develop or expand. All sectors of the forest and wood products industry, whether associated with native forests, plantations or imports, are confronted with issues and interest groups that could undermine their social licence.

Forest and Wood Products Australia, through industry consultation, has explored the issue under a framework for improving social licence based on four pillars: community engagement, transparency and reporting, common messaging, and new models of operating, while recognising that social licence, although powerful, is neither permanent nor predictable.³⁵

Part of the response of the forestry sector to this issue has been the uptake of voluntary certification through such schemes as the Responsible Wood Certification Scheme, which is underpinned by two Australian Standards, Sustainable Forest Management (AS 4708) and Chain of Custody (AS 4707), and the international Forest Stewardship Council (FSC) scheme. However, despite a large proportion of the Australian commercial forest estate being covered by these schemes (90% of Australian public and private native (timber harvesting) forests and plantations are certified),³⁶ the social licence for forestry remains elusive. The issue not only relates to management of the current estate, but also to expansion of plantations on agricultural land.

Researchers, policy makers and practitioners continue to grapple with the changing, and sometimes challenging, nature of social relations, interactions and expectations between the forest industry, communities and other stakeholders.³⁷ To meet community expectations, the forestry sector needs access to skilled social scientists for community engagement and other strategies to improve the social licence of the industry.

1.4. Expected impacts of the 2019–2020 bushfires and COVID-19 global pandemic

The extensive bushfires of 2019–2020 and COVID-19 are expected to have a significant impact on the forest and wood processing industry. Potential impacts include:

- Changes to supply and demand for forest products
- Changes to supply of essential goods and services
- Disruption to registered training organisations
- Disruption to businesses and organisations.

1.4.1. Supply and demand for forest products

An analysis of the expected impacts of the bushfires and COVID-19 undertaken by ABARES³⁸ in June 2020 predicts a downturn in construction due to domestic and international recessions reducing the domestic demand for sawn wood and wood-based panel products in the short-term (over the next six months). The ABARES report predicts international demand for log and woodchip is expected to remain strong while

³⁵ see FWPA <https://www.fwpa.com.au/forwood-newsletters/1649-social-license-will-help-drive-industry-credibility.html>

³⁶ <https://www.responsiblewood.org.au/responsible-wood/responsible-wood-certification-scheme/>

³⁷ Peter Edwards et al., "Social Licence to Operate and Forestry – an Introduction," *Forestry: An International Journal of Forest Research* 89, no. 5 (2016). <https://doi.org/10.1093/forestry/cpw036>

³⁸ L. Whittle, *Analysis of the Effects of Bushfires and Covid-19 on the Forestry and Wood Processing Sectors*, ABARES Insights (Canberra: Australian Bureau of Agricultural and Resource Economics and Sciences, 2020).

China continues to accept woodchip exports from Australia. More recently, however, reports from Western Australia indicate a worsening of the downward trade pattern developing in 2019, with enterprises reporting a decline in demand for woodchips into China.³⁹ Export demand may weaken further if the demand for Chinese manufactured wood products reduces because of a downturn in economic activity in other countries and regions. The ABARES analysis also predicts that export prices for roundwood and woodchip may fall, although domestic prices are unlikely to fall in the immediate future.

As noted by the ABARES analysis, there is uncertainty around the extent of damage to production forests from the 2019-2020 bushfires, and the potential duration and severity of the COVID-19 pandemic is unknown, meaning that many of these impacts for the forestry and wood processing sectors are highly uncertain. The analysis identified that softwood log supply will be lower in the medium to long term due particularly to the bushfire damage to plantations in New South Wales, which may have implications for the structure and competitiveness of the domestic processing industry. Arguably this may improve the market prospects of the forecast medium-term increase in sawlog availability from softwood plantations in Tasmania (Table 1), subject to factors (e.g. new house starts) affecting demand.

1.4.2. Supply of essential goods and services

Supply chain disruptions caused by the COVID-19 global pandemic threatens the supply of essential goods and services provided by forest product industries. The *Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work* highlights the need to ensure the forest products supply chain maintains supply of essential goods and services during the pandemic, including the supply of:⁴⁰

- Toilet paper, tissues, medical products, sanitary products and other paper
- Cardboard packaging for supermarket and retail deliveries, including pharmaceuticals
- Food and beverage packaging
- Wooden pallets for supermarkets and other retailer distribution operations
- Timber for housing and building construction, particularly if the construction of new makeshift hospitals and temporary structures are required
- Kerbside, wastepaper and packaging recycling services
- Newspaper for most of Australia's metropolitan and regional newspapers
- Supply of wood residues to the agriculture sector, essential for food production
- Bushfire mitigation and suppression conducting fuel load reduction and frontline fire suppression
- Sawn timber and LVL (laminated veneer lumber) used to make poles for electricity and telecommunications services, as well as fence posts
- Firewood, which is the main source of heating for many households.

1.4.3. Registered training organisations

Skills and training programs have been disrupted by the COVID-19 pandemic. While some registered training organisations (RTOs) have been able to continue to deliver on-site training on worksites where social distancing between the learner and trainer is possible, training programs requiring close contact

³⁹ Skills Impact, "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work," (Prepared on behalf of the Forest Management and Harvesting Industry Reference Committee (IRC), Timber and Wood Processing IRC and Timber Building Solutions IRC for the Australian Industry Skills Committee (AISC).2020).

⁴⁰ "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work."

between the learner and trainer have been postponed or cancelled. The requirement for social distancing has affected the delivery of classroom-based training, with some TasTAFE campuses and training facilities closed.⁴¹ The required reduction in class sizes has meant the delivery of some courses is not financially viable.⁴² Internal training has been affected by travel restrictions, preventing interstate trainers travelling to Tasmania to deliver in-house training; similarly, workers and students are not permitted to travel interstate to attend courses. Some training has been adapted to online delivery – TasTAFE now offers a combination of hands-on training and online courses,⁴³ whereas other RTOs may not have the resources to develop online content.⁴⁴

1.4.4. Businesses and associations

The COVID-19 pandemic has caused a significant disruption to the way businesses and associations operate. Businesses have been required to introduce new management strategies in line with government restrictions and protocols. These include implementing travel and meeting bans, providing support for working from home, and rearranging operations and processes to allow appropriate physical distancing.⁴⁵ The long-term impact of these disruptions is still to be determined.

⁴¹ <https://www.tastafe.tas.edu.au/news/novel-coronavirus-update>

⁴² Skills Impact, "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work."

⁴³ https://www.tastafe.tas.edu.au/_data/assets/pdf_file/0028/25876/9-September-2020-Student-communication.pdf

⁴⁴ Skills Impact, "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work."

⁴⁵ Ibid.

2. Methods

Two approaches, a literature review and stakeholder consultation, were used in preparation of this strategic assessment.

2.1. Literature review

An extensive literature review and desktop study was conducted to identify existing knowledge relevant to the current and projected future state of culture, skills and training within the forestry sector in Tasmania. Sources drawn on in the literature review included peer reviewed publications, government and industry reports and web content, government databases (e.g. the Australian Bureau of Statistics (ABS)) and other publicly available publications (grey literature, e.g. brochures, magazines). Where possible the information and data informing the literature review was the most up to date available and the most specific to the forestry sector.

There were some limitations in the data available. For example, the most recent Population and Housing Census data was collected in 2016; the next Census will be undertaken in 2021. While the 2016 Census data is to a degree out of date, it is also the most detailed and comprehensive demographic data relating to the forest and wood products sector available. The availability of sector specific information was also limited where forest industry data was amalgamed with that of the agriculture and fisheries sectors, for example the available regional workforce data for Tasmania is aggregated at the level of Agriculture, Forestry and Fishing (See Section 5).

2.2. Stakeholder consultation

The stakeholder consultation component of the strategic assessment included an online survey and in-depth interviews. Representative from eight key stakeholder groups participated in the stakeholder consultation. These were:

- Forest growers
- Forest management business and agencies
- Silvicultural contractors
- Transport providers (harvesting and haulage contractors)
- Timber processors
- Training providers
- Industry associations
- State government (Department of State Growth, Industry and Business Development and Skills Tasmania).

2.2.1. Online survey

Quantitative and qualitative data about culture, skills and training within the forest industry in Tasmania was collected in an online stakeholder survey. The survey was open from 14 August to 1 September 2020. In the survey respondents were asked about the relative impact of different culture skills and training factors on the respondent's business or area of work, skills needs in their business or area of work, the relative ease or difficulty in recruiting and retaining workers, types of training used, barriers to accessing training, and information about new and emerging technologies in their area of work (see Appendix B).

Invitations to take part in the survey were forwarded to key stakeholders, posted on industry websites, and advertised in industry publications. One hundred and six surveys were started, with 50 surveys fully completed and submitted. Survey respondents accessed multiple forest resource types (plantations, private native forests, native forests, farm forestry) and participated in multiple roles (e.g. growing, management, harvesting, haulage, processing, training and training support). Plantation grown timber was the most frequently used resource (64% of respondents), with public native forest the second most frequently used resource (34%). The most common area of work was forest management (26% of respondents), followed by forest owner or grower (20%) and primary wood processing (20%).

Fourteen industry roles were represented in the survey. Many respondents performed more than one role. For analysis purposes the industry roles were categorised into segments broadly reflecting the location of the role within the supply chain. Five segments were created:

- Grower: includes forest management company, forest owner or grower, and nursery
- Post-harvest/processing: harvesting and haulage service provider (e.g. road transport); primary wood processing (e.g. sawmilling, veneer manufacturing, chipping); secondary wood processing; and silvicultural contractor
- Regulatory/association: Tasmanian state or local government; industry association
- Training: training provider; technology development (e.g. information technology (IT), geographic information system (GIS), forestry equipment, harvesting, processing technology) but only if no other role
- Business/sales: marketing and sales; business and financial management.

Responses to closed questions in the survey (items requiring a response on a five-point scale) were analysed using descriptive and univariate statistics. Open-ended questions requiring a written response were thematically coded to identify patterns or themes within the data.

2.2.2. Stakeholder interviews

Stakeholder interviews were undertaken in September 2020. All interviews were conducted by telephone or via online conferencing software due to COVID-19 travel restrictions preventing interstate travel at the time of the consultations.

Twenty-two interviews, with a total of 24 participants, were conducted. Those interviewed included representatives from:

- Forest Practices Authority (FPA)
- Private Forests Tasmania (PFT)
- MechLog
- Sustainable Timber Tasmania
- Reliance FF
- Timberlink
- State Growth
- People at their Best
- University of Tasmania (UTAS)/ National Institute for Forest Products Innovation (NIFPI)
- ForestWorks
- Australian Forest Contractors Association
- Forest Education Foundation
- PF Olsen
- Forico
- NW Tree Growers
- Skills Tasmania
- TasTAFE
- Tasmania Forests and Forest Products Network (TFFPN)
- ARBRE

The aim of the interviews was to confirm understanding of the current state of culture, skills and training within the sector, and to gain a more detailed understanding of the culture, skills and training factors perceived to be limiting or promoting growth from the perspective of industry sub-sectors.

3. Workforce demographics and trends in the labour market

This section describes selected characteristics of the forestry workforce in Tasmania, and trends in the labour market in Tasmania. It draws on a report commissioned by Forest and Wood Products Australia (FWPA) in 2018 to examine the socio-economic impacts of the forest industry in Tasmania.⁴⁶ The source of much of the data presented in the FWPA analysis is the 2006, 2011 and 2016 ABS Census of Population and Housing. The next ABS Census of Population and Housing is due to be conducted in 2021.

Human capital and learning⁴⁷ are important factors in ensuring the competitive advantage of the forest industry in Tasmania. The long-term sustainability and future growth of the industry is dependent on being able to attract and retain a diversity of workers within the industry. Changes in workforce demographics, technology and work practices can exacerbate skill shortages and increase competition for workers within the industry,⁴⁸ while the need for gender and cultural inclusiveness and diversity has increased with changing social values. The contribution of a diverse workforce to productivity, profitability and resilience is increasingly recognised.⁴⁹

The age profile of workers and participation rates of women and First Nations Australians are indicators of the effectiveness of the industry to recruit workers from all parts of the available workforce. The worker age profile is also an indicator of the attractiveness of the industry to potential workers, indicating potential succession issues and reflects the availability of progression and development opportunities for younger workers in the industry.⁵⁰

Worker wellbeing is also an important determinant of the sectors ability to retain workers within the industry. Wellbeing is defined here as "an individual's subjective quality of life, or subjective wellbeing".⁵¹ Although wellbeing is inherently subjective, proxy indicators include worker income, working hours and educational attainment.⁵²

⁴⁶ J. Schirmer, *Socioeconomic Impacts of the Plantation Industry on Rural Communities in Tasmania* (Hobart, Tasmania: Technical report 199; Cooperative Research Centre for Forestry, 2009).

⁴⁷ Nile W. Hatch and Jeffrey H. Dyer, "Human Capital and Learning as a Source of Sustainable Competitive Advantage," *Strategic Management Journal* 25, no. 12 (2004).

⁴⁸ R. J. Burke and E. Ng, "The Changing Nature of Work and Organizations: Implications for Human Resource Management," *Human Resource Management Review* 16, no. 2 (2006).

⁴⁹ <https://ausfpa.com.au/australian-forest-industries-diversity-and-inclusion-charter/>

⁵⁰ <https://www.agriculture.gov.au/abares/research-topics/forests/forest-economics/forest-wood-products-statistics/socio-economic-indicators-trends-2018#workforce--diversity>

⁵¹ Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania." p.48

⁵² "Socio-Economic Impacts of the Forest Industry: Tasmania."

3.1. Selected workforce characteristics

3.1.1. Age

Tasmania has the oldest population in Australia, with a median age of 42.3 years in June 2018, five years higher than the national average.⁵³ The forest industry workforce, like the total labour force in Tasmania, is ageing (Table 2). The percentage of the workforce aged 55 years and older within the forestry, logging, and wood product manufacturing sectors almost doubled in the decade 2006–2016, while the percentage of workers aged 55 years and older in forestry support services and pulp and paper manufacturing increased almost threefold in this period. Over the same period the percentage of workers aged under 35 years declined in all forestry sectors at a time when the proportion of participants aged under 35 years in the total employed workforce in Tasmania remained relatively stable. The age distribution of workers within the forest industry in the 10 years to 2016 varied between regions. The ageing of the workforce in the years 2006–2016 was most marked in the Southern Natural Resource Management (NRM) region.

Table 2 Workforce by age, industry sector and location, 2006–2016 – ABS Census of Population and Housing

Industry sector (ABS classification)	% aged <35 years			% aged 55 and older		
	2006	2011	2016	2006	2011	2016
Forestry	42	27	24	9	17	17
Logging	39	29	33	14	14	24
Forestry support services	42	36	25	7	15	19
Wood product manufacturing	38	35	31	13	17	20
Pulp and paper manufacturing	27	16	16	10	14	31
<i>Forest industry workforce – Cradle Coast</i>	<i>33</i>	<i>28</i>	<i>33</i>	<i>14</i>	<i>17</i>	<i>18</i>
<i>Forest industry workforce – Northern</i>	<i>39</i>	<i>32</i>	<i>29</i>	<i>12</i>	<i>15</i>	<i>19</i>
<i>Forest industry workforce – Southern</i>	<i>36</i>	<i>30</i>	<i>23</i>	<i>13</i>	<i>16</i>	<i>26</i>
<i>Forest industry workforce – Tasmania</i>	<i>35</i>	<i>31</i>	<i>27</i>	<i>13</i>	<i>16</i>	<i>22</i>
Employed labour force (all industries) – Tasmania	34	30	32	16	16	22

Source: Schirmer et al. (2018)⁵⁴ p. 40

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

Some of the decline in workers aged under 35 years in the forestry sector can be attributed to significant structural changes in the forest industry between 2006 and 2011. The 10 years between 1999 and 2010 was a period of rapid expansion and then contraction in the forest industry in Tasmania. Direct employment within the forestry sector in Australia decreased by 14% between 2006 and 2011.⁵⁵ The area established to plantations in Tasmania increased by 65% in the 15 years from 1999–2000 to 2014–2015. In contrast, the area of plantations increased by just 0.2% in the five years between 2009–2010 and 2014–

⁵³ <https://www.treasury.tas.gov.au/Documents/Population-By-Age-And-Sex.pdf>

⁵⁴ Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania."

⁵⁵ ABARES, "Australian Forest and Wood Products Statistics, September and December Quarters 2012," (Canberra 2013).

2015.⁵⁶ Other forest industry indicators (including forestry and logging value-added, wood and paper products manufacturing, forest product manufacturing industry sales and service income, and pulp and paper product) showed a similar contraction between 2009–2010 and 2014–2015.⁵⁷

3.1.2. Gender

While the proportion of male and female workers across all industries in Tasmania is relatively balanced, less than one-fifth of the forest industry workforce was female in 2016 (Table 3). The gender balance has remained relatively stable in the 10 years to 2016 in all forest industry sectors except forestry support services, where the number of females employed increased by 6 percentage points between 2006 and 2016, an increase of 40%. The percentage of females employed in both the pulp and paper manufacturing and the wood manufacturing sectors increased slightly during this period (13% and 18% increase respectively), with the percentage of females employed in the logging sector decreasing by 18% in the 10 years from 2006 to 2016.

Table 3 Workforce by gender composition by industry sector and location, 2006–2016 – ABS Census of Population and Housing

Industry sector (ABS classification)	% male			% female		
	2006	2011	2016	2006	2011	2016
Forestry	82	82	82	18	18	18
Logging	89	90	91	11	10	9
Forestry support services	85	89	79	15	11	21
Wood product manufacturing	89	88	87	11	12	13
Pulp and paper manufacturing	88	88	86	12	12	14
<i>Forest industry workforce – Cradle Coast</i>	89	87	88	11	13	12
<i>Forest industry workforce – Northern</i>	73	71	76	27	29	24
<i>Forest industry workforce – Southern</i>	75	75	76	25	25	24
<i>Forest industry workforce – Tasmania</i>	86	85	82	14	15	18
Employed labour force (all industries) – Tasmania	53	52	51	47	48	49

Source: Schirmer et al. (2018)⁵⁸ p. 39

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

3.1.3. Aboriginal and Torres Strait Islander peoples

The rate of participation of workers identifying as Aboriginal and Torres Strait Islander peoples within the forest industry workforce in Tasmania parallels that within the total employed labour force in Tasmania, with a very slight increase in Aboriginal and Torres Strait Islander peoples employed in the total forest industry workforce in Tasmania between 2006 and 2016 (Table 4). Aboriginal and Torres Strait Islander

⁵⁶ "Australian Plantation Statistics 2016," ed. Australian Bureau of Agricultural and Resource Economics and Sciences (Canberra 2016).

⁵⁷ *Australian Forest and Wood Products Statistics: March and June Quarters 2018*, ABARES Technical Report (Canberra: Australian Bureau of Agricultural and Resource Economics and Science, 2018).

⁵⁸ Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania."

peoples are more likely to be employed in wood product manufacturing than in other forest industry sectors.

Table 4 Aboriginal and Torres Strait Islander participation in workforce by industry sector and location, 2006–2016 – ABS Census

Industry sector (ABS classification)	% workforce identifying as Aboriginal or Torres Strait Islander		
	2006	2011	2016
Forestry	3	5	3
Logging	5	3	4
Forestry support services	6	6	2
Wood product manufacturing	3	4	6
Pulp and paper manufacturing	2	2	1
<i>Forest industry workforce – Cradle Coast</i>	3	8	9
<i>Forest industry workforce – Northern</i>	2	3	3
<i>Forest industry workforce – Southern</i>	2	3	2
<i>Forest industry workforce – Tasmania</i>	3	4	4
Employed labour force (all industries) – Tasmania	3	3	4

Source: Schirmer et al. (2018)⁵⁹ p. 41

Data source: ABS Census of Population and Housing, 2006, 2011, 2016, TableBuilderPro *Place of Usual Residence* database. Workers who did not complete this question on the Census were excluded from the analysis.

3.1.4. Worker income

Worker income is one measure of wellbeing that can reflect the appeal of jobs in the forest industry. Relative wellbeing is indicated by the percentage of forest and wood products workers having low full-time earnings (defined as less than \$600 per week in 2006 and 2011, and less than \$649 per week in 2016) and high full-time earnings (defined as more than \$1299 per week in 2006 and more than \$1250 in 2011 and 2016) compared with the percentage of workers in the total employed workforce. Analysis of the ABS Census of Population and Housing data⁶⁰ indicates that in 2016 workers in the forest industry were better remunerated than the total employed workforce in Tasmania (all industries), with only 19% of workers earning less than \$649/week compared with 55% in the total workforce, and 33% earning more than \$1250/week, compared with 18% in the total workforce (Table 5). Worker income has also increased in all forestry sectors in the 10 years to 2016, although some of the apparent increase over this period may be attributed to the lower threshold used to measure high income in 2011 and 2016. Workers in the paper and pulp manufacturing sector have the highest income of all forestry sectors, with two-thirds earning more than \$1250/week.

⁵⁹ "Socio-Economic Impacts of the Forest Industry: Tasmania."

⁶⁰ Ibid.

Table 5 Income earned by forestry and wood products workers identified in the 2006–2016 ABS Census of Population and Housing

Industry sector (ABS classification)	% all workers earning <\$600 or <\$649 per week			% all workers earning > \$1299 or >\$1250 per week		
	2006 (\$600/wk)	2011 (\$600/wk)	2016 (\$649/wk)	2006 (\$1299/wk)	2011 (\$1250/wk)	2016 (\$1250/wk)
Forestry	25	16	13	12	24	43
Logging	26	17	13	7	18	34
Forestry support services	41	19	23	6	23	43
Wood product manufacturing	42	26	23	8	11	19
Pulp and paper manufacturing	11	11	9	36	62	66
Forest industry workforce – Tasmania	32	22	19	14	21	33
Employed labour force (all industries) – Tasmania	46	29	55	11	64	18

Source: Schirmer et al. (2018)⁶¹ p. 38

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

The relatively high income of workers in the forest industry can be attributed in part to the high levels of full-time employment in the industry compared with the total workforce in Tasmania.⁶² Correcting the data to reflect the income of full-time workers indicates the proportion of workers in the forestry industry workforce earning either a low or high income was roughly equivalent to that of full-time workers in the total employed labour force in Tasmania.⁶³

3.1.5. Working hours

Working long hours, defined as working more than 49 hours per week, as well as working fewer hours than desired (underemployment) can have a negative impact on worker health and wellbeing.⁶⁴ The 2016 ABS Census of Population and Housing shows that in 2016 workers in the forest industry workforce worked longer hours per week on average than workers in the total employed labour force in Tasmania (21% compared with 13% in the total workforce) (Table 6). The higher number of working hours is likely to contribute to the higher weekly earnings across the forestry sector compared with the total employed labour force (Table 5).

⁶¹ Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania."

⁶² Ibid.

⁶³ Ibid.

⁶⁴ Ibid.

Table 6 Working hours in Tasmania by industry sector, 2006–2016 – ABS Census of Population and Housing

Industry sector (ABS classification)	% workers who worked <25 hours in week prior to Census			% workers who worked >48 hours in week prior to Census		
	2006	2011	2016	2006	2011	2016
Forestry	14	16	10	19	13	24
Logging	11	14	7	47	38	52
Forestry support services	21	18	18	29	31	27
Wood product manufacturing	11	14	10	18	13	14
Pulp and paper manufacturing	15	14	11	8	7	13
Forest industry workforce – Tasmania	14	15	11	19	15	21
Employed labour force (all industries) – Tasmania	27	29	29	15	13	13

Source: Schirmer et al. (2018)⁶⁵ p. 37

Data source: ABS Census of Population and Housing, 2006, 2011, 2016, TableBuilderPro *Place of Usual Residence* database.

3.1.6. Educational characteristics of the forest industry workforce

The educational characteristics of the forest industry workforce in Tasmania identified in the 2016 ABS Census of Population and Housing⁶⁶ are shown in Table 7. The forest industry workforce is characterised by relatively low rates of high school completion (30%) compared with the total employed labour force in Tasmania (50% completed Year 12 or equivalent). Just under half (49%) of the forest industry workforce has a post-school qualification compared with 62% of the total employed workforce in Tasmania. This trend was more pronounced in some sectors, for example only 10% of those employed in the logging sector in 2016 completed secondary education, with around one-third of the logging workforce having any post-school qualification. Low levels of secondary school completion and post-school qualification were also found in the wood product manufacturing sector. While the percentage of workers with a certificate qualification in the forest industry was roughly equivalent to that in the total employed workforce (40% and 39% respectively), only 9% of workers in the forest industry had a bachelor or postgraduate degree, compared with 23% in the total workforce. However, it is important to note that formal qualifications do not necessarily reflect workforce skill levels, particularly in the forest industry where historically much of the skills training has occurred ‘in-house’ or on the job (stakeholder consultation).

⁶⁵ Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania."

⁶⁶ Ibid.

Table 7 Formal educational attainment: rates of attainment of high school and post-school qualifications in the Tasmanian forest industry by industry sector and location, 2006–2016

Industry sector (ABS classification)	% completed high school (Year 12 or equivalent)			% with no post-school qualification			% with certificate qualification			% with bachelor or postgraduate degree		
	2006	2011	2016	2006	2011	2016	2006	2011	2016	2006	2011	2016
Forestry	35	44	44	55	43	40	26	34	38	19	22	22
Logging	6	8	10	81	74	65	18	25	34	1	1	1
Forestry support services	28	31	40	72	55	41	21	30	32	7	15	28
Wood product manufacturing	18	23	24	60	68	54	36	27	43	4	5	4
Pulp & paper manufacturing	23	34	32	50	43	40	42	43	50	8	13	10
<i>Forest industry workforce – Cradle Coast</i>	13	17	22	61	61	52	34	36	36	5	3	12
<i>Forest industry workforce – Northern</i>	22	24	26	63	58	56	31	37	40	6	6	4
<i>Forest industry workforce – Southern</i>	27	36	38	57	49	47	34	38	40	10	12	1
<i>Forest industry workforce – Tasmania</i>	23	28	30	61	57	51	32	32	40	7	11	9
Employed labour force (all industries) – Tasmania	41	45	50	48	43	38	33	36	39	18	21	23

Source: Schirmer et al. (2018) p. 47

Data source: ABS Census of Population and Housing, 2006, 2011, 2016, TableBuilderPro Place of Usual Residence database. Workers who did not complete this question on the Census were excluded from the analysis

3.2. Implications of the industry workforce characteristics

The lack of diversity in the industry workforce, described by one survey respondent as “an ageing male workforce”, was identified in stakeholder consultations as having a negative impact on the industry, and on future growth prospects within the industry.

In the stakeholder survey respondents were asked to rate the impact of a range of workforce demographic and other factors on their business or area of work. Ratings were on a five-point scale: 1 = negatively affect; 2 = somewhat negatively affect; 3 = no affect; 4 = somewhat positively affect; 5 = positively affect.

An ageing workforce and the availability of younger workers was identified as having the most negative effect on businesses and operations, particularly in the post-harvest/processing sectors (Figure 1). Difficulties in attracting young workers was rated as having the most negative impact in the post-harvest/processing sector.

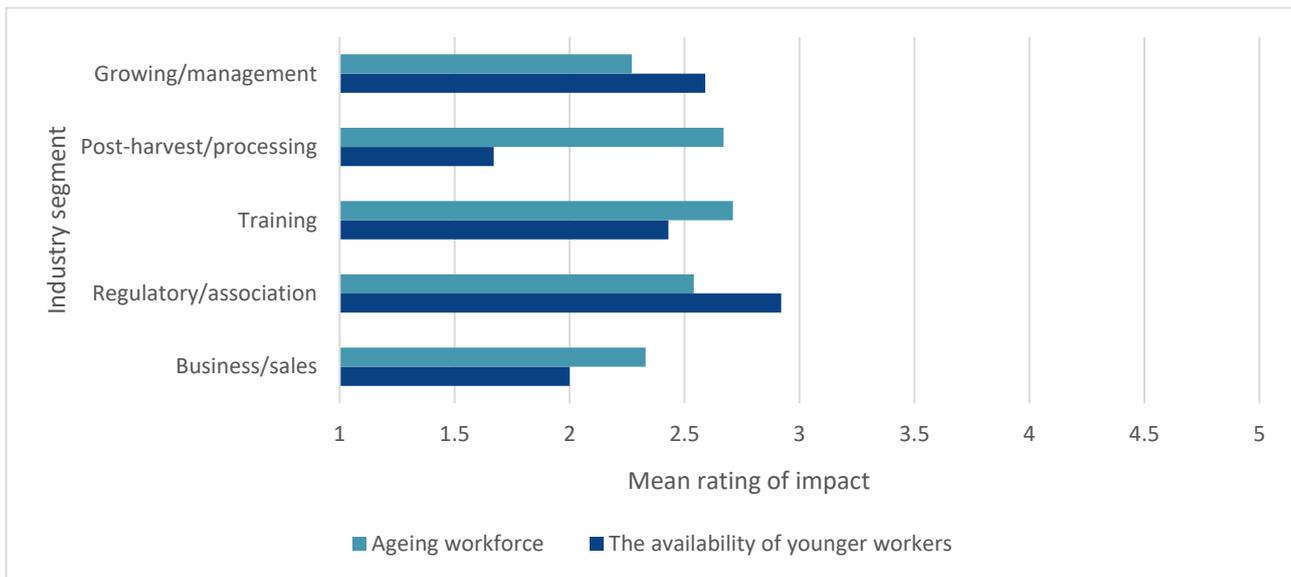


Figure 1 Mean rating of the perceived impact of an ageing workforce and the availability of younger workers on forest industry segments in the stakeholder survey. Five-point scale: 1 = negatively affect; 2 = somewhat negatively affect; 3 = no affect; 4 = somewhat positively affect; 5 = positively affect

Although difficulties in attracting new employees was generally considered to have a negative effect on businesses (mean rating 2.94 across all respondents), the ability to retain employees was rated more positively (mean rating of 3.56 across all survey respondents) (Figure 2). While retaining workers in the workforce can have multiple social and economic benefits,⁶⁷ it also contributes to the ageing of the workforce and the limitations this poses.⁶⁸

⁶⁷ <https://humanrights.gov.au/our-work/6-economic-and-social-benefits-employing-older-australians>

⁶⁸ A. Brown and Guttman, R. "Ageing and Labour Supply in Advanced Economies," in *Reserve Bank of Australia Bulletin* December (2017).

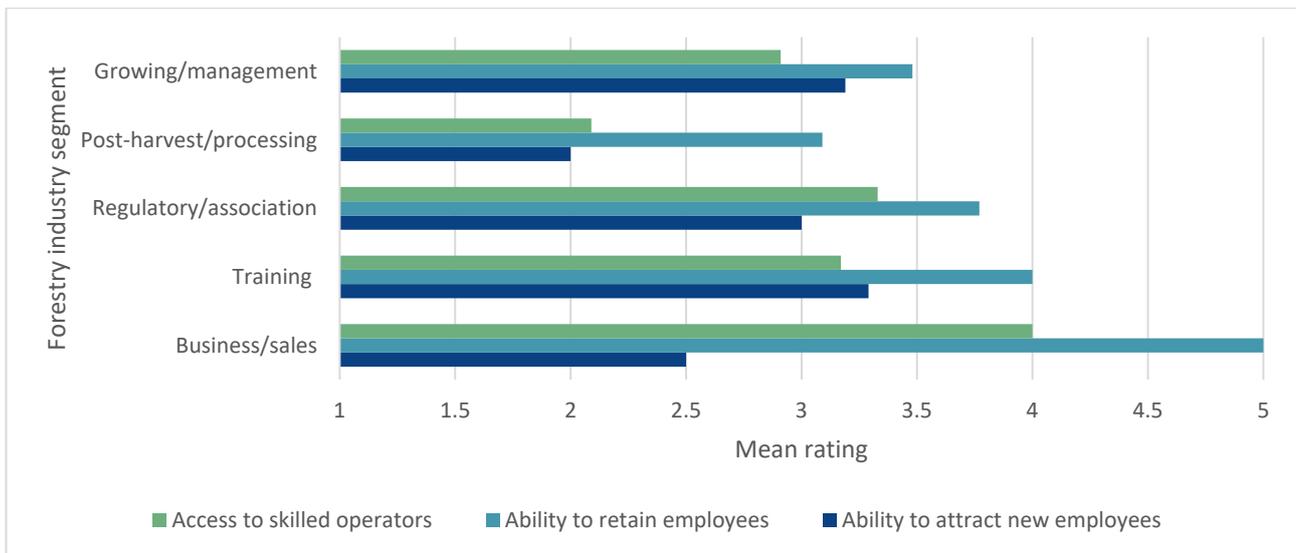


Figure 2 Mean rating of the perceived impact of employment factors within the forest industry segments in the stakeholder survey. Five-point scale: 1 = negatively affect; 2 = somewhat negatively affect; 3 = no affect; 4 = somewhat positively affect; 5 = positively affect

3.2.1. An ageing workforce

Two forces are likely to be influencing the trend to an ageing workforce in the forestry sector: workers remaining in the workforce for longer, and low rates at which young people are attracted to the industry. Factors contributing to the increase in the proportion of older workers in the workforce include increasing life expectancy, the ageing of the ‘baby boomer’ cohort, insufficient superannuation savings due to late access to the compulsory superannuation scheme, and changes in retirement policies raising the age that older Australians can access the government age pension.⁶⁹

One of the challenges posed by an ageing workforce is the downward pressure placed on the labour supply, reducing the pool of skilled workers as workers retire, or reduce work hours for lifestyle, financial or health-based reasons.⁷⁰ Older workers staying in the workforce also decreases opportunities for younger workers to move upwards through career pathways, as observed in the stakeholder interviews. Of further concern is research demonstrating proficiency in information processing and problem-solving skills in technology-rich

“The forest industry has a profile of an ageing male workforce – in the contracting (haulage) sector of the industry the average age of drivers is 57. A strategy needs to be developed to attract and retain talent as those in this age group leave the industry. The industry is very male dominated. There needs to be a strategy to get diversity into the management/workforce. Women are in extremely low numbers across the industry and other groups poorly represented.”

Survey respondent

⁶⁹ AIHW and <https://www.aihw.gov.au/reports/older-people/older-australia-at-a-glance>, "Older Australia at a Glance, Cat. No. Age 87," (Canberra:2018).

⁷⁰ Brown and R, "Ageing and Labour Supply in Advanced Economies."

environments declining with age,⁷¹ further exacerbating the impact of an ageing workforce on an industry increasingly shaped by technical advances and innovations.

The reduced proportion of young people in the workforce is expected to increase the competition for skilled workers within the industry, while ensuring the workforce has the required skills will become more dependent on upskilling and/or re-skilling the existing workforce.⁷² Also contributing to the relatively low proportion of young people in the industry is the historical net loss of young people in the post-school and workforce entry age bracket from Tasmania to the mainland states, although research notes that this trend has been tempered to a degree by in-migration in recent years.⁷³

Other factors identified in the stakeholder consultation as contributing to the low number of young people in the forest industry in Tasmania include:

- The lack of training opportunities and clear career pathways available in Tasmania for young people wanting to enter the forest industry. There is currently no tertiary undergraduate training specifically for forestry in Tasmania, and relatively few undergraduate degree options on the mainland. Students leaving Tasmania to undertake a forestry degree on the mainland are in high demand and are less likely to return to Tasmania at the completion of their degree, at least in the short term
- The industry is poor at promoting itself. It is not universally recognised that participation in forest-relevant training produces a broad skill set applicable to a range of other workplaces and occupations
- Forestry is not seen as a preferential career due to the general negative image of forestry promoted in the media means. Competition with other industries makes it critical for forestry to become an industry of choice, one that was more than just “driving a harvester in the bush”.

“The industry has a lot of older people who are ‘set in their ways’ at all levels from senior corporate managers to bush operators. It creates an ‘us and them’ attitude which often puts off young people or people with more liberal views from entering the industry. There needs to be a significant cultural shift to win the hearts and minds of these younger generations.”

Survey respondent

3.2.2 Initiatives promoting forestry to younger people

The ageing of the workforce within the forest industry in Tasmania highlights the importance of attracting younger people to careers within the industry. To address this, several organisations in collaboration with industry partners have developed programs to showcase forests and the forest industry to school age children and provide opportunities for entry of school leavers to the industry (see Box 1).

⁷¹ Results from the Survey of Adult Skill, a survey of 166 000 adults aged 16-65 in 22 OECD (Organisation for Economic Co-operation and Development) member countries and two partner countries conducted by the OECD in 2011-12 OECD, "OECD Skills Outlook 2013: First Results from the Survey of Adult Skills," (OECD Publishing 2013).

⁷² "OECD Skills Outlook 2013: First Results from the Survey of Adult Skills."

⁷³ L. Denny, "Insight Six: Positive Signs, but How Can We Make It Last? Tasmania's Changing Population Dynamics," (2018).

Arbre Forest Industries Training and Careers Hub

- The primary function of the Arbre Hub is to promote careers and training within the forest industry, and to attract interest in careers in the industry. Arbre has a schools engagement program and offers a pre-employment training program and the Cadet Forester Program to support new entrants to the industry.
- The Arbre Hub is a not-for-profit organisation overseen and managed by a Governing Board represented by Forico, Sustainable Timber Tasmania, Timberlands Pacific, Norske Skog, Reliance Forest Fibre, Waratah Forestry Equipment Pty Ltd, Casegrande Lumber Pty Ltd and Technical Forest Services.
- Website: <https://www.arbre.net.au/>

Forest Education Foundation Inc. (FEF)

- FEF is a not-for-profit educational institution staffed by qualified and experienced teachers. The foundation provides learning experiences about forests and the forestry industry for teachers and students from Kinder to Year 12 and beyond throughout Tasmania.
- FEF programs provide teachers and students with the opportunity to engage with forest environments. Making connections to the Australian Curriculum: Science, Humanities and Social Sciences, and Design and Technologies, the FEF programs explore forest systems and the connection between humans and natural environments.
- Website <http://www.forest-education.com/>

ForestLearning

- [Forestlearning.edu.au](https://forestlearning.edu.au) provides school teachers and educators, children, and the public with information on Australian forests and forest-based products, and provision and access to forestry teaching resources. It is further supported by links to key government, industry organisations and educational service providers.
- The site has been built and maintained by a network of forest educators and forestry communication specialists from organisations across Australia known as the Australian Forest Education Alliance (AFEA).
- Website: <https://forestlearning.edu.au/>

Changes in workforce demographics means that the forest sector increasingly needs to find new ways to attract workers to the industry. New approaches being trialled include: ⁷⁴

- Industry involvement in National Trees Day (South Australia)
- Teacher education days (Western Australia)
- Industry-developed YouTube videos for use at career days
- Working with Google Expeditions to take virtual tours of working forests (United Kingdom)
- Trialling virtual reality resources developed as part of the ForestLearning program by FWPA
- The use of simulators and virtual reality as a careers promotional tool in schools and colleges, providing students with an opportunity to use harvesting equipment (Arbre Forest Industries Training and Careers Hub; Forest Education Foundation).

⁷⁴ Skills Impact, "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work."

3.2.3. Gender diversity

The Forest Stewardship Council International Standards Principle 2: Workers Rights and Employment Conditions states that organisations should promote gender equality in employment practices, training opportunities, awarding of contracts, processes of engagement and management activities.⁷⁵

The need to increase the participation of females in the Australian forestry work force is recognised within industry. In March 2019, the Australian Forest Products Association hosted the first Women in Forest Industries Workshop in Canberra.⁷⁶ An outcome of the workshop was the development the Australian Forest Industries Diversity and Inclusion Charter. The charter is a voluntary framework for guiding the development of supportive and inclusive workplaces for people from diverse backgrounds within the Australian forest industries. Organisations adopting the charter acknowledge that a diverse and inclusive workplace is likely to:⁷⁷

- Increase productivity and efficiency by encouraging a diversity of perspectives and opinions
- Increase profitability and resilience
- Attract a greater pool of talent.

Other initiatives to encourage females within the industry include:

- An Australian Forest Products Association (AFPA) Women in Forest Industries Forum scheduled to be held in March 2020 in Canberra. Two representatives from Tasmania were awarded scholarships to attend, although this event was subsequently cancelled due to COVID-19 restrictions
- The Women in Forests and Timber Network (WFTN). Supported by ForestWorks, the WFTN is a forum for women in the timber industry providing an opportunity to meet, exchange ideas and ensure their voices are heard. The forum provides a means to recognise the contribution of women to the industry and to support access to skills and professional development opportunities⁷⁸
- Arbre Forest Industries Training and Careers Hub aim to include female representatives from the Cadet Forester program when visiting schools to speak about their experiences in what is traditionally perceived to be a male dominated industry (pers comm. stakeholder interview).

⁷⁵ <https://fsc.org/en/document-centre/documents/resource/392>

⁷⁶ <https://ausfpa.com.au/australian-forest-industries-diversity-and-inclusion-charter/>

⁷⁷ Ibid.

⁷⁸ <https://forestworks.com.au/networks/wftn/>

3.2.4. Literacy

Low literacy levels within some sectors of the forest industry were identified in the stakeholder consultation as posing a barrier to training and upskilling within the industry.

Lower levels of educational attainment have implications for future growth within the industry. Schooling level is correlated to literacy, numeracy and problem-solving skills in technology-rich environments, as well as to cognitive and interpersonal skills.⁷⁹ Low literacy and numeracy skills are a barrier to accessing skills and training opportunities and job performance, particularly as the industry increasingly requires workers with advanced information and communication technology skills, high-level business management and financial skills and high-level cognitive and interpersonal skills, including critical thinking, problem solving and system thinking.⁸⁰

⁷⁹ A. Shomos and M. Forbes, "Literacy and Numeracy Skills and Labour Market Outcomes in Australia," (Canberra 2014).

⁸⁰ Skills Impact, "IRC Skills Forecast and Proposed Schedule of Work 2019-2022."

4. Education, training programs, workforce development and career pathways

This section examines the formal, competency-based education and training programs, workforce development and career pathways within the forest industry in Australia in general, and more specifically in Tasmania.

The forest and wood processing industry in Australia is a diverse industry spanning a wide range of activities, including managing forests, forest reserves and parks for conservation and land management purposes, the growing and management of forests and plantations for timber production, forest harvesting and haulage including tree felling, processing, extraction and loading, the primary and secondary processing and manufacture of traditional and non-traditional wood-based products, and the marketing and distribution of the products derived from forests.⁸¹ These activities require a broad set of specific knowledge and skills. At the same time, technological innovations and changes in forest operations, increased demand for environmental outcomes from forests and forest products, access to international markets, and structural changes in the industry resulting from business consolidation and ownership changes means that the nature of work within the industry has changed. Having workers with the skills that align with these changes is critical for the long-term sustainability and growth of the industry.

Educational and training opportunities to achieve the required degree of knowledge and skills within the forest and wood products industry can be broadly grouped into three categories:

1. Community awareness and communication
2. Competency-based training provided at vocational training institutes or on-site by an RTO once a person is employed
3. Knowledge-based education (e.g. school or tertiary training) undertaken to assist gaining employment.⁸²

Some roles within the industry require highly skilled operators who have completed formal accredited competency-based training. Course accreditation confirms that a course meets established industry, enterprise, educational, legislative or community needs and provides appropriate competency outcomes and a satisfactory basis for assessment.⁸³ Formal accreditation is more likely to be required for mechanised operations such as tree felling, processing, extraction and loading⁸⁴ Box 2 provides an example of the range of detailed knowledge and skills required for harvest operations.

Respondents in the stakeholder survey indicated formal accreditation is more likely to be required for skills relating to the use of chainsaws and other hand-held machinery, forest operations, planning and management, and firefighting (Figure 3). The requirement for formal accreditation varied between industry segment.

⁸¹ ForestWorks, "Companion Volume Implementation Guide Fwp Forest and Wood Product Version 6.0".

⁸² R. de Fégely, "Review of Australian Forestry and Wood Products Education and Training Needs". Melbourne: FWPA, 2010) https://www.utas.edu.au/data/assets/pdf_file/0010/1178065/Insight-Six-Tasmanias-Changing-Population-Dynamics.pdf

⁸³ Australian Skills Quality Authority <https://www.asqa.gov.au/course-accreditation/overview>

⁸⁴ ForestWorks, "Companion Volume Implementation Guide Fwp Forest and Wood Product Version 6.0".

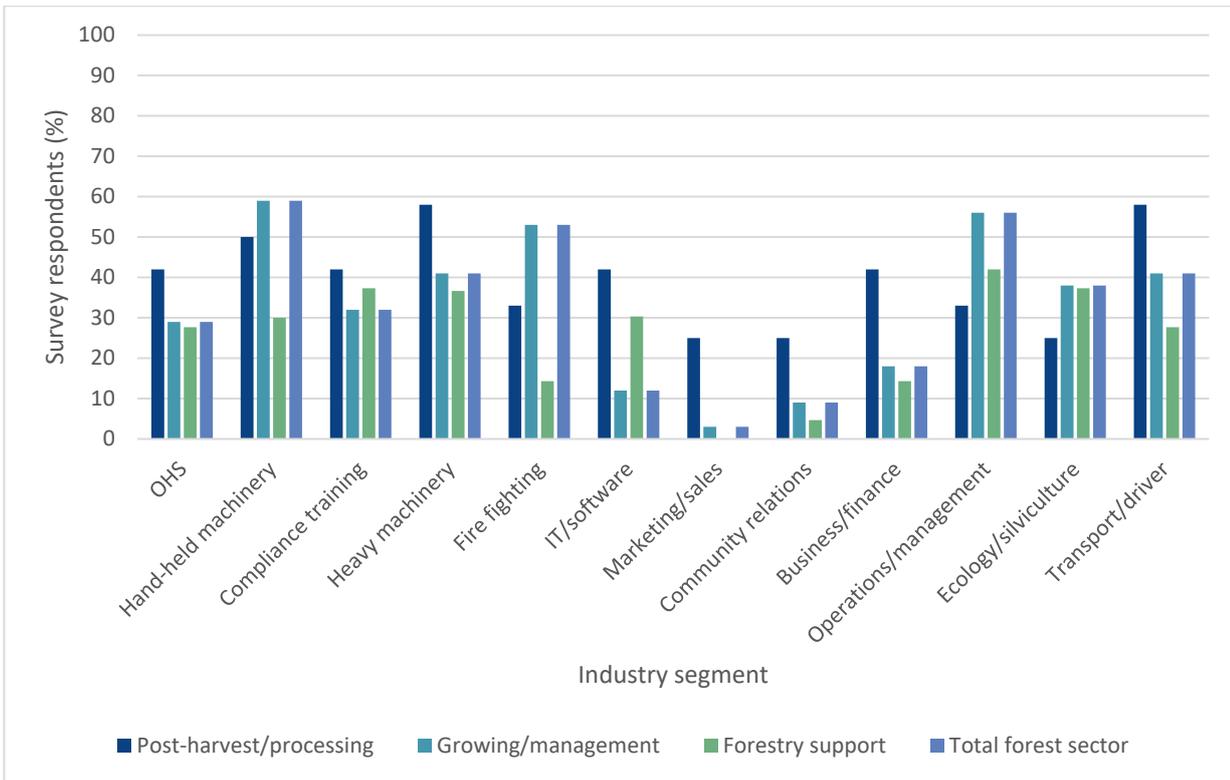


Figure 3 Percentage of survey respondents indicating formal accreditation was required for skills within their business or area of work.

For example, formal accreditation was required for multiple skills within the post-harvest/processing sector, particularly for heavy machinery use and road transport/driver training for haulage drivers, while formal accreditation is also more likely to be required for forest operations, planning and management within the forest growing and forest management, and training segments.

Harvesting operator skills

Depending on workplace requirements, harvest operators require specific knowledge relating to:

- (a) Work health and safety risk control measures, including:
 - Personal protective equipment requirements
 - Lifting heavy items safely
 - Proper restraint techniques
 - Emergency procedures
 - Site security measures
 - Getting in and out of the machine safely (the 'three-point of contact' method)
- (b) Machine maintenance requirements, including:
 - Maintain clear windows
 - Check the machine and clear build-up of flammable debris
 - Maintain operational machine lighting
 - Maintain operational machine safety features including handles, steps, emergency exits, radios, door latches, etc
- (c) Log quality characteristics and defects, including:
 - Size (lengths and diameters)
 - Shape (straightness/sweep, ovality, taper)
 - External features (branching/forks, knots)
 - Internal features (wood properties)
 - Defects including: natural (fungal, insects, scars, deadwood, dry sides, pruning stubs, resin pockets), felling and processing defects, drying damage
- (d) Methods to reset the harvesting head's length counter, including:
 - Use on-board computer systems for single grip harvester
 - Find End function of the on-board computer system
 - Saw Zeroing method
- (e) Length and diameter measuring system fitted on harvesting heads, including:
 - Potentiometer
 - Measuring arm
 - Drive coupling
 - Length encoder
 - Measuring wheel
 - Accumulator

Source: ForestWorks (2020). Companion Volume Implementation Guide FWP Forest and Wood Product Version 6.0 July 2020, p. 22–23.

4.1. Career pathways in the forest and wood products industry

There are various pathways for entry to a career in the forest and wood products industry. Formal educational career pathways include completion of a tertiary-level forest undergraduate or graduate degree in forest science and management, or a science degree with a major in forestry. Entry to the industry can follow the completion of an accredited forest management course in the vocational education and training (VET) system. Formal completion of accredited training within VET can also occur while employed in the workforce. Non-accredited training may also be undertaken, as well as on-the-job training in the workplace.⁸⁵

4.1.1. Tertiary-level undergraduate and graduate courses

Forestry or forest-related undergraduate and postgraduate courses are available at many Australian and international universities. Graduates with forestry-related degrees typically enter the industry as project forester or equivalent.

Areas of study within tertiary forestry courses typically include:⁸⁶

- Forest science
- Environmental science and management
- Biodiversity conservation
- Forest silviculture
- Forests, carbon and climate change
- Biosecurity, pests and diseases
- Fire management and planning.

Australian tertiary institutions offering undergraduate and graduate forestry-related degrees include:

- Australian National University (Canberra, ACT)
- Southern Cross University (Lismore, NSW and Mt Gambier, SA)
- University of Melbourne (Victoria)
- University of Sunshine Coast (Queensland)
- University of Tasmania (Hobart, TAS).

Other tertiary pathways to a career in the forest industry can be accessed following the completion of a tertiary course in environmental studies and ecology, or other relevant undergraduate degree.

⁸⁵ IFA and AFG

https://www.forestry.org.au/Forestry/About/Forestry_education/Forestry/About_the_Forestry/Forestry_education/Education_pathways.aspx?hkey=3f0eef78-b116-4a17-9feb-9c6b1616eb56

⁸⁶ Ibid.

Tertiary-level training opportunities in Tasmania

There are currently no forestry undergraduate degrees available in Tasmania. However, the Australian Research Council (ARC) Centre for Forest Value (CFV) and the Centre for Sustainable Architecture in Wood (CSAW) at UTAS provide postgraduate research training opportunities.

The ARC Centre for Forest Value

The CFV receives funding from the ARC as part of the ARC's Industrial Transformation Training Centres scheme.⁸⁷ The aim of the Centre is to produce industry-ready graduates and postdoctoral fellows with a broad perspective of the forest industry. Research and training opportunities target the whole value chain, from component design and construction, component fabrication, wood product manufacture, log harvesting, forest production, certification and forest restoration. The Centre has eight industry partners from across the forest value chain. Industry partners provide strategic advice to ensure the benefits and outcomes arising from the Centre are optimised to support industry transformation. Industry involvement in the Centre helps build research capacity within the sector and provides evidence-based research to industry identified problems.⁸⁸

The Centre for Sustainable Architecture in Wood

CSAW is a broad, multidisciplinary research and education group located within UTAS's Department of Architecture and Design. The purpose of CSAW is to foster the use of timber and wood products as building materials that are efficient, economic, environmentally sustainable and socially responsible. CSAW collaborates with industry, external research organisations in Australia and internationally, and with colleagues throughout UTAS.⁸⁹

Stakeholder assessment of tertiary-level entry to the forest industry in Tasmania

Feedback from the stakeholder consultation indicates forestry-related industries have difficulty recruiting forestry graduates to work in Tasmania. This may be because of the relatively small number of places offered in forestry undergraduate degrees at Australian universities – it was observed that there are not enough forestry students graduating to meet demand, which is further confounded by the preference for many forestry graduates trained on the mainland to remain on the mainland once they have graduated (pers comm. stakeholder interview).

“Forestry and agriculture are not ‘sexy’ things to study, there is a perception that they are dumb, dirty and dangerous, yesterday’s industry...”

Stakeholder interview

One of the consequences of the shortfall in the supply of forestry graduates is that some stakeholders reported recruiting graduates from non-traditional areas such as agricultural science or plant science. While these graduates do not necessarily have specific forest knowledge, stakeholders report that having recruits with a broader knowledge base has other advantages, particularly with the increasing focus on

⁸⁷ For more information about the Industrial Transformation Training Centres see <https://www.arc.gov.au/grants/linkage-program/industrial-transformation-research-program/industrial-transformation-training-centres>

⁸⁸ University of Tasmania <https://www.utas.edu.au/arc-forest-value/partners>

⁸⁹ University of Tasmania <https://www.utas.edu.au/csaw>

environmental science and management and biodiversity conservation. Some stakeholders even proposed that the traditional tertiary-level forestry courses should be broadened to include more environmental related subjects. Alternatively, forestry relevant subjects could be integrated within related undergraduate courses, such as agricultural and environmental science.

4.1.2. Forest and wood products vocational education pathways

Much of the education and training that takes place within the forest and wood products industry occurs within the VET sector, a national education system involving the Commonwealth, state and territory governments and the private sector. The VET system provides workplace-specific skills, training and knowledge.

The forest and wood products training package provides career pathways to occupations within the six industry sectors: Forest Growing and Management, Harvesting and Haulage, Sawmilling and Processing, Engineered Wood Panel Production, Timber Manufactured Products, and Timber Supply. The occupational outcomes of qualifications within the forest and wood products industry are outlined in Table 8.⁹⁰

Forest and wood products qualifications within the VET system align with the Australian Qualification Framework (AQF), a national framework agreed by Commonwealth, State and Territory ministers incorporating the qualifications from each education and training sector into a single comprehensive national qualifications framework.⁹¹

⁹⁰ ForestWorks, "Companion Volume Implementation Guide FWP Forest and Wood Product Version 6.0".

⁹¹ Australian Qualification Framework <https://www.aqf.edu.au/>

Table 8 Industry sectors and occupational outcomes of qualifications within the Forest and Wood Product training package.

Industry Sectors and Occupational Outcomes of Qualifications							
AQF Level	Forest Growing and Management	Harvesting and Haulage	Sawmilling and Processing	Engineered Wood Panel Production	Timber Manufactured Products	Timber Supply	
II	Arboriculture Worker Farm Forestry Worker Forestry Worker Nursery Worker Plantation Establishment Worker Plantation Forest Officer Silviculturist	Bulldozer Operator Chainsaw Operator Excavator Operator Forest Harvester Forwarder Operator Grader Harvesting Technician Mobile Equipment Operator Rigging Slinger Skidder Operator	Kiln Worker Timber Grader Treatment Plant Worker Production Worker Sawmill Worker Wood Machinist Saw Technician		Production Worker (laminates) Production Worker (engineered wood panel) Production Worker (veneer)	Grader Manufacturing Assistant (timber products) Saw Operator Timber Manufacturing Worker Engineered Wood Product Manufacturing Worker Timber Products Worker Timber Puller	Customer Service/Sales Assistant (retail or wholesale)
III	Arboriculture Technician Farm Forestry Technician Forestry Technician Nursery Technician Supervisor (Forestry Operations) Tree Planter Silviculturist	Bulldozer Operator Excavator Operator Feller Buncher Operator Forest Harvester Forwarder Operator Harvesting Technician In-field Chipper Operator Loader Operator Log Truck Driver Mobile Equipment Operator Skidder Operator	Benchman Chipper Operator Head Rig Operator Kiln Operator Machine Operator (e.g. finger jointing, moulding, planning) Production Tech.	Timber Grader Timber Products Technician Treatment Plant Operator Saw Technician Optimisation Technician Wood Machinist Technician Sawyer	Production Technician/Operator (laminates) Production Technician/Operator (engineered wood panel) Production Technician/Operator (veneer) Timber Fabricator (laminates)	Press Operator Jig Setter Machine Operator (e.g. finger jointing, moulding, planning) Saw Operator Kiln Operator Timber Manufactured Products Technician Engineered Wood Products Technician Timber Fabricator (truss & frame) Timber Systems Designer/Estimator (truss & frame)	Customer Service/Sales Assistant (retail or wholesale) Customer Service Officer Sales and Merchandising Team Leader Sales and Merchandising Team Leader (timber products) Timber Advisor
IV	Arboriculture Supervisor Farm Forestry Supervisor Forestry Supervisor Forestry Operations Supervisor	Harvesting Supervisor Harvesting Team Leader Propagation and Stand Health Supervisor Tree Farm Supervisor	Customer Service Manager (wholesale) Sawmill Supervisor Production Supervisor Treatment Plant Supervisor Optimisation Manager		Timber Advisor Supervisor Timber Manufacturing Supervisor Timber Supervisor (wholesale) Timber Systems Designer/Detailer (truss & frame)		
V	Arboriculture Manager Forest Manager Forestry Manager Harvesting Manager	Nursery Manager Plantation Establishment Manager Plantation Manager Production Manager	Sawmill Manager Timber Advisory Manager Timber Manufacturing Manager Tree Farm Manager		Production Manager	N/A	
VI	Community Liaison Officer Designer (manufacturing and engineered wood products) Environmental Manager Environmental Planner		Forest/Timber Harvester Forest Auditor (e.g. certification provider) Forest Planner Forest Sustainability Manager		Forestry Manager General Manager Plantation Manager Sustainability Manager	Technical Forester Technical Services Officer Technical Services Manager Value Recovery Officer	

Source: ForestWorks (2020). Companion Volume Implementation Guide FWP Forest and Wood Product Version 6.0 July 2020 p.39

4.1.3. Unaccredited pathways

Historically training in the forest industry has been largely unaccredited, including ‘on-the-job’ training. This prevalence of on-the-job training rather than formal qualifications is reflected in the lower levels of post-schooling education in all sectors of the forest and wood products industry compared with the whole Tasmanian workforce, as outlined in Table 7. Unaccredited education and training courses do not contribute to qualifications within the AQF.

As well as on-the-job training, other unaccredited training is available through programs such as those run by Private Forests Tasmania (PFT)⁹² (see Box 3). This includes supporting private landowners, including farmers, with the skills and knowledge to participate in farm forestry or agroforestry. Encouraging farmers to establish trees on farms can provide multiple environmental, economic and social benefits to farmers as well as the wider community.⁹³ Integrating trees on farms, whether for environmental or commercial reasons, is becoming increasingly important as identified in the *Growing a Better Australia – A Billion Trees for Jobs and Growth* plan.⁹⁴ As such, support and training provided to landowners by organisations such as PFT will also become increasingly important.

Box 3 Example of unaccredited training skills provision provided by Private Forests Tasmania.

Private Forests Tasmania (PFT)

Established in 1994 as a statutory authority under the *Private Forests Act 1994* (Tas). PFT has a legislated role to facilitate and expand the development of Tasmania’s private forest resource in a manner that is consistent with sound forest and land management practices.

PFT is the only government-funded authority established in Australia to specifically promote, foster and assist the private forestry sector on forestry matters. PFT provides information and advice to private growers and their markets using research, innovation and planning tools. PFT represents the interests of private forest growers by providing practical policy advice to the state and federal governments.

As a statutory authority, funding is provided by the Tasmanian state government as well as from a levy paid by private forest growers.

Recent initiatives include the development of the Integrated Farm Forestry Demonstration Sites Program to develop landscape-scale best practice forestry plantings in North West, Northern and Southern Tasmania. Other services provided to growers include information on grant funding, forestry information sheets, private forests information sheets, information about market opportunities, and a farm forestry tool kit.

Source: <https://www.treealliance.com.au/about>

⁹² Private Forests Tasmania <https://www.treealliance.com.au/home>

⁹³ Aysha Fleming et al., "Understanding the Values Behind Farmer Perceptions of Trees on Farms to Increase Adoption of Agroforestry in Australia," *Agronomy for Sustainable Development* 39, no. 1 (January 22 2019). <https://doi.org/10.1007/s13593-019-0555-5>.

⁹⁴ DAWR, "Growing a Better Australia – a Billion Trees for Jobs and Growth."

4.2. Overview: vocational education and training (VET) in Australia

Much of the training in the forest and wood products sector takes place within the VET framework. As such it is important to understand the underlying structure of the VET framework in Australia before examining how this framework applies to the forest and wood products industry in general, and in Tasmania in particular. The following section provides an overview of the vocational competency-based training framework in Australia.

VET is a national training system established in 1992. The multilevel governance framework involves input from Commonwealth, states and territories, as well as receiving strategic input from industry (Figure 4). At the government level the Council of Australian Governments (COAG), COAG Industry and Skills Council (CISC), along with state and territory ministers and departments, are responsible for intergovernmental arrangements in the sector. Training packages are developed and reviewed by the Australian Industry and Skills Committee (AISC), an industry-expert committee acting on advice from industry reference committees (IRCs). The sector is regulated by the Australian Skills Quality Authority (ASQA) alongside state-based regulators in Victoria and Western Australia.⁹⁵

AISC comprises industry leaders from across Australia who provide an industry-based perspective to government ministers. AISC is responsible for the development of national training package products within the VET sector. It is the role of AISC to ensure Australian workers are provided with industry-relevant skills that meet the needs of employers now and into the future.

IRCs provide a conduit from industry to government. IRCs are comprised of industry representatives with expertise from a cross-section of the relevant industry or sector. The primary purpose of the IRC is to provide advice to the AISC about the skills needs of their industry or sector.

Skills service organisations (SSOs) are independent, professional service organisations that support IRCs to develop and review training packages to ensure the packages reflect the skills needs of industry. SSOs support IRCs to develop a four-year Industry Skills Forecast and Proposed Schedule of Work (Industry Skills Forecast).

⁹⁵ Department of Agriculture Water and the Environment, "National Agricultural Workforce Strategy Literature Review," (Canberra2020).

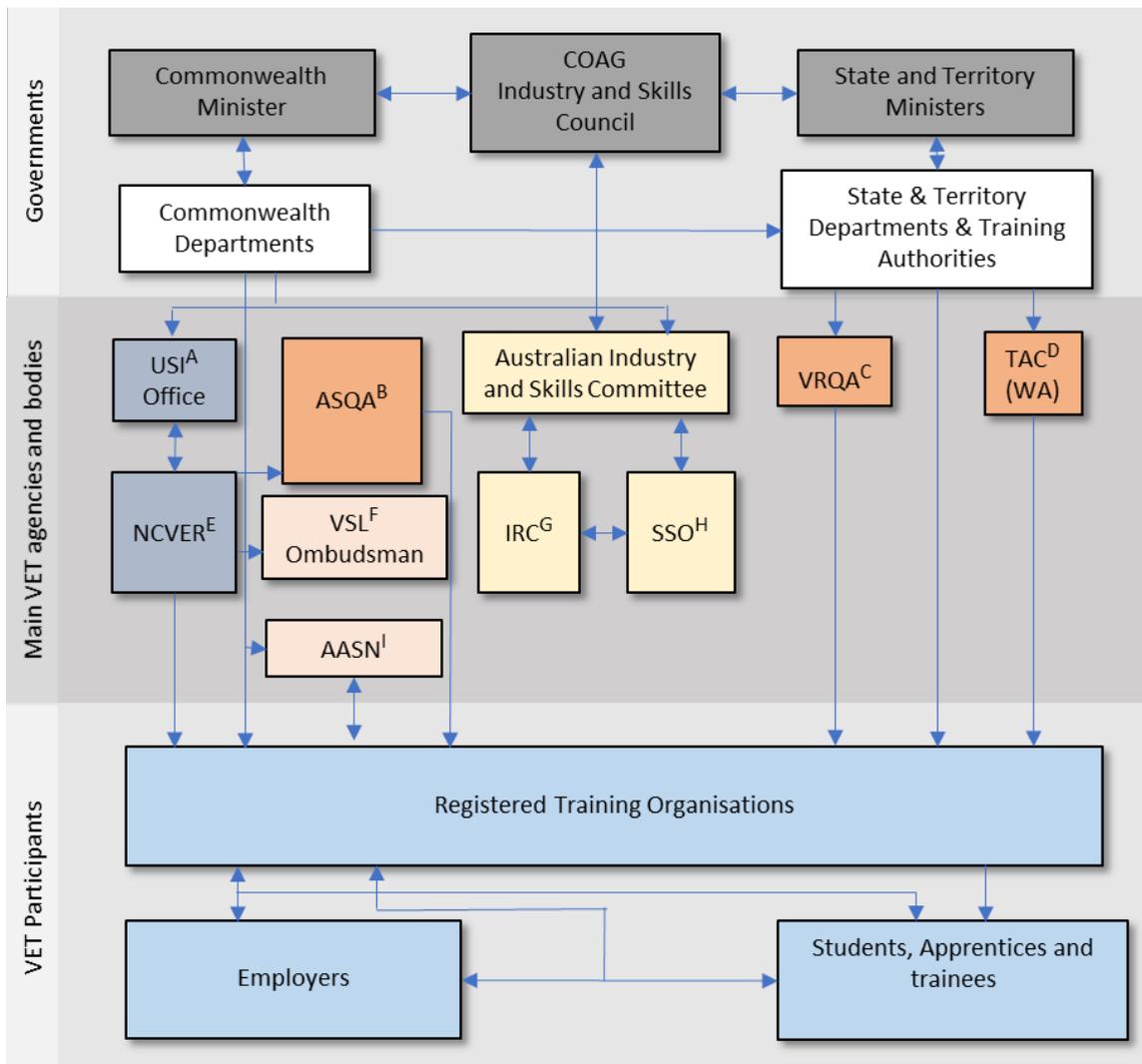


Figure 4 Governance arrangements for the Australian vocational education training (VET) system.

Key: (A) Unique Student Identifier; (B) Australian Skills Quality Authority; (C) Victorian Registration & Qualifications Authority; (D) Training Accreditation Council (WA); (E) National Centre for Vocational Education Research; (F) VET Student Loans; (G) Industry Reference Committee; (H) Skills Services Organisation; (I) Australian Apprenticeship Support Network.

Source: Department of the Prime Minister and Cabinet (2019). Strengthening Skills: Expert Review of Australia's Vocational Education and Training System

4.2.1. Training packages: a key component of VET

Training packages are a key component of the education training and skills framework. Training packages are occupational skills standards that define the skills and knowledge needed for individuals to effectively perform job roles within the workplace. The aims of training packages are to:^{96, 97}

- Ensure workplace skill demand align with the supply of skills and knowledge training
- Provide the core, job-specific and transferable skills necessary to effectively perform job roles
- Provide national recognition of vocational outcomes of learning, ensuring the portability of skills and supporting movement between school, VET and higher education sectors
- Encourage flexible and relevant workforce development and training that suits individual and industry requirements.

Training package development is primarily undertaken by:

- The Australian Industry and Skills Committee (AISC)
- Industry reference committees (IRCs)
- Skills service organisations (SSOs).

Training package components

Training packages can include endorsed and non-endorsed components. Endorsed components consist of four nationally endorsed training package products:⁹⁸

- A qualification that aligns with the Australian Qualification Framework (AQF) – Certificate I to Advanced Diploma, and Graduate Certificate and Graduate Diploma
- Units of competency, which specify the standard of performance required in the workplace
- Assessment requirements associated with each unit of competency
- Credit arrangements, specifying existing arrangements between training package qualifications and higher education qualifications in accordance with the AQF.

Features of non-endorsed components:

- Non-endorsed components have quality assured Companion Volume Implementation Guides to support training and assessment
- Industry recognised skill sets addressing an industry need or a licensing or regulatory requirement. Skill sets are not endorsed but must be provided for consultation and validation as part of the training package development process and submitted to AISC for approval.

⁹⁶ <https://www.employment.gov.au/training-packages>

⁹⁷ ForestWorks, "Companion Volume Implementation Guide Fwp Forest and Wood Product Version 6.0".

⁹⁸ Australian Industry Skills Committee Training Package Development and Endorsement Process Policy https://docs.employment.gov.au/system/files/doc/other/tpdepp_jun_2020.pdf

4.3. The forest industry vocational training framework in Tasmania

Figure 5 provides an overview of the key government agencies and organisations responsible for the development of industry skills and training for the forest industry in Tasmania.

Four IRCs are responsible for developing the national training package relevant to the forest industry:

- The Timber and Wood Processing IRC – oversees the development of industry units of competency, skill sets and qualifications relevant to Sawmilling and Processing, Saw Technology and Wood Machining
- The Forest Management and Harvesting IRC – oversees the development of industry units of competency, skill sets and qualifications relative to the Forest Growing and Management and Harvesting and Haulage sectors
- The Timber Building Solutions IRC – oversees the development of industry units of competency, skill sets and qualifications relevant to Timber Merchandising, Timber Manufactured Products, Timber Truss and Frame, and Timber Merchandising
- The Pulp and Paper Manufacturing Industry IRC – oversees the development of industry units of competency, skill sets and qualifications relevant to the Personal and Family Care Products, Paper Products, and Fibre Based Packaging.

The four IRCs are supported by Skills Impact. Skills Impact is a not-for-profit, industry-owned SSO. As an SSO, Skills Impact's role is to benchmark learning and skills standards for industry.⁹⁹

Skills Impact contracts ForestWorks to manage government-approved training, provide support services to the four forest and wood products sector IRCs, develop skills standards, and manage government-approved training. ForestWorks is an industry-owned not-for-profit organisation offering skills development services for industry.¹⁰⁰

In Tasmania training and workforce development is supported by Skills Tasmania, a division of the Department of State Growth.

⁹⁹ <https://www.skillsimpact.com.au/>

¹⁰⁰ <https://forestworks.com.au/about-forestworks/>

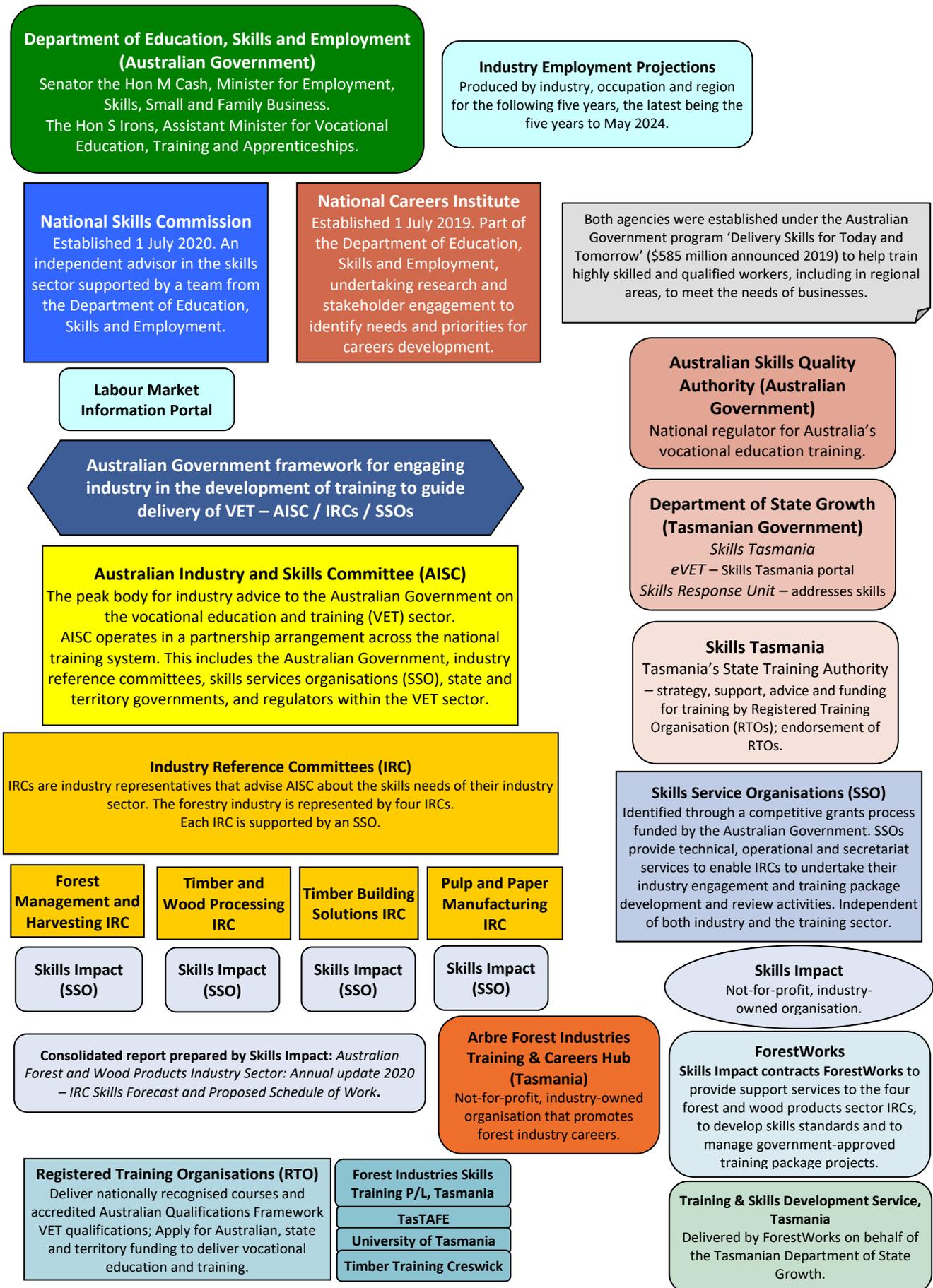


Figure 5 Schematic overview of the Australian forest industry skills and training network, with reference to Tasmania

4.3.1. The FWP Forest and Wood Products Training Package

Currently the FWP Forest and Wood Products Training Package offers qualifications at AQF levels 1 to 6: Certificates I to IV, Diploma and Advanced Diploma (Figure 6).

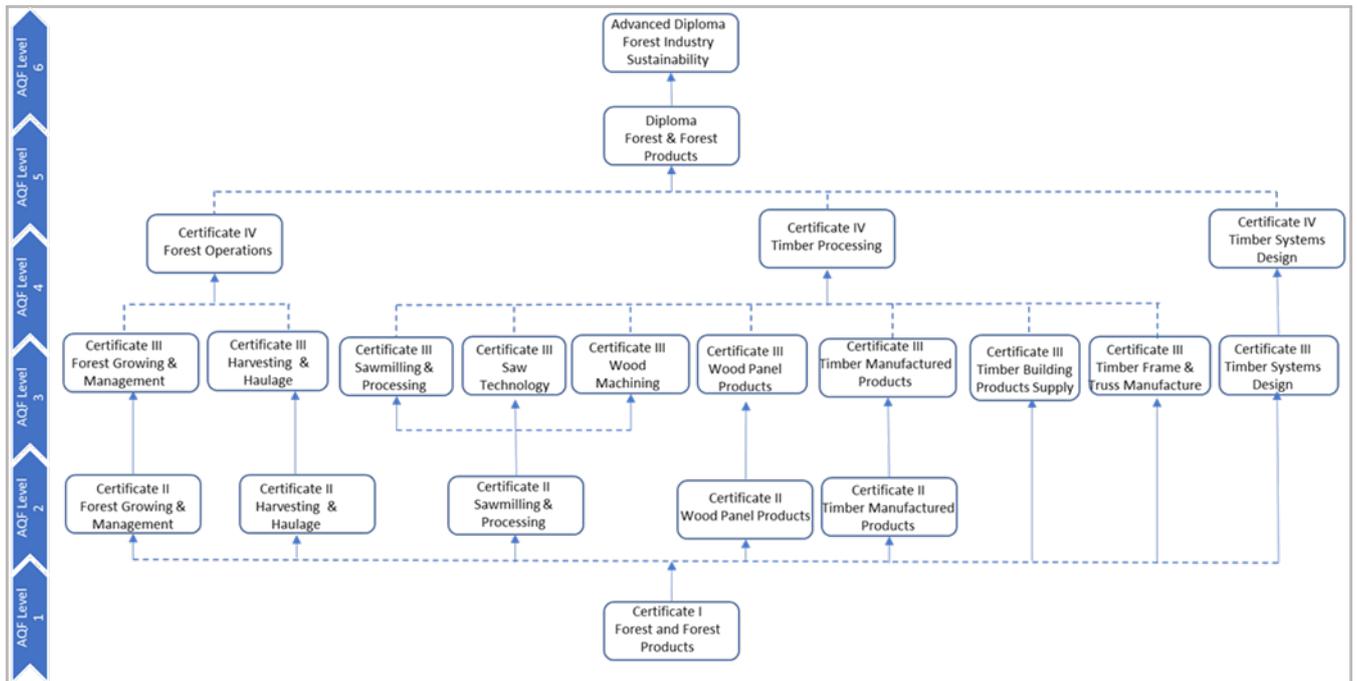


Figure 6 Forest and wood products career pathways, July 2020. Source: ForestWorks (2020) ¹⁰¹

The FWP Forest and Wood Products Training Package includes units for seven industry sectors (Table 9).

¹⁰¹ ForestWorks 2020 Companion Volume Implementation FWP Forest and Wood Product Version 6.0
<https://www.skillsimpact.com.au/site/skilliampactmedia/uploads/2019/09/IMPL.FWPForestAndWoodProducts.V6.0.pdf>

Table 9 Industry sectors included in the FWP Forest and Wood Products Training Package. Source: ForestWorks (2020). Companion Volume Implementation Guide FWP Forest and Wood Product Version 6.0 July2020

Code	Unit Sector
COR	Core: <ul style="list-style-type: none"> • Forest Growing and Management • Harvesting and Haulage • Sawmilling and Processing • Timber Manufactured Products • Timber Merchandising • Wood Panel Products • Timber Truss and Frame Design and Manufacture
COT	Common Technical
FGM	Forest Growing and Management
HAR	Harvesting and Haulage
SAW	Sawmilling and Processing
TIMM	Timber Manufactured Products Timber Merchandising
WPP	Wood Panel Products

In 2019 the greatest number of enrolments in FWP Forest and Wood Products Training Package in Australia were at the Certificate II and III level, predominantly for the occupations of Forestry Worker or Logging Plant Operator (Figure 7). Of the 1591 FWP Forest and Wood Products Training Package training program enrolments in Australia in 2019, almost one quarter (23%) were delivered in Tasmania, second only to Victoria (27%).¹⁰²

¹⁰² AISC <https://nationalindustryinsights.aisc.net.au/industries/forest-and-wood-products/forestry>

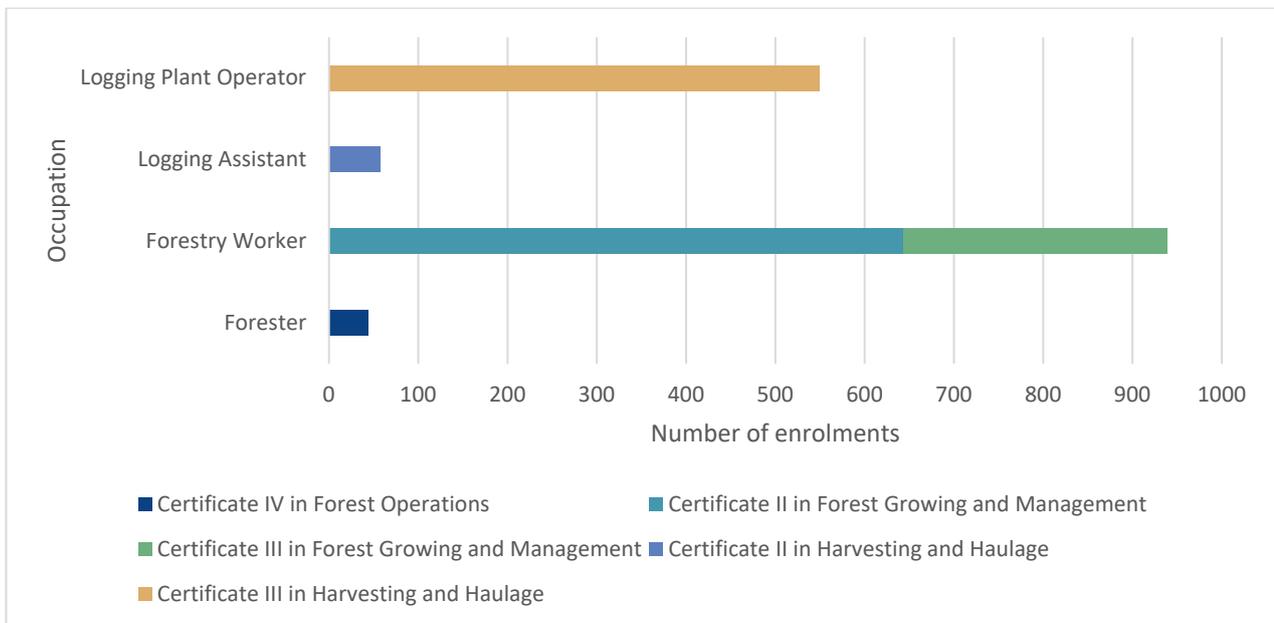


Figure 7 Forestry related qualifications: number of program enrolments by qualification level and occupation (6 digit ANZSCO) 2019. Source: AISC¹⁰³

4.4. Stakeholder assessment of the current education, training programs, workforce development and career pathways

Feedback from the stakeholder consultation is that the current VET system is not meeting industry needs for education and training. This observation is supported by the fall in enrolments in forestry-related qualifications between 2015 and 2019, with the number of enrolments more than halving in this period, from 3092 in 2015 to 1501 enrolments in 2019 (Figure 8).¹⁰⁴

“The courses available are not accessible, not relevant, and not targeted at what needs to be done.”

Stakeholder interview

Stakeholders outlined many concerns about the efficacy of the current education, training programs, workforce development and career pathways, with one interviewee noting that the “whole curriculum needs to be reviewed”. Concerns about the current training system included that it is complex, difficult to navigate, presenting many obstacles and impediments to formal skill development. Similar systemic issues were noted in a Commonwealth government review of Australia’s VET system in 2019.¹⁰⁵ The 2019 review proposed a six-point plan to strengthen the skills education sector in Australia.

¹⁰³ AISC <https://nationalindustryinsights.aisc.net.au/industries/forest-and-wood-products/forestry>

¹⁰⁴ Ibid.

¹⁰⁵ Department of the Prime Minister and Cabinet, "Strengthening Skills: Expert Review of Australia’s Vocational Education and Training System," (Canberra2019).

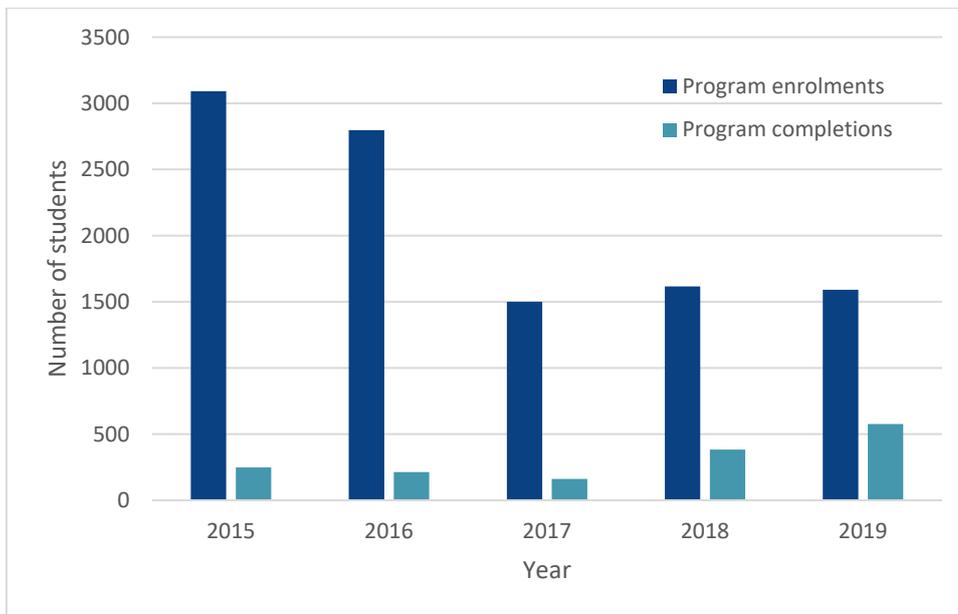


Figure 8 Forestry-related qualifications: number of VET program enrolments and completions for 2015–2019. Source: AISC¹⁰⁶

4.4.1. Accessing skills training

Acquiring the skills necessary for the safe and efficient performance of jobs within the forest industry, particularly where there is a requirement for formal accreditation of skills, requires access to education and training services. To assess the relative ease of difficulty in accessing education and training opportunities survey respondents were asked to indicate on a five-point scale (1 = very difficult; 2 = somewhat difficult; 3 = neither easy or difficult; 4 = somewhat easy; 5 = very easy) how easy or difficult it had been to access required education skills and training in the past three years.

The most difficult training to access was training in the areas of haulage (transport/driver), compliance training, operations and forest management, ecology and silviculture, and firefighting. In contrast business and finance, occupational health and training, and hand-held machinery training was relatively easy to access (Table 10).

¹⁰⁶ AISC <https://nationalindustryinsights.aisc.net.au/industries/forest-and-wood-products/forestry>

Table 10 Survey respondent ratings of ease in accessing required education skills and training in past three years.¹

	Difficult %	Neither easy nor difficult %	Easy %
Transport/driver	43	29	29
Compliance training	43	25	33
Operations/management	42	22	36
Ecology/silviculture	42	28	31
Fire fighting	41	25	34
IT/software	39	33	28
Community relations	39	26	36
Heavy machinery	25	45	29
Marketing/sales	24	38	38
Business/finance	23	33	44
OHS	23	25	43
Hand-held machinery	17	38	45

¹ Calculated as percentage of survey respondents rating the ease in accessing required education skills and training as very difficult/somewhat difficult, neither easy or difficult, or very easy/somewhat easy.

4.4.2. Barriers to accessing skills training

Cost, time and location are significant barriers to accessing skills, training and education, particularly for smaller operators (Table 11). The time needed to travel large distances to attend formal training courses increases the cost to individuals and businesses. Recently, difficulties associated with accessing training both intrastate and interstate have been exacerbated by travel restrictions and distancing requirements established in response to the COVID-19 pandemic.

The availability of skilled trainers is also a significant barrier to accessing necessary or desired training and education. For example, although formal accreditation for road transport and driver training for haulage drivers is required in the post-harvest industry segment, one training provider noted: “Over the last three years it has proved impossible for us to access a trainer to provide log truck driver training”.

“The culture in the industry around reluctance in training staff who then move on is a challenge.”

Survey respondent

Table 11 Barriers to accessing the required or desired training, skills and education opportunities identified in the stakeholder survey

Barrier	Description
Cost and time	Specialist external training is generally cost prohibitive, especially for small companies.
Location of available courses	Travel time to access available courses is a barrier, e.g. no Cert IV in WHS (work health and safety) in Launceston requires travel to NW Tasmania. Location, especially relating to COVID-19 interstate travel restrictions.
Availability of appropriate training	Lack of people offering or requesting training in professional and technical forestry skills. Graduates from other disciplines lack key fundamental training in ecology, silviculture, forest measurement, engineering etc. There is a need for more flexibility, and more relevant training packages, e.g. shortage of RTOs providing IT/software training in Tasmania necessary to access technological advances; lack of service providers especially for plant operators and heavy haulage. Key gaps in forest estate modelling and silviculture training.
Lack of career pathway for school leavers	No clear pathway for school students to enter the industry. Related to this there is a need for better community education about the industry: ‘what we actually do’. Need for forestry training at the university degree level in Tasmania.
Training structure	Current Government Business Enterprise framework is top-heavy, a barrier to growing the sector and increasing resilience; bureaucracy between agencies.
Industry culture	A lack of openness to learning and a lack of belief that there may be new ways to lead and operate.

4.4.3. Stakeholder recommendations for reducing training barriers

Survey respondents were asked to recommend ways to remove or lessen barriers to accessing training, skills and education opportunities. The recommendations were grouped to reflect categories or themes (Table 12). Six general categories of recommendations to address training barriers were identified:

1. Identify training needs to ensure the training is targeted to reflect needs within the industry. This includes developing a Workforce Development Plan for the forest industry. Workforce planning is a critical tool used to position the industry to deliver the best outcomes for the industry and manage workforce-related risks.¹⁰⁷ Workforce development planning helps identify priorities, and the capacity and capability of the industry to meet its objectives. A Workforce Development Plan would help identify areas of skill shortages and develop strategies to address these shortages.
2. Restructure and reduce the cost of training, including ensuring trainers and assessors are available locally, particularly given the regional and remote nature of forest operations in Tasmania. It is also recommended that a program like the current Training and Skills Development Service (TSDS) program is instituted to help navigate the training system, and help smaller operators access required, industry-specific training. There needs to be a change away from formal qualifications to a structure where there is more focus on delivering ‘skill sets’ targeting to the performance of industry-specific jobs.

¹⁰⁷ <https://www.apsc.gov.au/2-workforce-planning-explained>

3. Increase skills and training funding. The cost of training was identified as a significant barrier to accessing training, especially for smaller operators. One of the stakeholders interviewed noted that funds for training is one of the “first things to go” when business returns are reduced. It was recommended that funding be linked to industry identified training needs to help address industry skill shortages.
4. Facilitate appropriate training and course development. The current formal education framework is complex, inflexible and difficult to navigate. Stakeholders query the relevance of the current structure considering the technological changes occurring within the industry. It is recommended that the formal education and training framework is reviewed and restructured to better align with industry needs.
5. Encourage community education to improve the understanding of forest ecosystems, the ecosystem services they provide, and the role of forestry within these ecosystems. Better community understanding of forests and forestry will help increase the social acceptance of forestry, potentially reducing opposition to forestry operations while also encouraging younger people to see forestry as a viable career option.
6. Review trainer training and qualifications, which are currently too focused on the formal course-based education framework, to address trainer shortages, and align training with the needs of the industry (e.g. the accreditation of workplace training).

Table 12 Stakeholder recommendations to lessen barriers to accessing training, skills and education

Proposal	Description
Identify needs	<ul style="list-style-type: none"> • Establish a holistic, industry-based approach to identify needs and requirements, from research to training • Identify needs and requirements of the industry; develop and implement the industry Workforce Development Plan
Restructuring and reducing costs	<ul style="list-style-type: none"> • Organise ‘bulk’ training opportunities through industry associations to reduce costs • Establish a successor to the Training and Skills Development Service (TSDS). The TSDS enabled the Forest Practices Authority (FPA) to provide subsidised training for industry as it was not limited to providing funding for RTO-delivered training • Address the need for locally available trainers and assessors; provide short courses in regional areas • Sponsor or subsidise training places by the industry association or government, or both, to reduce the cost barrier for less financial businesses
Increase funding	<ul style="list-style-type: none"> • Provide funding for restructuring and identification of industry need • Provide government funding for traineeship positions to increase professionalism across the industry and establish clear career pathways • Increase funding for forestry specific technical and further education (TAFE) training • Provide funding linked to learning and development initiatives • Provide more government (state and/or federal) funding to provide skill sets rather than focusing on full qualifications
Appropriate training – course development	<ul style="list-style-type: none"> • Complete review of courses and funding to create more relevant, useful and applicable courses for industry (forestry, timber and agroforestry) • Develop post-secondary courses for entry to the industry, ie career pathway, including preparation for working in rural communities • Provide incentives/scholarships to encourage students to undertake post-secondary courses • Develop courses more aligned to current marketplace demands, ie align ways of managing the public resource with community values and expectations • Align courses with the real time needs and requirements of the industry • Enable reliable RTOs that focus on addressing skills gaps • Ensure flexibility in training opportunities
Community education	<ul style="list-style-type: none"> • Promote positive aspects of sustainable native forest management to the public • Provide a timber processing and harvesting sector schools pathway that is similar to the school-based Cadet Forester Program in Tasmania, which is working well to provide a career pathway for technical foresters • Develop secondary courses to encourage Year 11 and 12 students to undertake forestry training
Address trainer shortages	<ul style="list-style-type: none"> • Restructure trainer training and qualifications. The current vocational qualification to be a VET trainer is oriented too much towards TAFE teachers rather than industry instructors and is an impediment to accessing industry trainers

4.5. Industry training initiatives

The forest industry in Tasmania has responded to the need for a better training framework by instituting various training initiatives, including the Arbre Forest Industries Training and Careers Hub, the For Our Future — Regional & Collaborative Leadership Program, and the Tasmanian Training and Skills Development Service (TSDS). Details of these industry initiatives are outlined below.

4.5.1. The Arbre Forest Industries Training and Careers Hub

The Arbre Hub is a not-for-profit organisation established in 2016 by industry leaders in Tasmania to help promote training and careers within the forest industry by acting as a conduit between those seeking a career in the industry and prospective employers.¹⁰⁸ Currently the focus of the Arbre Hub training and careers advice services is the harvesting, transport and silviculture sectors. The Arbre Hub has a training facility with in-field capability and acts as a referral agency to industry-endorsed training providers.

“The ARBRE in Launceston has been pivotal in getting forestry back on topic at school career days, and the travelling simulators are key in attracting young people.”

Stakeholder interview

The Arbre Hub works in consultation with RTOs to source appropriate training for members and non-members within industry. The Arbre Hub’s role is to facilitate RTO training or industry affiliated training and source appropriate training organisations. This includes sourcing funding for the delivery of training programs such as upskilling programs and grants.

The Arbre Hub is overseen and managed by a governing board represented by Forico, Sustainable Timber Tasmania, Timberlands Pacific, Norske Skog, Reliance Forest Fibre, Waratah Forestry Equipment Pty Ltd, Casagrande Lumber Pty Ltd and Technical Forest Services.

4.5.2. For Our Future — Regional & Collaborative Leadership Program

The For Our Future — Regional & Collaborative Leadership Program is an intensive, experiential-based program run by FWPA that aims to develop leaders in the forestry and wood industries.¹⁰⁹ The training is delivered in partnership with the Australian Rural Leadership Foundation and Polykala, an organisation that focuses on developing leaders in sectors facing complex challenges or change. The For Our Future program has been run in Tasmania and Gippsland, Victoria – the program was oversubscribed in both regions, indicating the substantial need within the industry for leadership programs such as this.

4.5.3. Tasmanian Training and Skills Development Service (TSDS)

The TSDS provides funding support for current and potential forestry employees to undertake training and skills development.¹¹⁰ The TSDS supports industry-endorsed non-accredited training for skills that the industry has determined are important but would not otherwise be subsidised. The TSDS also supports businesses to engage in workforce development planning.

¹⁰⁸ Arbre <http://arbre.net.au/index.php>

¹⁰⁹ FWPA <https://www.fwpa.com.au/forwood-newsletters/1737-building-our-future-through-leadership.html>

¹¹⁰ ForestWorks 2020 Training and Skills Development Service (TSDS) Progress Report - August 2016 to December 2019

The TSDS program is delivered by ForestWorks, an industry-owned not-for-profit organisation, under the auspices of the Department of Infrastructure, Energy and Resources. The TSDS is governed by an industry-based Project Steering Committee. The service was originally established to provide transition support payments and skills development to forest industry employees directly affected by the 2013 Tasmanian Forests Intergovernmental Agreement. Since 2016 the focus of the TSDS has moved to providing skill development services.

Strengths of the TSDS program include high completion rates (98%), the provision of financial support to small businesses otherwise unlikely to access training for their workers, providing funding for training that is of benefit to industry, and its flexibility: changes can be applied for, and approved, during the life of the project as training needs change.

The TSDS has been very successful with all funding rounds being oversubscribed. Funding for the TSDS will conclude in June 2021.

5. Constraints on the labour market

This section examines the current skills and labour force market and projections for future changes in the labour market and, in the context of the main trends considered likely to impact on the forestry sector, discusses the ways access to skilled operators may potentially promote or limit growth within the sector.

The long-term sustainability and future growth of the forest industry in Tasmania is dependent on the availability of a labour force with the required skills to undertake industry activities. The degree to which the labour force market can meet the supply and demand for labour is one measure of the potential for future growth. For example, a shortage of workers with the appropriate skills can have an inflationary effect on wages, increasing labour costs. Similarly, underemployment indicates underutilisation of available skills.

5.1. Current labour market in Tasmania

Table 13 indicates the number of direct jobs that depend on the presence of the forest industry sector in Tasmania in 2017. There is a relative shortage of fine data reporting labour market conditions in Tasmania at the level of industry sub-sector. Data in Table 13 were collected in a survey of forest industry businesses operating in Tasmania between 2017 and 2018 and reported in the FWPA *Socio-economic Impacts of the Forest Industry: Tasmania*.¹¹¹ This shows that up to the point of sale of primary processed products, the forest industry generated a total of 2714 direct jobs located in Tasmania during 2017–2018, and a total of 3076 jobs when secondary processing jobs were included.

¹¹¹ Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania."

Table 13 Direct employment generated by the forest industry in Tasmania, 2017–2018, by sector

Industry sector	Jobs located in Tasmania that depend on...			Total direct forest industry jobs
	Native forest	Softwood plantation	Hardwood plantation	
Growers (forest management companies)			100	284
Nurseries, silvicultural & roading contracting businesses	258	131	154	285
Other (including consultants, equipment sales, training)			27	101
Harvest & haulage contracting businesses (including in-field chipping)	197	231	323	751
Primary wood and paper processing	656	541	95	1,292
Total – excluding secondary processing	1,112	903	699	2,714
Secondary wood and paper processing (2011 ABS data)	Unknown	Unknown	Unknown	362
Total – including secondary processing	Unknown	Unknown	Unknown	3,076

Source: Schirmer et al. (2018) ¹¹² p. 21

The breakdown of jobs by industry sector indicates that just over half of the jobs that depend on the presence of the industry were within the primary and secondary processing of wood and paper products sectors, while just under half (45%) of jobs depending on the presence of the industry were generated by the growing and harvesting of native forest and plantations. ¹¹³

5.2. Access to skilled operators

The number of jobs generated by the forest industry is just one measure of the labour market – it is a snapshot in time indicating how many people are employed in the industry at that time. The number of jobs generated by the industry does not report how many people with the required skills were looking for work, or whether the demand for skilled labour was satisfied.

Another gauge of the labour market is the degree of difficulty experienced by employers in recruiting and retaining workers. In the stakeholder survey, respondents indicated on a scale of 1 (very difficult) to 5 (very easy) how easy or difficult it is to recruit and retain workers and contractors in five occupational areas (Table 14).

¹¹² "Socio-Economic Impacts of the Forest Industry: Tasmania."

¹¹³ Ibid.

Table 14 Mean ratings of ease of recruiting and retaining employers, by industry segment

Occupation	Industry segment											
	Growing and management		Post-harvest, processing		Regulatory		Training		Business, sales, marketing		Total forest industry	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
Managers/professional	24	2.42	9	2.11	12	2.83	6	3.17	3	2.67	54	2.56
Administrative	24	3.25	10	3.1	13	3.69	6	4.17	3	3.67	56	3.45
Finance/bookkeepers	24	3.54	7	3	12	3.42	6	3.83	3	3.33	52	3.46
Transport drivers	17	2.18	7	3.43	4	2.75	3	2.67	3	3.67	34	2.68
Heavy machine operators	17	2.35	8	2.5	4	3	3	2.33	3	2.33	35	2.46

Five-point scale: 1 = Very difficult; 2 = Somewhat difficult; 3 = Neither easy or difficult; 4 = Somewhat easy; 5 = Very easy

Across the forest sector, heavy machine operators and managers and high-level professional staff were the most difficult to recruit and retain, while administrative workers and finance manager/bookkeeper positions were the least difficult to recruit and retain. This pattern was relatively consistent across all industry segments, with some exceptions. For example, transport drivers were relatively less difficult to recruit and retain in the post-harvest/processing segment compared with the growing and management segment.

These findings are similar to those observed in a survey of forestry businesses in Tasmania in 2018.¹¹⁴ In the 2018 survey 75% of respondents found managers and high-level professional staff difficult to recruit, with 40% of respondents finding it difficult to recruit administrative staff. However, in contrast to the findings in this study, finance managers/bookkeepers were also relatively difficult to recruit (40% of businesses finding it difficult to recruit), while most businesses (60%) found it relatively easy to source heavy machine operators. The authors of the 2018 survey note, however, that only a few harvest and haulage contractors responded to this section of the survey, and as such the figures may not fully reflect the ease of recruiting staff in this sector.¹¹⁵

Together these findings indicate that in the current labour market in Tasmania there is a shortage of workers with management skills, transport drivers and operators of heavy machinery. This pattern was supported in the stakeholder interviews where participants reported difficulty recruiting workers to operate machinery such as bulldozers, heavy machinery for firefighting, professional and technical foresters, field operatives to do field work such as insect monitoring and survival surveys, and skilled operators in harvesting and haulage.

¹¹⁴ Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania."

¹¹⁵ Ibid.

5.3. Factors affecting access to skilled operators

Several factors were identified in the stakeholder consultation as affecting the ability to recruit workers. These included:

- Difficulties in mobilising an unskilled workforce for seasonal tasks such as tree planting: “entry level labour is hard work for not much better than award wages”
- Difficulty in competing for skilled workers with other industries, for example mining and agriculture
- The shortage of degree-level training places in Australia increasing competition for forestry graduates. This is exacerbated by the trend for young people to leave Tasmania for training and not necessarily returning
- Reluctance of workers to work in remote regional areas
- A lack of available workers with the required skills and qualifications.

In the 2018 forest industry survey ¹¹⁶ the investment and time required to build workforce skills was the main issue identified as making it difficult to recruit staff, with 71% businesses reporting that this was a big issue for them. For 57% of businesses a lack of available workers with the right skills and qualifications, and a lack of suitable workers available in their local community, were significant challenges affecting their ability to recruit staff. Forty per cent of businesses felt that lack of certainty about the future of the industry was a big issue that reduced ability to recruit staff – these were predominantly native forest-dependent businesses. A lack of certainty is not such an issue for those in the plantation sector. ¹¹⁷

5.4. Trends in the forest sector labour market

The following section outlines the trends in the national labour market, forest and wood products industry workforce projections, and trends in the labour market in Tasmania.

5.4.1. Trends in the national forest sector labour market

The National Skills Commission reports on the Australian labour market to identify workforce changes and future skills needs. Employment projections by industry, occupation, skill level and region are produced each year for the following five-year period. The employment projections are based on Labour Force Survey data and provide a guide to the expected future labour market. ¹¹⁸

In 2019 the total employment in Australia was projected to increase by 1,075,000 (or 8.3%) over the five-year period 2019-2024. While employment is projected to increase in 16 of the 19 broad industries, employment in Agriculture, Forestry and Fishing is projected to decline (–1.2%). Much of this decline is expected to occur in the agriculture industry as a result of the effects of extreme weather events and the extended drought conditions in much of Australia. ¹¹⁹

The 2019 employment projections were produced prior to the COVID-19 pandemic. Although there is uncertainty about the degree, duration and impact of the pandemic, employment across all local industry

¹¹⁶ Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania."

¹¹⁷ Ibid.

¹¹⁸ <https://lmip.gov.au/default.aspx?LMIP/GainInsights/EmploymentProjections>

¹¹⁹ Ibid.

sectors in Tasmania is estimated to fall by around 2%¹²⁰. As such the 2019 employment projections may not reflect the of current labour market conditions and should be used, and interpreted, with caution.

5.4.2. Forest and wood products industry workforce projections

Figure 9 shows current and projected trends in the national Forestry and Logging industry labour market. The three largest occupations as a proportion of the Forestry and Logging workforce are Agricultural, Forestry and Horticultural Plant Operators (15%), Forestry and Logging Workers (15%) and Agricultural and Forestry Scientists (9%). Employment levels are predicted to increase significantly between 2020 and 2024, with the greatest growth in employment projected to occur within Agricultural and Forestry Science and Paper and Wood Processing Machine Operators.

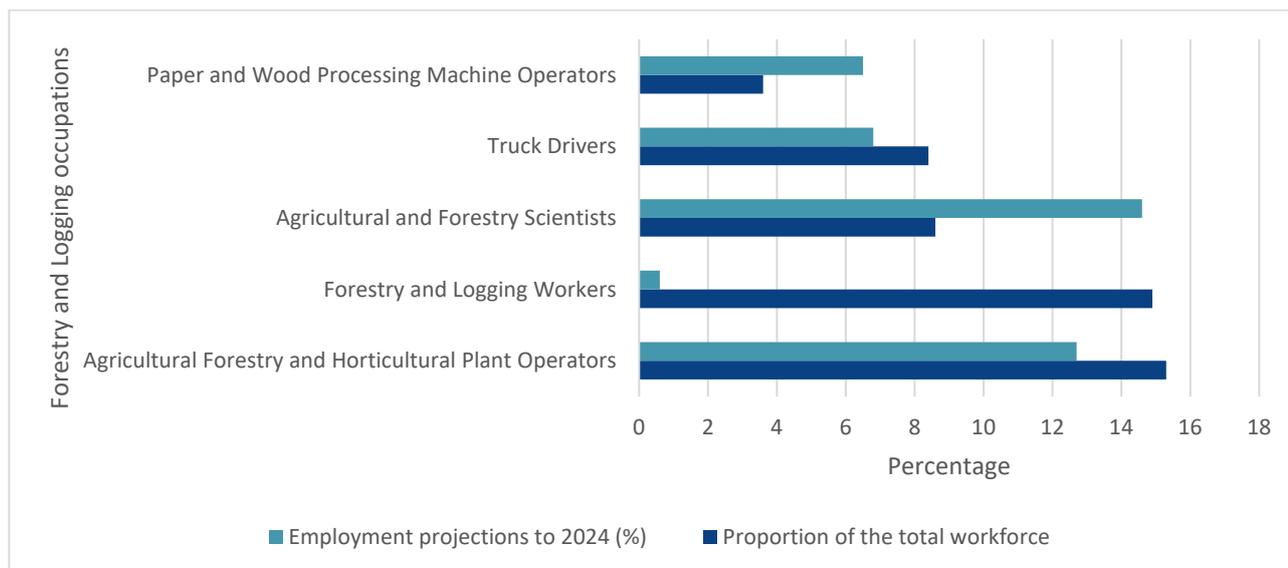


Figure 9 Occupations as a proportion of the Forestry and Logging industry workforce, and the projected employment growth for each occupation to 2024. Source: <https://nationalindustryinsights.aisc.net.au/industries/forest-and-wood-products/forestry>

A more detailed analysis of the current and projected employment for all forestry related occupations is provided by examining projections by Australian and New Zealand Standard Industrial Classifications (ANZSIC). A subset of the ANZSIC Category Codes is used by the ABS to classify workers by industry.¹²¹

To segregate data for the forest sector from the broader Agriculture, Forestry and Fishing a subset of data by ANZSIC category was extracted from the 2019 employment projections (Table 15). This data reveals that nationally the total employment in Forestry and Logging (growing and harvesting forests) and Forestry Support Services (nurseries, silviculture services) is projected to increase by about 2% over the five years to May 2024.

¹²⁰ <https://app.remplan.com.au/eda-tasmania/economy/covid-19/impact-on-employment?state=jw1zhv!3MLrcBMp0CBpALLH9zMBJh3TAflqzFafOfzfObHefBI114qIZ1M>

¹²¹ J. Schirmer et al., "Social Indicators for Australia's Forest and Wood Products Industries: Discussion Paper," (Canberra: Australian Bureau of Agricultural and Resource Economics and Sciences, 2013).

Table 15 Projected employment growth within the national forest and wood products industry by 2024. Department of Employment, Skills, Small and Family Business Projections¹

Level	ANZSIC 06 Code	Forest and wood products industries	Employment May 2019 ('000)	Projected employment May 2024 ('000)	Projected employment growth five years to May 2024 ('000)	Projected employment growth five years to May 2024 (%)
1	A	Agriculture, Forestry and Fishing				
3	030	Forestry and Logging	5.2	5.3	0.1	1.7
3	051	Forestry Support Services	4.4	4.5	0.1	2.5
1	C	Manufacturing				
3	140	Wood Product Manufacturing, nfd ²	0.1	0.1	0.0	0.0
3	141	Log Sawmilling and Timber Dressing	9.2	8.4	-0.8	-8.5
3	149	Other Wood Product Manufacturing	40.2	41.8	1.6	3.9
3	150	Pulp, Paper and Converted Paper Product Manufacturing, nfd ²	2.7	2.2	-0.5	-19.5
3	151	Pulp, Paper and Paperboard Manufacturing	3.6	3.6	0.0	0.8
3	152	Converted Paper Product Manufacturing	8.1	8.1	0.0	0.3
3	161	Printing and Printing Support Services	33.6	28.3	-5.3	-15.7
3	162	Reproduction of Recorded Media	0.3	0.3	0.0	-14.4
3	251	Furniture Manufacturing	43.6	43.5	-0.1	-0.2
1	E	Construction				
3	324	Building Completion Services	210.1	225.5	15.4	7.3
1	F	Wholesale Trade				
3	333	Timber and Hardware Goods Wholesaling	43.5	43.2	-0.2	-0.6
3	373	Furniture, Floor Covering and Other Goods Wholesaling	38.1	39.4	1.3	3.3
1	G	Retail Trade				
3	423	Hardware, Building and Garden Supplies Retailing	83.6	89.9	6.3	7.5
1	I	Transport, Postal and Warehousing				
3	461	Road Freight Transport	198.4	215.9	17.5	8.8
3	471	Rail Freight Transport	7.3	7.2	-0.1	-1.3
3	481	Water Freight Transport	2.7	2.8	0.1	3.1
3	490	Air and Space Transport	53.9	53.4	-0.5	-0.9
3	521	Water Transport Support Services	16.8	16.6	-0.2	-1.1
1	M	Professional, Scientific and Technical Services				
3	691	Scientific Research Services	42.3	48.0	5.6	13.3
3	692	Architectural, Engineering and Technical Services	308.0	353.1	45.1	14.6
1	R	Arts and Recreation Services				
3	892	Parks and Gardens Operations	17.5	17.5	0.0	0.1
1	S	Other Services				
3	942	Machinery and Equipment Repair and Maintenance	78.6	81.9	3.3	4.2
		Total	1,251.8	1,340.5	88.7	7.1%

¹The data on which these projections are based have been separately seasonally adjusted and trended for each industry, May-19 and May-24 employment levels do not necessarily sum exactly to totals.

²"nfd" indicates "not further defined".

Source: <https://lmip.gov.au/default.aspx?LMIP/GainInsights/EmploymentProjections>

Overall, prior to the impact of recent bushfires and COVID-19, employment in the forest industry was expected to continue to grow at a national level, albeit at a moderate rate, as illustrated in Figure 10. There is considerable variation between industry sectors, but employment growth is expected in most sectors. Scientific Research Services and Architectural, Engineering and Technical Services are projected to have the greatest increase in employment between 2018 and 2024 (increasing by 13% and 15% respectively). Occupations with the greatest decrease in projected employment by 2024 are Pulp, Paper and Converted Paper Product Manufacturing (not further defined), Printing and Printing Support Services, and Reproduction of Recorded Media (a decrease of 20%, 16% and 14% respectively).

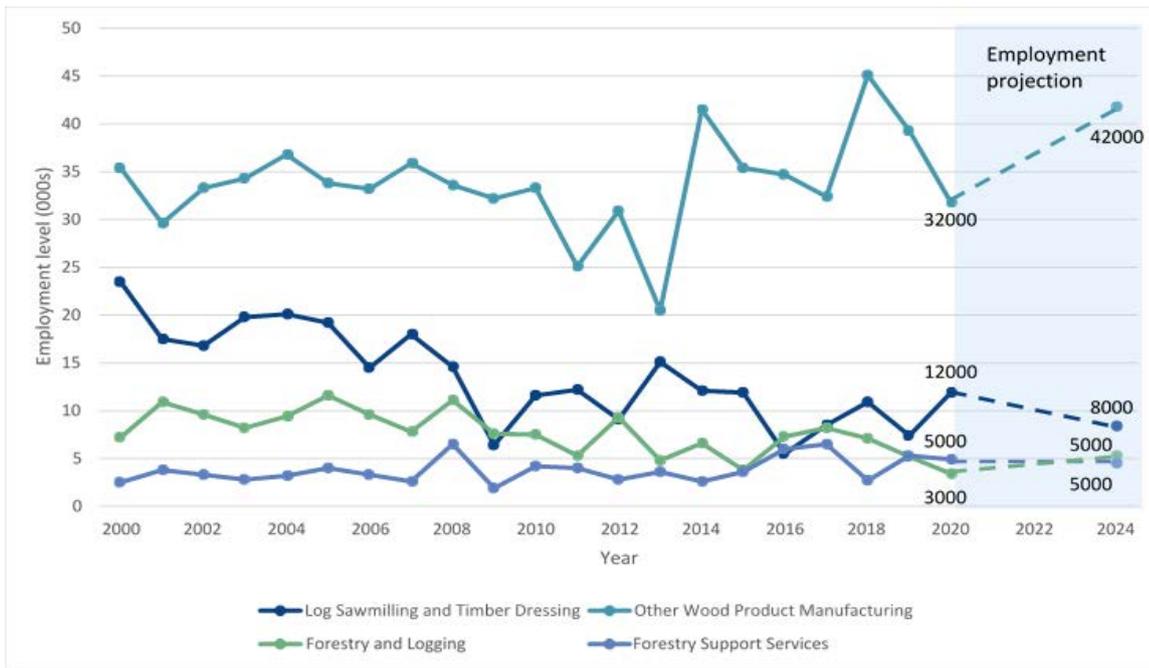


Figure 10 Employment levels 2000 to 2020, and 2024 employment projections, for Forestry and Timber Processing and Products sectors. Source: AISC¹

Regional data for Tasmania was extracted from the same dataset however the regional data is aggregated to the level of Agriculture, Forestry and Fishing (Table 16). While this analysis indicates projected employment growth in 2019-2024, it is not possible to segregate forest industry data from agriculture and fishing industry data.

Table 16 Agriculture, Forestry and Fishing industry projected employment to May 2024 by region

Region	Industry	Employment May 2019 ('000)	Projected level May 2024 ('000)	Projected employment growth five years to May 2024	
				('000)	(%)
Tasmania	Agriculture, Forestry and Fishing	14.6	15.0	0.4	2.6
Greater Hobart	Agriculture, Forestry and Fishing	2.3	2.3	0.0	1.0
Rest of Tasmania	Agriculture, Forestry and Fishing	10.6	11.0	0.3	3.3
Launceston and North East	Agriculture, Forestry and Fishing	4.0	3.9	-0.1	-2.2
Tasmania - South East	Agriculture, Forestry and Fishing	2.3	2.4	0.1	5.0
Tasmania - West and North West	Agriculture, Forestry and Fishing	4.9	5.2	0.3	6.6

Source: <https://lmip.gov.au/default.aspx?LMIP/GainInsights/EmploymentProjections>

5.4.3. Trends in the Tasmanian labour market

Some trends within the Tasmanian forest industry labour market to 2016 can be discerned in an analysis of the ABS Census of Population and Housing data (Table 17). However, caution should be taken when extrapolating current trends in the Tasmanian labour market from this data.

Analysis of the ABS Census of Population and Housing data indicates an overall downward trend in the Tasmanian forest industry labour market since 2006 with employment more than halving (-55%) in the period 2006-2016. The rate of decline in total forest related employment was highest in the period 2006-2011 (-36%), with the decline easing somewhat (-30%) in the five years from 2011. Some regional differences in employment levels can be discerned. For example, the number of forestry dependent jobs fell by two-thirds (66%) in the Cradle Coast region in the ten years from 2006, while employment in the Southern region declined by less than half (-45%) over the same period.¹²²

Trends can also be discerned between industry sectors, with the greatest decline in employment in the period 2006-2016 occurring in the Wood and Paper Product Manufacturing sectors (-61%) compared to jobs in the Forestry, Logging, Services to Forestry sectors (-43%). The fall in the number of jobs in the Wood and Paper Product Manufacturing sectors was most marked in the Cradle Coast region, with employment falling 79% in the period 2006-2011 compared to -45% in the Southern region. The pattern of declining employment in the Wood and Paper Manufacturing sectors in Tasmania between 2006 to 2016 mirrors the downward trend in this sector across Australia.¹²³ The closure of paper mills in Burnie and Wesley Vale in 2010 contributed to the downward trend in employment in the Wood and Paper Product Manufacturing sectors in the Cradle Coast region between 2006 and 2011.

¹²² Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania."

¹²³ *Australian Forest and Wood Products Statistics: March and June Quarters 2018.*

Table 17 Forest industry employment recorded in the ABS Census of Population and Housing 2006-2016, by region

Region	Local government area	Jobs in Forestry, Logging, Services to Forestry					Jobs in Wood and Paper Product Manufacturing (primary & secondary)					Total forest industry dependent jobs recorded in Census (includes wholesaling)				
		2006	2011	2016	% change 2006–11 ¹	% change 2011–16 ¹	2006	2011	2016	% change 2006–11 ¹	% change 2011–16 ¹	2006	2011	2016	% change 2006–11 ¹	% change 2011–16 ¹
Cradle Coast	Burnie	85	52	72	-39	39	226	40	16	-82	-60	311	92	88	-70	-4
	Central Coast	84	55	55	-35	0	161	53	26	-67	-51	245	108	81	-56	-25
	Circular Head	112	58	46	-48	-21	157	173	98	10	-43	269	231	144	-14	-38
	Devonport	25	29	23	16	-21	215	89	21	-59	-76	240	118	44	-51	-63
	Kentish	27	15	15	-44	0	49	15	11	-69	-27	76	30	26	-61	-13
	Latrobe	25	12	13	-52	8	119	31	12	-74	-61	144	43	25	-70	-42
	Waratah/Wynyard	66	46	59	-30	28	159	53	40	-67	-25	225	99	99	-56	0
	West Coast	3	7	3			3	12	4			6	19	7		
	TOTAL (inc King Isle)	427	274	286	-36	4	1089	466	228	-57	-51	1516	740	514	-51	-31
Northern	Break O'Day	83	39	11	-53	-72	16	18	6	13	-67	99	57	17	-42	-70
	Dorset	150	108	91	-28	-16	294	109	78	-63	-28	444	217	169	-51	-22
	George Town	11	10	14	-9	40	52	54	73	4	35	63	64	87	2	36
	Launceston	215	106	111	-51	5	474	363	169	-23	-53	689	469	280	-32	-40
	Meander Valley	129	68	64	-47	-6	115	99	45	-14	-54	244	167	109	-32	-35
	Nthn Midlands	60	27	28	-55	4	83	49	16	-41	-67	143	76	44	-47	-42
	West Tamar	42	24	49	-43	104	128	88	65	-31	-26	170	112	114	-34	2
		TOTAL (inc. Flinders Isle)	690	382	368	-45	-4	1162	780	452	-33	-42	1852	1162	820	-37
Southern	Brighton	18	23	26	28	13	110	78	60	-29	-23	128	101	86	-21	-15
	Central Highlands	35	27	19	-23	-30	13	3	3	-77	0.0	48	30	22	-38	-27
	Clarence	43	30	32	-30	7	158	117	61	-26	-48	201	147	93	-27	-37
	Derwent Valley	95	92	82	-3	-11	249	156	128	-37	-18	344	248	210	-28	-15
	Glam/ Spring Bay	60	25	3	-58	-88	50	6	0	-88	-100	110	31	3	-72	-90
	Glenorchy	41	36	17	-12	-53	210	178	124	-15	-30	251	214	141	-15	-34
	Hobart	80	67	40	-16	-40	112	96	53	-14	-45	192	163	93	-15	-43
	Huon Valley	138	109	64	-21	-41	68	121	77	78	-36	206	230	141	12	-39
	Kingborough	69	49	30	-29	-39	96	85	79	-12	-7	165	134	109	-19	-19
	Sorell & Tasman	26	13	6	-50	-54	64	53	33	-17	-38	90	66	39	-27	-41
	S'thern Midlands	25	16	17	-36	6	44	32	31	-27	-3	69	48	48	-30	0
	TOTAL	630	487	336	-23	-31	1174	925	649	-21	-30	1804	1412	985	-22	-30
Tasmania		1747	1143	990	-35	-13	3428	2171	1329	-37	-39	5175	3314	2319	-36	-30

¹Change only calculated where total number of workers >10 in both years, as randomisation of small numbers by the ABS means smaller changes may not be meaningful.

Source: Schirmer et al. (2018) p. 32

Some of the employment trends reflect the changing nature of forestry in Tasmania. In the period 2006-2007 to 2016-2017 the area of plantation in Tasmania increased 13% from 274,200 to 309,900¹²⁴, with harvest of hardwood plantations increasing significantly in this period¹²⁵. In contrast, harvesting of native forests decreased between 2011 and 2016.¹²⁶ The impact of these changes in forest type can be observed in the employment trends identified in surveys of the forest industry in Tasmania in 2006, 2008, 2010, 2011 and 2013.¹²⁷ Analysis of the surveys indicates a fall of 73% in jobs dependent on native forests between 2006 and 2017-2018, compared to a fall of 29% in jobs dependent on hardwood plantations over this period (Table 18). The decline in native forest dependent jobs was to a degree offset by the expansion of the hardwood plantation sector.¹²⁸

Table 18 Forest industry employment over time in Tasmanian forest industry surveys by type of forest: native forest, softwood plantation and hardwood plantation

	Local government area	Total number of forest industry workers living in local government area						% change 2006 to 2011	% change 2011 to 2017-18
		2006 (Aug)	2008 (Aug)	2010 (Sept)	2011 (May)	2013 (Nov)	2017-18 (Jun-Mar)		
Type of forest/ plantation	Native forest	4120	3837	2571	1957	1241	1112	-52.5%	-43.2%
	Hardwood plantation	990	1437	867	558	521	699	-43.7%	25.4%
	Softwood plantation	1398	1690	1210	945	953	903	-32.4%	-4.4%
Total Tasmania		6409	6963	4649	3460	2751	2702	-46.0%	-21.9%

Note: Prior to 2017, estimates of industry employment included some jobs that could not be classified into different sectors. This included 1044 jobs in 2006, 1207 in 2008, 972 in 2010, 494 in 2011 and 188 in 2013. To enable comparison over time, the figures in this table include these 'other' jobs, based on the assumption that the jobs that could not be classified had the same ratios as those jobs where the sector could be identified. For example, if in a given year 1/3 of jobs that could be classified by forest sector were dependent on native forests, 1/3 on hardwood plantations and 1/3 on softwood plantations, the jobs that could not be classified into sectors were assumed to be 1/3 dependent on each sector.

Source: Schirmer et al. (2018)¹²⁹ p. 34

¹²⁴ R. Downham and M. Gavran, *Australian Plantation Statistics 2018 Update*, ABARES Technical Report (Canberra: Australian Bureau of Agricultural and Resource Economics and Science, 2018).

¹²⁵ FPA, "State of the Forests Tasmania 2017."

¹²⁶ Ibid.

¹²⁷ Schirmer et al., "Socio-Economic Impacts of the Forest Industry: Tasmania."

¹²⁸ Ibid.

¹²⁹ "Socio-Economic Impacts of the Forest Industry: Tasmania."

6. Skill development and training

This section examines the skill development and training needs required to meet the demands for labour within the forest and wood products industry. The projected skills and workforce needs to promote growth in the sector, are examined first, followed by an examination of the education and training programs in place to support skills and training, and opportunities for future developments.

6.1. Skills forecast – skills and labour force needs to promote growth in the sector

The Australian Industry Skills Committee (AISC) requires IRCs to submit comprehensive Skills Forecast and a Proposed Schedule of Work (Skills Forecast) once every three years, with abridged annual updates in the intervening two years. The next comprehensive Skills Forecasts are due in 2022. The Skills Forecasts describe industry trends, opportunities and challenges, and reviews skills gaps and emerging skills needs.

The current Skills Forecast for the forest and wood products sector (2019–2022) ¹³⁰ presents the latest industry intelligence and proposes Vocational Education and Training (VET) Training Package review and development work considered necessary by the IRC to meet the needs of industry.

The three IRCs responsible for the Forest and Wood Products Training Package were consulted to identify industry priorities for set of generic skills provided by the Department of Education and Training. Table 19 indicates industry ranking of the selected generic skills by priority. ¹³¹The IRC rankings indicate that the highest priority for the sector was developing skills and training in the use and application of technology, with skills to address environmental and sustainability issues, and language, literacy and numeracy skills ranked the second and third priority within the industry.

¹³⁰ Skills Impact <https://www.skillsimpact.com.au/irc-skills-forecasts/>

¹³¹ Skills Impact, "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work."

Table 19 Industry priorities for generic skills

Rank	Generic skill
1	Technology use and application skills Ability to understand and apply scientific or industrial processes, inventions, methods, etc. Ability to deal with increasing mechanisation and automation and computerisation. Ability to do work from mobile devices rather than from paper.
2	Environmental and sustainability skills Ability to focus on problem solving and the development of applied solutions to environmental issues and resource pressures at local, national and international levels.
3	Language, literacy and numeracy skills Foundation skills of literacy and numeracy.
4	Design mindset/thinking critically/systems thinking/problem-solving skills Ability to adapt products to rapidly shifting consumer tastes and trends. Ability to determine the deeper meaning or significance of what is being expressed via technology. Ability to think holistically.
5	Communication/collaboration including virtual collaboration/social intelligence skills Ability to understand and apply the principles of creating more value for customers with fewer resources (lean manufacturing) and collaborative skills. Ability to critically assess and develop content that uses new media forms and leverage these media for persuasive communications. Ability to connect with others deeply and directly.
6	Science, technology, engineering and maths (STEM) skills Sciences, mathematics and scientific literacy.
7	Learning agility/information literacy/intellectual autonomy and self-management skills Ability to identify a need for information. Ability to identify, locate, evaluate, and effectively use and cite the information. Ability to discriminate and filter information for importance. Ability to do more with less. Ability to quickly develop a working knowledge of new systems to fulfil the expectations of a job. Ability to work without direct leadership and independently.
8	Managerial/leadership skills Ability to effectively communicate with all functional areas of the organisation. Ability to represent and develop tasks and work processes for desired outcomes. Ability to oversee processes, guide initiatives and steer employees towards achievement of goals.
9	Data analysis skills Ability to translate vast amounts of data into abstract concepts and understand data-based reasoning. Ability to use data effectively to improve programs, processes and business outcomes. Ability to work with large amounts of data: facts, figures, number crunching, analysing results.
10	Customer service/marketing skills Ability to interact with another human being, whether helping them find, choose or buy something. Ability to supply customers' wants and needs both via face-to-face interactions or digital technology. Ability to manage online sales and marketing. Ability to understand and manage digital products.
11	Financial skills Ability to understand and apply core financial literacy concepts and metrics, streamlining processes such as budgeting, forecasting, and reporting, and stepping up compliance. Ability to manage costs and resources, and drive efficiency.
12	Entrepreneurial skills Ability to take any idea, whether it be a product and service, and turn that concept into reality and not only bring it to market but make it a viable product and/or service. Ability to focus on the very next step to get closer to the ultimate goal. Ability to weather the ups and downs of any business. Ability to sell ideas, products or services to customers, investors or employees etc.

Source: Skills Impact: Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work

6.2. Other skills needed identified by stakeholders

The following section outlines the skills needs identified by industry stakeholders.

6.2.1. TFFPN submission to the National Agricultural Workforce Strategy

In 2020 the National Agricultural Labour Advisory Committee consulted extensively with stakeholders to prepare a National Agricultural Workforce Strategy for consideration by the government. The Strategy will specifically address school education, VET and higher education, recommending potential actions to address future workforce needs in the agriculture, fisheries and forestry industries and allied service and supply chain industry sectors.¹³²

Tasmanian Forest and Forest Products Network (TFFPN) prepared a submission to the National Agricultural Workforce Strategy. The submission represented all the major commercial forest growers, managers, processors, public service providers and private service providers in Tasmania via their respective membership of the TFFPN.¹³³

The TFFPN submission identified nine key skills and knowledge needs required to ensure the ongoing productivity of the forest industry:

- Workplace health and safety
- Leadership and management
- Risk management
- Marketing and communications
- Logistics
- Agronomic/plant health
- Information technology
- Artificial intelligence/big data
- Research and innovation.

“It is actually culture training that is required and sessions to help businesses understand and articulate the behaviours correlated with success for them and the industry.” Survey respondent

6.2.2. Skills needs identified in the stakeholder consultation

Respondents in the stakeholder survey were asked to indicate which skills were needed in their business or area of work.

Community relations and engagement, IT and software training specialised to the industry, occupational health and safety, and business and financial management skills were the most frequently required skills across all industry segments (see Figure 11). Other required skills varied by industry segment. For example, ecology and silviculture skills were needed most frequently within growing and management, while compliance training, marketing and sales skills were most needed within post-harvest/processing operations.

¹³² <https://haveyoursay.awe.gov.au/national-agricultural-workforce-strategy>

¹³³ <https://www.tffpn.com.au/review-of-the-national-agricultural-workforce-strategy/>

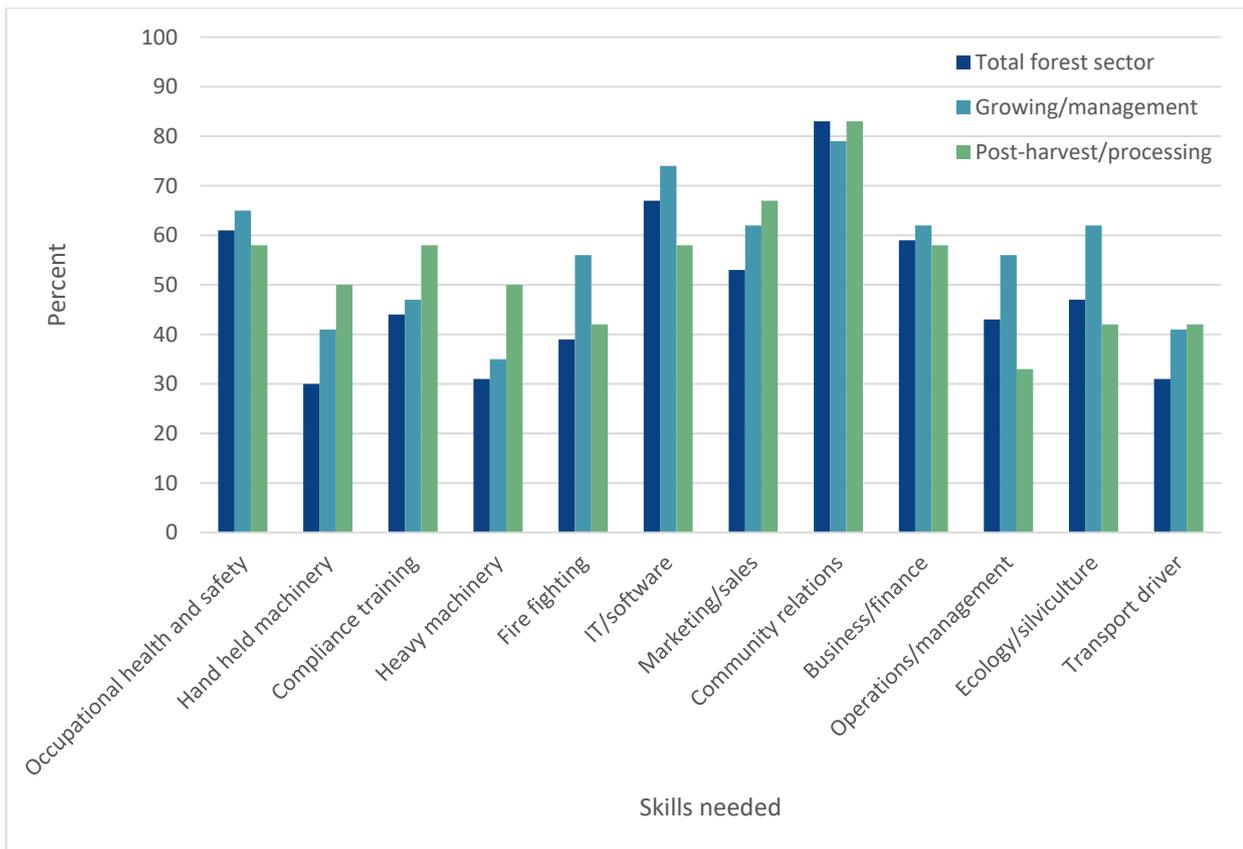


Figure 11 Percentage of stakeholder survey respondents indicating a skill was needed by the total forest sector, and by the Growing/management and Post-harvest/processing industry segments. Note: the total forest sector includes all the industry segments as well as Growing/management and Post-harvest/processing segments

Respondents were also asked to indicate what additional skills and training not already included in Figure 11 were needed. Fifteen respondents provided information about additional training needs. Nine themes were identified in the written responses (Table 20).

Table 20 Other skills and training needs identified in the stakeholder survey

Training type	Description
Research and communication	Analysis, research and communication training, including data analysis training, research skills training and written communication/publication/reporting training. Also includes strategic planning and communications training – looking forward and planning future directions of the industry, and communicating with executive decision/policy makers
Business management	Business management, including agroforestry, value chain, business skills, export market development
Human resources and leadership	Human resource training, including leadership and people management, stakeholder engagement (internal and external customers), mental health, first aid, leadership training
Forest education	An appreciation of forest values, including tangible ecosystem services forests provide, and the intangible cultural significance of timber and its benefits to human society
Conservation	Conservation planning and management, including the impact of forest operations on environment – soil, water, biodiversity
Legal frameworks	Legal frameworks at Commonwealth, state and local government levels
Training type	Forestry operations training: optimisation and analytics, applications of technology, quality assurance, GIS, remote sensing, statistics, forest resource analysis software
Training provision	In-house training package development
Nursery	Plant propagation and seed collection technique

6.3. Education and training programs to address skills gaps in the sector

This section outlines current projects to improve VET qualifications, skill sets and units of competency and key skills projects for 2020–2021 identified by Skills Impact.

6.3.1. Current projects to improve VET qualifications, skill sets and units of competency

Several projects are currently underway to improve the VET qualifications, skill sets and units of competency within the forest industry. The government allocates projects to IRCs, based on advice in the IRC Skills Forecasts or a Case for Change. These projects relate to existing rather than emerging skill priorities and job roles in the industry.¹³⁴

Projects proposed in the IRC Skills Forecast and Proposed Schedule of Work 2019-2022 relating to the three IRCs responsible for the FWP Forest and Wood Products Training Package, the Forest Management and Harvesting IRC, Timber and Wood Processing IRC and the Timber Building Solutions IRC, include:

¹³⁴ "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work."

(a) Forest Management and Harvesting IRC

National Heavy Vehicle Regulator (NHVR) Master Industry Code of Practice: Log Haulage Operators. This project will investigate the skills implications and training requirements arising from the NHVR's Master Industry Code of Practice, and the subsidiary, industry-specific code of practice for harvesting and haulage operations.

Safety leadership in remote forestry and related operations. This project will examine the industry's unique requirements for safety leadership and risk compliance management. It will identify the nature and risks of operating in remote areas in relation to variables such as terrain, harvesting and removal characteristics; the impact of extreme weather (e.g. fire season and high rainfall) on operational safety; and interactions with multiple industry partners (e.g. arborists, state emergency services, local landholders and councils). The increasing impact of severe weather events across seasons requires diverse, context-dependent preparation and response skills and strategies.

Forest certification impact on work functions and skill requirements. This project will assess the impact of the Forest Certification Scheme and Responsible Wood programme across job clusters in terms of work functions and training package gaps.

(b) Timber and Wood Processing IRC

Review of sawmilling and processing job roles and qualifications. This project will review Certificates II to IV in Sawmilling and Processing to identify better enrolment pathways, skill sets and connections with specific job roles. Industry has experienced disjuncture between the competency standards used in the workplace and the role of training providers, including enrolment and completion mechanisms and data collection. Relevant occupations and work functions have changed significantly in the two decades since these qualifications were reviewed.

National Construction Code (NCC) compliance responsibilities. Recent changes to the NCC, allowing timber buildings up to a height of 25 m (approximately eight storeys), creates new product obligations, some of which will have work function and skills development implications.

Timber product development and supply chain innovation. This project covers skills for supporting product development in timber processing and for improving performance in product supply chain operations. Specific skills requirements will be determined through industry consultation, and by assessing the impact of cross-sector 'supply chain' standards in the context of this industry.

Bioenergy, cogeneration and biochar – this project responds to the emergence of renewable energy strategies by industry. In principle, it covers skills requirements for supporting biomass-based energy developments, where the feedstock is derived from woody biomass and other agricultural plant residues.

(c) Timber Building Solutions IRC

Review of Certificates II and III in Timber Merchandising. These qualifications include imported core units that have been deleted or superseded with non-equivalent units. The consequences of changing work functions on job roles and skills requirements has also been identified by industry as requiring review.

An example of the process for updating qualifications within the FWP training package is the *New timber harvesting technologies project* currently underway for the Forest Management and Harvesting IRC. Details of the project process are outlined in Box 4.¹³⁵

Box 4 New timber harvesting technologies project: an example of the process to approve units of competency, skill sets and qualification

A case for change

To remain competitive forest harvesting organisations need to improve technical efficiency, reduce costs, and demonstrate best forest management and environmental practices. This requires the adoption of new technologies, which in turn requires new technical skills.

The project plan

The project aim was to review and develop nationally endorsed units of competency for the forest management and harvesting sectors related to environmental practices, geospatial data management for forest assessment and tree inventory, and forestry operations to develop new skill sets for harvesting on steep slope terrain and in-field chipping operations and new units of competency in harvesting technologies.

Development

Site visits and consultations were undertaken to identify new skills required by the changes in technology and processes, and to determine skill gaps in the existing units of competency.

Drafts for consultation

Following the consultation process drafts of five new units of competency were developed, 22 units were revised, and deletion of four units of competency within the FWP Forest and Wood Products Training Package was proposed. Feedback from industry was sought about the proposed draft changes.

Validation

The proposed changes were updated following validation in the consultation process.

Finalisation

The final draft units were reviewed by the State/Territory Training Authorities, after which the drafts will be forwarded to the Forest Management and Harvesting Industry Reference Committee (IRC) for consideration and sign off, before being submitted to the Australian Industry and Skills Committee (AISC) and State/Territory Ministers to consider and approve.

Source: Skills Impact <https://www.skillsimpact.com.au/forest-management-and-harvesting/training-package-projects/new-timber-harvesting-technologies/>

¹³⁵ <https://www.skillsimpact.com.au/forest-management-and-harvesting/training-package-projects/new-timber-harvesting-technologies/>

Key outcomes of the *New timber harvesting technologies* project included the development of five new units of competency to capture skills to:

- Access, capture and communicate forestry field data using mobile devices
- Read and interpret digital maps and forest operation plans
- Operate harvesting machine with winch-assist systems
- Use mechanised equipment for forestry site preparation on steep slopes
- Use a chainsaw within a tree

Revisions were made to 18 units to update and improve relevancy:

- Four cable logging units
- Two transporting forestry logs and produce
- Nine tree felling/chainsaw operations units
- Three wood chipping units

One unit, FWPFGM2210 Implement animal pest control procedures, was proposed for deletion, to be replaced with AHCPMG309 Apply pest animal control techniques.¹³⁶

6.3.2. Key skills projects for 2020–2021

The 2020 annual update *Skills Forecast for the Australian Forest and Wood Products Industry Sector* prepared by Skills Impact proposed five key projects for 2020–2021 for the Forest Management and Harvesting Industry Reference Committee to address barriers identified in the annual update of skills and qualifications.¹³⁷ These projects will help address barriers and skill gaps previously identified in the sector.

Project 1: Review Qualifications to Attract New Entrants

The ageing of the forest growing, management and harvesting workforce and the difficulty recruiting workers with the required skills means that it is critical to recruit young people to careers in the industry. The demand for skilled workers is expected to continue to grow in response Commonwealth and state initiatives such as the *Growing a Better Australia – A Billion Trees for Jobs and Growth*¹³⁸ plan and the *Strategic Growth Plan for the Tasmanian Forests, Fine Timber and Wood Fibre Industry*¹³⁹ recommendations. An expansion of the industry is expected to increase the demand for skilled workers.

School-based apprenticeships are one way to attract young people to the industry but the number of forestry relevant apprenticeships is still relatively low. Project 1 will review the lower level qualifications within the VET framework to ensure they support the industry goal of attracting more young people to the industry. The project will:

- Examine whether there is a need to retain the Certificate I in Forest and Forest Products and look at whether amalgamating some Certificate II courses will provide better access to career pathways for young people

¹³⁶ <https://forestworks.com.au/2019/06/20/new-training-package-projects/>

¹³⁷ Skills Impact, "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work."

¹³⁸ DAWR, "Growing a Better Australia – a Billion Trees for Jobs and Growth."

¹³⁹ Department of State Growth

https://www.stategrowth.tas.gov.au/energy_and_resources/forestry/strategic_growth_plan

- Ensure there are consistent industry agreed qualifications suitable for school-based and entry pathways into the forestry sector
- Support individuals to gain a good understanding of career pathways within and between different sectors of the industry as well as related industries like horticulture, agriculture and civil construction
- Review the makeup of entry-level qualifications for the forestry sector and ensure units of competency meet industry need and provide opportunities for young people to pursue related occupations including public safety, horticulture and agriculture.

Project 2: Review of High-Level Jobs in Forestry

Project 2 will examine the job roles of foresters and related occupations, and review and rationalise existing qualifications in the Forest and Wood Products Training Package. This review is driven by the significant nationwide shortage of foresters, and the need for skills development to support private forest growers. The higher level vocational-based forest management qualifications, particularly the Certificate IV, Diploma, and Advanced Diploma, are outdated and underutilised. This project will review the higher level qualifications to ensure they meet the skills and knowledge needs required to manage public and private forests.

Project 3: Safety Mindsets in Remote Operation

Forest harvesting and haulage contractors frequently work in small teams in remote locations where access for emergency personnel is often difficult. Working alone in the cabin of a harvester for extended periods of time can have a severe impact on a person's mental health. This project proposes the development of a skill set and up to two new units of competency for operators, relating to shaping and sustaining safety culture and practices while working in remote high-risk operations.

Project 4: Assessment Materials

This project will develop assessment materials for 40 units of competency used by industry in compliance programs to support safer work practices in the forest harvesting sector. The assessment materials will incorporate, moderate and validate content relating to a broad range of forest types and jurisdictional codes of practice.

Project 5: Responding and Assisting in Bushfires

This project is in response to the changing role of forestry workers in responding to and assisting in bushfire situations. Harvesting and haulage contractors provide valuable assistance in fire mitigation, firefighting, clean up and clearing operations. This project will examine the roles played by forestry operators during bushfires in relation to machinery operations, tree felling, salvage operations and hazard reduction activities in both native and plantation forestry.

6.4. Training delivery needs

The Skills Impact Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work¹⁴⁰ notes that previously the FWP Training Package was delivered successfully by workplace trainers and assessors overseen and facilitated by an RTO. Reasons for delivering training on-site included:

- The regional location of the industry
- The need to use enterprises' own equipment
- The small number and low turnover of people employed in the industry, resulting in a lack of scale
- The benefits of experienced industry-based trainers
- Reduced time required for the employee to be off-site.

However, changes in the assessment requirements for workplace trainers and assessors means this mode of delivery is now too difficult to maintain. Removing the capability of RTOs to deliver and assess training at workplaces poses a significant barrier, particularly for businesses working in very remote areas. The regional and remote nature of work within the forest industry means that training programs need to be flexible to fit with workplace commitments. For example, module-based training programs, and programs that can be delivered online and remotely, would provide a degree of flexibility not currently available in the formal vocational training system. Cost has been identified as a barrier to accessing training. Cost refers not only to payments required to undertake a course or qualification but also the cost associated with travel to and attendance at training.

It was clear from the stakeholder consultation process that skill training programs need to be flexible and able to address specific workforce needs that arise from time to time. A good example of this is the current need to increase computer skills of people working remotely in response to the COVID-19 lockdowns (stakeholder interviews). Currently there is also a demand for mental health first aid training and fire-fighting skills following the devastating 2019–2020 bushfires. Rather than focusing on full qualifications there is a need for industry-endorsed non-accredited training outside the formal VET system that is of benefit to the industry.

Training needs to be more closely tailored to reflect the specific skills needed in specific workplaces. Skills Impact note that there is increasing interest in the forest and wood products sector for training in some areas to be 'culture based' rather than 'competency based'. For example, relating to workplace health and safety, Skills Impact note:

"Training needs to be highly specific and relevant to people who are working in very remote areas, in small groups but often operating in machines on their own for long periods of time, conducting extremely hazardous work activities, travelling significant distances to and from site, and being always vigilant and responsive to their surrounding environment. Generic health and safety units of competence just do not deliver the type of specialised content that industry is seeking."¹⁴¹

¹⁴⁰ Skills Impact, "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work."

¹⁴¹ "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work." p.33

6.5. Industry initiatives supporting industry skills and training in Tasmania

Several programs and initiatives have been developed to support skills and training development in Tasmania. These include programs to support early career forest industry workers and programs to support research and innovation, programs to support industry training and upskilling.

6.5.1. Programs supporting early career forest industry workers in Tasmania

The need to attract more young people to careers in the forest and wood products industry was consistently identified in the stakeholder consultation. Three industry-based programs have been established in Tasmania to support early career forest industry workers:

1. *Cadet Forester Program*

The Arbre Forest Industries Training and Careers Hub offers a Forestry Cadetship program in Tasmania. The aim of the program is to create a clear training pathway and program to address the shortfall of new entrants into forest management and supervisory roles in all industry sectors in Tasmania.¹⁴² The program supports Year 11 and 12 students to commence an Australian School Based Apprenticeship, or supports older workers to commence an adult traineeship. Trainees are directly employed by individual companies, or by a group training organisation for shared work placements. Trainees work towards achieving a Certificate IV in Forest Operations within four years of employment.

2. *FIVE+5 program*

The FIVE+5 program is a pre-employment program run by the Arbre Forest Industries Training and Careers Hub. The aim of the program is to address the shortage of skilled labour currently facing the Tasmanian forest industry.¹⁴³ Arbre has partnered with forestry, sawmilling and transport RTO businesses to offer four contextualised versions of the FIVE+5 to suit Sawmilling, Harvesting, Transport and Silviculture. Participants complete up to five nationally accredited units of competency throughout the duration of the course.

3. *Apprenticeship Scholarship Pilot Program*

The New Apprenticeship Scholarship Program (NASP) offers scholarships of up to \$2000 to support apprentices in the North West of Tasmania in three industry sectors, including the forestry sector.¹⁴⁴ Scholarship funding commenced in March 2020 and is an initiative under the North-West Tasmania Job Ready Generation Package.

6.6. Skills and training funding availability

This section examines the availability of funding for skills and training within the forest and wood products industry.

6.6.1. Funding for vocational education training (VET)

Currently much of the accredited training in the forest and wood products industry is undertaken within the VET sector. The VET sector is jointly funded by the Commonwealth, state and territory governments, employers and individuals. Each jurisdiction is responsible for developing their own funding policies,

¹⁴² Arbre Cadet Forester Final Report - Skills Tasmania 2018

https://www.skills.tas.gov.au/_data/assets/pdf_file/0017/200654/Arbre_Cadet_Forester_Final_Report.pdf

¹⁴³ See <https://www.arbre.net.au/index.php/about>

¹⁴⁴ <https://www.tffpn.com.au/new-apprenticeship-scholarship-program-nasp/>

priorities and levels of funding. Currently most of the public funding is used to support full qualifications. Much of the training does not receive any public funding and instead relies on the payment of full fee-for-service fees.

This current funding model does not support observations in the stakeholder consultation of the need for more flexibility in training delivery that is not focused solely on achieving full qualifications but supports individual units of competency and non-accredited training based on identified industry needs.

The 2019 review of the VET system concluded that a new funding policy was needed that better met the needs of states, territories and the Commonwealth as well as the those wishing to participate in VET.¹⁴⁵

6.7. Innovation and research training

6.7.1. National Institutes for Forest Products Innovation Centres¹⁴⁶

Funding provided by the Australian and Tasmanian government has been used to establish a National Institute for Forest Products Innovation (NIFPI) Centre in Launceston. An NIFPI Centre has also been established in Mt Gambier, with funding announced recently to establish a Centre in Gippsland, Victoria.¹⁴⁷

The aim of the NIFPI Centres is to grow the Australian forest and forest products industry by exploring and facilitating innovation in the forest products sector in areas such as forest management, timber processing, wood fibre recovery, value-adding, advanced manufacturing and the bio-economy.

The Launceston NIFPI Centre identified four research priority areas relating to Tasmania's forest resources:

1. Improved utilisation of the forest resource
2. New product development
3. Non-timber forest products and services
4. Improved efficiency and safety along the supply chain.

The Launceston NIFPI Centre called for project proposals to conduct research and development projects in the four priority areas. Two rounds of funding have been undertaken resulting in nearly \$4 million of NIFPI funding being approved to support 17 research projects, which together have a total budget of nearly \$10 million.¹⁴⁸ Research projects in Tasmania receiving NIFPI funding in the first two funding rounds are outlined in Tables 21 and Table 22.

¹⁴⁵ Department of the Prime Minister and Cabinet, "Strengthening Skills: Expert Review of Australia's Vocational Education and Training System."

¹⁴⁶ <https://nifpi.org.au/about-us/>

¹⁴⁷ <https://minister.awe.gov.au/duniam/media-releases/nifpi-centre-gippsland>

¹⁴⁸ <https://nifpi.org.au/projects/>

Table 21 Details of research projects funded by the NIFPI Launceston Centre in funding Round 1

NIFPI Project number	Applicant	Project title	NIFPI funding approved (\$)	Total project budget (\$)
NT001 – Jointly with Mt Gambier project NS020	NSWDPI Forestry/University of SA	Solutions for the optimal use of remotely acquired, high resolution data for the forestry sector	250,000	821,279
NT004	Forest Industries Research Centre (University of the Sunshine Coast) & Private Forest Tasmania	Optimising machinery configurations for profitable harvesting operations of small-scale plantations	70,000	151,000
NT010	Technical Forest Services Pty Ltd	Conceptualise and develop a functioning model for collaborative integrated pest management within the Tasmanian forest industry	7,500	25,000
NT011	CSIRO	Unlocking financial innovation in forest products with natural capital	408,000	1,363,476
NT013	Forestry Tasmania trading as Sustainable Timber Tasmania	Sensing technology and digital tools to support decision-making in hardwood timber drying	315,000	855,000
NT014	Britton Timbers Australia	Increasing the durability and other material characteristics of Tasmanian hardwoods	320,000	815,000
NT015	Neville Smith Forest Products	Developing a new generation of Tasmanian appearance hardwood products for in-State design and manufacturing	270,000	788,500
NT016	CLTP Panel Products Pty Ltd	Developing laminated structural elements from fibre-managed plantation hardwood	200,000	467,500
NT018	Tasmanian Timber Promotion Board	A forest resource characterisation of Tasmania – Stage 1 of 2 feasibility	65,000	205,000
Total investment			1,905,500	5,501,755

Source: NFPI <https://nifpi.org.au/projects/>

Table 22 Details of research projects funded by the NIFPI Launceston Centre in funding Round 2

NIFPI Project number	Applicant	Project title	NIFPI funding approved (\$)	Total project budget (\$)
NT042	Sustainable Timber Tasmania	Eagle Eye – Applying the Internet of Things to landscape scale Wedge-tail eagle management	151,263	404,276
NT043	Forest Industries Research Centre (University of the Sunshine Coast)	Short log supply chain impacts in hardwood plantations	115,700	283,100
NT044	Forest Industries Research Centre (University of the Sunshine Coast)	Assessing the economic impact of damage to Eucalyptus nitens logs during mechanised harvesting operations	190,706	541,006
NT045	University of Tasmania & SFM Environmental Solutions Pty Ltd	Managing timber’s moisture content in the supply chain, construction and in service	276,500	621,500
NT046	University of Tasmania	Minimising market-limiting discolouration in appearance Tasmanian hardwood	160,000	340,500
NT047	University of Tasmania & Britton Timbers	New methods of reliably demonstrating species durability in commercially relevant timeframes	275,000	598,000
NT048	The Southern Tree Breeding Association Inc.	Implementation of single-step genomic selection of eucalypts	493,497	998,906
NT049	BioFuels Tasmania Pty Ltd	Improve returns to forest owners by exploring the feasibility of a pellet-based industry in Tasmania	250,000	462,000
Total investment			1,912,666	4,249,288

Source: NFPI <https://nifpi.org.au/projects/>

7. New skills and employment for embracing new technologies

This section examines key technical advances and innovations in the forest and wood products industry, and the skill development needed to ensure the forest industry capitalises on these advances.

New technologies and innovations are transforming the forest industry. The cliched image of forestry as “dirty, dark and dangerous” is outdated and needs to be dispelled.¹⁴⁹ The uptake of new technologies to increase productivity and improve environmental sustainability and safety require workers with the skills to operate increasingly sophisticated technologies.¹⁵⁰ It is essential training opportunities keep abreast of new technical innovations for the industry to remain competitive in the future.

7.1. New technology developments and emerging opportunities

Advances in biotechnology, geospatial technology, robotics and automation have been integrated into the areas of forestry, transport, logistics and wood products. Such advances are expected to generate improvements along the full value chain, including tree characteristics, forest growth rates, log utilisation, process management, pest management, species’ climate adaptability, and general value-add and productivity.¹⁵¹ Technological advances identified in the Skills Impact Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work as expected to have implications for current and future commercial forest management and harvesting include:¹⁵²

- Biotechnology: clonal propagation, marker-aided selection and breeding, genetic engineering and genomics
- Geospatial technologies: remote sensors, drone technology (UAVs), wearable and mobile technologies/apps, and new generation satellite imagery technologies
- Robotics and automation: automatic (x-ray) log measuring systems, on-board computers with wireless data transfer, and remote-controlled felling
- It is also likely that self-driving vehicles will potentially transform commercial forest practices in the future.

The 2020 IRC Skills Forecast and Proposed Schedule of Work Skills¹⁵³ also identifies further advances within the timber and wood processing sector to include: specialised sawmilling x-ray (or infrared, ultrasound) scanning technologies used to optimise the cutting pattern of logs, computer-controlled systems for log and timber transfer, drying or packaging (among other processes), computer numerical control (CNC) manufacturing tools, and inventory management software systems. Computer-aided design and manufacturing (CAD/CAM) technologies and CNC robotics are also expected to bring about advances in areas such as the design and manufacture of engineered solid wood products and standard and modular prefabricated walls, floors and roof trusses.

¹⁴⁹ de Fégely, "Review of Australian Forestry and Wood Products Education and Training Needs."

¹⁵⁰ AISC, "Modernising Training Units for a High Tech Industry " (2018).

¹⁵¹ Skills Impact, "Annual Update 2020 IRC Skills Forecast and Proposed Schedule of Work."

¹⁵² Ibid.

¹⁵³ Ibid.

Eight key areas have been identified by ForestWorks as requiring new and improved skills to support recent industry developments: ¹⁵⁴

1. Geospatial technologies for forest operations, such as the use of drones to perform quality control when harvesting
2. Programming harvesting optimisation files
3. Management of electrical risks
4. Best practices to minimise environmental footprint of forest harvesting
5. Systems for harvesting on steep slope terrain
6. In-field wood-chipping operations
7. In-field debarking of logs
8. Tree felling and chainsaw operation.

7.2. Challenges for upskilling within the forest industry

Upskilling the current forest industry workforce to take advantage of transformative technologies faces some challenges. One such challenge identified in IRC Skills Forecast and Proposed Schedule of Work 2019-2022 ¹⁵⁵ is the fragmentation of capital investment in the industry where the focus is on upgrading existing technology. Unfamiliarity with the potential value of advanced technologies, the current economic and business environment and a lack of skills and capabilities within an organisation were also identified as challenges to the uptake of new technology.

“The forest sector needs to be attractive to young talent entering the workforce with technology skillsets that can deliver on big data. In addition, the existing workforce requires support to upskill and maintain currency in the changing workplace.”

TFFPN (2020). Submission National Agricultural Workforce Strategy, Tasmanian Forests and Forest Products Network. p 3

The IRC Skills Forecast and Proposed Schedule of Work 2019-2022T noted that the forest and wood products industry is in general slow to take up digital technologies. ¹⁵⁶ One factor contributing to this lag is the fragmentation of trials, with strategies needed to transform existing operations into new business models. This will require finding ways to support leadership as well as the development of digital skills and capabilities within organisations. ¹⁵⁷

7.3. Skill development needs

Skills Impact conducted forest industry consultations and site visits in August and September 2019 to identify skill development needs arising from the adoption of new technologies and innovations. The following skills development themes emerged: ¹⁵⁸

¹⁵⁴ ForestWorks <https://forestworks.com.au/2019/06/20/new-training-package-projects/>

¹⁵⁵ Skills Impact, "IRC Skills Forecast and Proposed Schedule of Work 2019-2022."

¹⁵⁶ Ibid.

¹⁵⁷ Ibid.

¹⁵⁸ Skills Impact <https://www.skillsimpact.com.au/forest-management-and-harvesting/training-package-projects/new-timber-harvesting-technologies/>

- Digital technologies are being used for the collection and management of field data from forest operations across the forest management and harvesting sector. These include the use of unmanned aerial vehicles (UAVs) to collect forestry data, and the use of mobile applications to access maps and other forestry field data. Operator training in these technologies is currently provided primarily by the vendor or delivered through in-house training programs
- In Victoria some harvesting contractors are using winch assist systems to safely harvest trees on slopes of up to 60 degrees without manual felling. It is expected that skills development in the operation of winch assist systems will be needed when this technology is adopted in Tasmania
- The use of highly specialised machines for in-field wood chipping operations for pulp and paper production is increasingly being used in northern Tasmania as well as the Green Triangle region and in Western Australia. Operation of the in-field wood chippers is very specialised and is not suitably provided by existing training
- Mechanisation and safety concerns means the volume of trees harvested manually has reduced considerably in recent years, from 90% five years ago to 1% now. However, work processes for cable logging operations and the manual harvest of trees using a chainsaw in commercial harvesting operations have remained the same.

“On the job mentoring education and training [is needed] ... ‘Competence’ sign-off does not mean the person knows how to do the job.”

Survey respondent

8. Community attitudes, social licence and industry culture

The following section examines community attitude towards forestry and the related concepts of social licence to operate and industry culture.

The forest and wood products sector depends on continued community support to access timber resources and non-forested land to expand the forest estate to sustainably produce wood products.¹⁵⁹ Community attitudes towards the forest and wood products industry, and the related concept of 'social licence to operate', are key drivers of change within the industry¹⁶⁰ and has important implications for the future development and expansion of growth of the forest and wood products industry in Tasmania. At the same time, an adverse industry culture can be an impediment to the application of technological advances and innovations.

In Tasmania community attitudes towards forestry in general, and plantation forestry more specifically, can be traced back to the history of logging native forests during the mid-1900s, and the large-scale expansion of the plantation estate in the 1990s and 2000s. Tasmania has been described as a 'world leader in environmental conflict'¹⁶¹ with community attitudes to forest management practices, and consequent translation to social licence to operate, having its genesis in the longstanding and divisive social conflict over the use and management of the state's natural resources.¹⁶² The 2010 'Forest Statement of Principles to Lead to an Agreement' between forest industry groups and environmental groups was an attempt to diffuse community agitation and conflict over harvesting in native forests. The Agreement supported a moratorium on the logging in high conservation value native forests, instead sourcing timber from "sustainable and socially acceptable plantations".¹⁶³

8.1. Community attitudes towards plantation forestry

The plantation estate expanded rapidly in Tasmania in the 1990s and 2000s, largely in response to Australian Government policy promoting plantations as offering a range of environmental, economic and social benefits to regional and rural areas.^{164, 165} However, the rapid expansion of plantation forestry on cleared agricultural land became a divisive socio-political issue in the early 2000s within some rural and

¹⁵⁹ Forest and Wood Products Australia.

¹⁶⁰ Ibid.

¹⁶¹ Libby Lester, "Media and Social Licence: On Being Publicly Useful in the Tasmanian Forests Conflict," *Forestry: An International Journal of Forest Research* 89, no. 5 (2016). <https://doi.org/10.1093/forestry/cpw015> pp.543

¹⁶² C. Lucas and R. Warman, "Disrupting Polarized Discourses: Can We Get out of the Ruts of Environmental Conflicts?," *Environment and Planning C: Politics and Space* 36, no. 6 (2018). <https://doi.org/10.1177/2399654418772843>.

¹⁶³ Australian Government, *Auditor-General's Reports on Tasmanian Forestry Grants Programs* (Canberra: Commonwealth of Australia, 2013).

¹⁶⁴ Australian Forestry Council, *National Forest Policy Statement: A New Focus for Australia's Forests* (Canberra: Commonwealth of Australia 1995).

¹⁶⁵ Plantation 2020 Vision Implementation Committee, "Plantations for Australia: The 2020 Vision," (Canberra Department of Primary Industries and Energy, 2002).

regional communities in Tasmania.¹⁶⁶ Community conflict over plantation forestry, particularly when established on land formerly used for agriculture typically revolved around concerns about the perceived loss of valued cultural landscapes, debates about whether plantation forestry is an appropriate rural land use and conflict over whether the landowner has the right to decide how the land is used.

Conflict over natural resource use arises when there are different expectations of the kinds of activities considered appropriate within the landscape. A study investigating community perceptions of small and large-scale afforestation in Ireland and Australia found ownership and management to be more important than the scale of the planting in determining public attitudes, with afforestation undertaken by farmers less likely to cause community concern than that undertaken by 'non-farmers'.¹⁶⁷ A large postal survey of residents of Tasmania and southwest Western Australia in 2009 found plantation forestry was considered more acceptable by the community when:

- Planted in areas with high water availability rather than in areas with a high demand on water resources
- Planted on land with poorer soil quality or saline soils rather than on land with high soil quality
- Planted on areas where plantations have previously been grown, rather than on former agricultural land or on areas with native vegetation
- Planted in areas with local processing rather than overseas processing
- Grown for timber rather than pulp and paper
- Owned by individual landholders rather than a plantation company.¹⁶⁸

Studies have documented the relationship between perceptions of commercial afforestation and the meanings attributed to rural landscapes.¹⁶⁹ In Tasmania a study of landowners identified three groups of values driving landowners' attitudes towards participating in agroforestry plantings on their land: (i) trees were perceived to be an economic proposition, (ii) trees as an uneconomic proposition, and (iii) trees on farms viewed to be essential regardless of economic considerations.¹⁷⁰ Landowner confidence and willingness to participate in commercial forestry has been weakened by the failure of key timber investment companies in the latter half of the 2000s, leaving some landholders facing extensive and often protracted legal proceedings.¹⁷¹

¹⁶⁶ G. R. Wilkinson and J. H. Drielsma, "Rampaging Plantations – Cause or Consequence of Changing Land Use in Rural Tasmania" (paper presented at the Forests in a changing landscape, 16th Commonwealth Forestry Conference jointly with the 19th Biennial Conference of the Institute of Foresters of Australia, Fremantle Western Australia 18-25 April 2001, Canning Bridge WA, 2001).

¹⁶⁷ J. Schirmer, "Plantations and Social Conflict: Exploring the Differences between Small-Scale and Large-Scale Plantation Forestry," *Small-Scale Forestry* 6, no. 1 (2007).

¹⁶⁸ K. Williams, *Community Attitudes to Plantation Forestry: Technical Report 194* (Hobart, Tasmania: Cooperative Research Centre for Forestry, 2009).

¹⁶⁹ N. M. Anderson, R M. Ford, and K J H. Williams, "Contested Beliefs About Land-Use Are Associated with Divergent Representations of a Rural Landscape as Place," *Landscape and Land Use Planning* (2017). <https://doi.org/10.1016/j.landurbplan.2016.05.020>

¹⁷⁰ Fleming et al.

¹⁷¹ I. Ferguson, "Australian Plantation Inventory: Ownership Changes, Availability and Policy," *Australian Forestry* 77, no. 1 (2014). <https://doi.org/10.1080/00049158.2013.868766>.

8.1.1. Perceptions of community attitudes and implications for the forest industry

In the stakeholder survey, 61% of respondents working in forest growing and management perceived community attitudes as having either a negative or somewhat negative effect on their businesses or area of work. In contrast only 13% of respondents in this industry segment felt that community attitudes had a positive, or somewhat positive effect on their business or area of work.

Participants in the stakeholder interviews observed that in general there has been a period of calm within the Tasmanian community since the 'forestry wars' a decade or so ago, and that social acceptance of the industry has improved overall. However, concern was expressed that the recent Federal Court decision related to harvesting of mountain ash (*E. regnans*) native forests in the Central Highlands of Victoria may 'embolden' non-government organisations in Tasmania to reignite resistance to forestry, particularly in native forests. For example, there has recently been intense scrutiny of native forest harvesting operations against Forest Practices Plans in the Styx valley by Forestry Watch, an independent organisation of scientists and concerned citizens based in Hobart.¹⁷²

One stakeholder expressed concern there is a subtle but consistent belief throughout the education system that forestry is a bad thing, that children grow up thinking that forestry is a bad thing. This perception tended not to be shared across all sectors: the impact of forest education in schools was perceived to be positive or somewhat positive by almost half (46%) of the survey respondents.

The 2016 *Transforming Australia's Forest Products Industry* report prepared by the Forest Industry Advisory Council recognised the need for industry to address poor community perceptions of the forest industry.¹⁷³ Poor community perceptions of the industry has implications for the expansion of the industry. For example, poor community perceptions can affect market demand for forest products,¹⁷⁴ require resources to be channelled towards community engagement activities,¹⁷⁵ and can lead to regulatory changes restricting the expansion of the plantation estate.¹⁷⁶

"There is a big knowledge gap in Tas between the forest industry and the general public. We have bred a culture of division, which has led to an 'us' and 'them' mentality. Industry culture needs to be inclusive and consultative – the public have valuable skills to offer which should be incorporated to grow the future skills of the industry." Survey respondent

¹⁷² <https://www.facebook.com/forestrywatch/>

¹⁷³ Commonwealth of Australia, "Transforming Australia's Forest Products Industry: Recommendations from the Forest Industry Advisory Council," (Canberra: Forest Industry Advisory Council, Department of Agriculture and Water Resources, 2016).

¹⁷⁴ Ibid.

¹⁷⁵ Melanie Dare, Frank Vanclay, and Jacki Schirmer, "Understanding Community Engagement in Plantation Forest Management: Insights from Practitioner and Community Narratives," *Journal of Environmental Planning and Management* 54, no. 9 (2011/11/01 2011). <https://doi.org/10.1080/09640568.2011.560456>.

¹⁷⁶ RPDC, *Revised State Pal Policy May 2008* (Hobart, Tasmania: Resource Planning and Development Commission Tasmania, 2008).

One of the most significant impacts of community attitudes towards the forestry sector observed in the stakeholder consultation was the potential implications for recruiting younger people to enter the industry. Community attitudes were observed to be an impediment to new entrants to the industry: "Why would young people want to enter an industry that is perceived to be a negative place to work, to have a negative reputation?" (stakeholder interview).

"Industry does not have community support; thus, we do not have people knocking on our door looking to work in the industry."

Stakeholder interview

8.2. What is social licence to operate and why is it important?

In general terms social licence to operate refers to the "broad approval or acceptance that the public or community of stakeholders affords to the operations of a company or industry".¹⁷⁷ Frequently paralleling community attitudes, social licence to operate is dynamic and constantly evolving, underpinned by multiple social and psychological variables, including perceived distributional and procedural fairness, trust and adaptability,¹⁷⁸ as well as beliefs about the potential impacts or outcomes of operations and management, normative beliefs about how the resources ought to be used and managed, and underlying social values.¹⁷⁹

Social licence to operate is complex: it is both intangible, lacking a formal process granting a physical permit or 'licence', while at the same time the presence or absence of social licence to operate can have very tangible impacts on the operations of businesses and organisation within the forest industry.¹⁸⁰ For example, the placing of forestry company Gunns into voluntary redundancy in 2012 has been largely credited to a loss of social licence to operate,¹⁸¹ while delays in production resulting from community conflict and loss of social licence has been demonstrated to greatly increase company exposure to risk and costs within the mining and hydrocarbon sector.¹⁸²

8.2.1. Social licence and the forest industry

A lack of social licence for forestry was felt by stakeholders to pose a real deterrent to recruitment of people into the industry. In the stakeholder survey, 63% of respondents in forest growing and management felt that a lack of social licence had a negative or somewhat negative impact on their business or area of work.

One stakeholder noted that there was no social licence for the expansion of large plantation areas, or for the conversion of native forest. The *Growing a Better Australia – A Billion Trees for Jobs and Growth*

¹⁷⁷ Justine Lacey, Peter Edwards, and Julian Lamont, "Social Licence as Social Contract: Procedural Fairness and Forest Agreement-Making in Australia," *Forestry: An International Journal of Forest Research* 89, no. 5 (2016). <https://doi.org/10.1093/forestry/cpw027> p. 490

¹⁷⁸ Alex Baumber, "Energy Cropping and Social Licence: What's Trust Got to Do with It?," *Biomass and Bioenergy* 108 (2018).

¹⁷⁹ Rebecca M. Ford and Kathryn J. H. Williams, "How Can Social Acceptability Research in Australian Forests Inform Social Licence to Operate?," *Forestry: An International Journal of Forest Research* 89, no. 5 (2016). <https://doi.org/10.1093/forestry/cpv051>.

¹⁸⁰ Kieren Moffat et al., "The Social Licence to Operate: A Critical Review," *Forestry: An International Journal of Forest Research* 89, no. 5 (2016). <https://doi.org/10.1093/forestry/cpv044>

¹⁸¹ F. Gale, "Timber Giant Gunns Felled by the 'Perfect Storm'," *The Conversation*, 26 September 2012

¹⁸² Daniel M. Franks et al., "Conflict Translates Environmental and Social Risk into Business Costs," *PNAS* 111, no. 21 (2014). <https://doi.org/10.1073/pnas.1405135111>

initiative¹⁸³ notes the importance of integrating plantations within agricultural enterprises if the goal of establishing one billion trees is to be achieved. Multiple barriers have been identified for integrating trees on farms,¹⁸⁴ and this strategy will require more complex levels of skill and expertise not currently available.

Multiple factors are identified in the FWPA *Strategic Plan 2019–2024* as contributing to a gap between the forest and key sections of the community.¹⁸⁵ These factors include social and demographic changes with increasing urbanisation weakening links between consumption and factors of production, as well as the rise of social media extending the reach and speed of campaigns directed against primary production industries.¹⁸⁶

In 2018 participants from the forest and wood products industry took part in a symposium organised by FWPA to examine the state of the industry’s social licence. Table 23 outlines six key challenges identified by symposium participants if the industry is to achieve and maintain a social licence to operate.¹⁸⁷

Table 23 Key challenges to achieving and maintaining a social licence to operate identified by participants in the FWPA 2018 symposium

Key challenge	Description
Community	The need for ‘social licence to operate’ initiatives to operate across all scales from local, to national and across all stakeholders was emphasised throughout the symposium, with all participants being encouraged to take the positive and progressive approach of ‘being the change they want to see’ and acting as good neighbours.
Collaboration	The sector is currently very fractured but demonstrates the ability to work together and recognises it is stronger together.
Consistency	Processes and resources need to be dedicated to ensuring the industry is aligned in action and voice.
Capacity	The sector lacks the skills, experience and capacity to plan, resource and manage the tools and materials needed to build the industry’s social licence to operate’.
Commitment	The industry must commit to measuring and evaluating impact against goals and making the data and reporting transparent and available.
Coordination	A centralised resource is needed to coordinate and manage the complexity of forestry messages to ensure coherence and alignment.

Source: <https://www.fwpa.com.au/forwood-newsletters/1649-social-license-will-help-drive-industry-credibility.html>

Community attitudes towards the forest industry, and the consequent granting of a social licence to operate, is underpinned by strongly held and frequently conflicting environmental and social values. Rather than seeking to change conflicting values it is important to frame forestry operations and management practices in ways that align with community values. This includes framing forestry, particularly plantations

¹⁸³ DAWR, "Growing a Better Australia – a Billion Trees for Jobs and Growth."

¹⁸⁴ See Next Generation Forest Plantation Investment <https://blogs.unimelb.edu.au/nextgenplantations/>

¹⁸⁵ FWPA <https://www.fwpa.com.au/images/corporatedocuments/FWPA- Strategic Plan 2014-19 web.pdf>

¹⁸⁶ Ibid.

¹⁸⁷ FWPA <https://www.fwpa.com.au/forwood-newsletters/1649-social-license-will-help-drive-industry-credibility.html>

integrated within agricultural production landscapes, in terms of the environmental services and potential on-farm co-benefits, and the potential contribution of wood products to carbon sequestration and climate change abatement.

8.3. Industry culture

Industry culture is an aggregation of organisational cultures within the industry and is a function of social and psychological variables that shape the behaviours and attitudes within the industry. Both industry culture and organisational culture are important determinants of business performance.¹⁸⁸ Organisational culture, defined as “a pattern of shared assumptions, beliefs and expectations” guides the interpretations and actions of members within an organisation by defining what is appropriate behaviour within that organisation or industry.¹⁸⁹ Organisational culture is theorised to operate on three interrelated levels: (i) as underlying conscious or unconscious assumptions and beliefs, (ii) as norms and values that signal appropriate attitudes and behaviours, and (iii) as cultural artefacts that may reflect the underlying norms and values, such as symbols and language.¹⁹⁰

In their *Strategic Plan 2019–2024*, FWPA identified the need for the industry to transition to a culture of innovation that includes embracing knowledge generation and adoption, technical transfer, skill development, continuous improvement and international best practice to ensure future growth within the industry

“A positive culture which embraces opportunities for training is crucial and must come from the most senior levels of leadership and instilled in the employee from their first contact with the industry.” Survey respondent

8.3.1. Stakeholder assessment of industry culture

Stakeholders are overall positive about the culture within the industry. In the stakeholder survey almost half (46%) of those responding to this question¹⁹¹ rated industry culture (described as innovation, workplace flexibility, and willingness to adopt new technologies) as having a positive or somewhat positive impact on their business or area of work.

The finding of a positive industry culture was supported in the stakeholder interviews. One stakeholder described the culture in their workplace as:

“Pride in what we do. We empower our people, and ensure they are well informed, so they are advocates for our industry. We have a culture of innovation. We have highly skilled employees.”

¹⁸⁸ C. A. Hartnell et al., "A Meta-Analytic Test of Organizational Culture's Association with Elements of an Organization's System and Its Relative Predictive Validity on Organizational Outcomes," *Journal of Applied Psychology* 104, no. 6 (2019). <https://doi.org/10.1037/apl0000380>.

¹⁸⁹ Jennifer A. Chatman et al., "Parsing Organizational Culture: How the Norm for Adaptability Influences the Relationship between Culture Consensus and Financial Performance in High-Technology Firms," *Journal of Organizational Behavior* 35, no. 6 (2014). <https://doi.org/10.1002/job.1928>. p.787

¹⁹⁰ Jennifer A. Chatman and Charles A. O'Reilly, "Paradigm Lost: Reinvigorating the Study of Organizational Culture," *Research in Organizational Behavior* 36 (2016).

¹⁹¹ Participants were not required to respond to this question if it was not applicable to them

Overall there was a view that industry culture had improved over the past decade, particularly with the change in management from MISs (managed investment schemes). Systems such as FOLS (see Box 5) and accreditation have helped with skill recognition within the industry (stakeholder interview). Where in the past there was a much more ‘cowboy’ approach within the industry, the prevailing culture is now more responsible and open about industry practices.

However, the understanding of what is meant by industry culture is very nuanced. While some referred to the culture of innovation and willingness to adopt new technologies, others commented on a more negative culture where it was accepted that the need to reduce costs in response to a decline in woodchip export was passed down the value chain to the contractor (stakeholder interview). Passing on cost cutting to the contractor compromised training opportunities. This trend was felt to be exacerbated somewhat by changes in ownership structure of forest estates to superannuation and investment companies.

Others noted the effect of the ageing workforce, observing that there is not a lot of appetite to upskill when people are well established in the profession.

8.4. Industry initiatives to help foster positive attitudes amongst the community

It is clear measures are needed to address poor community perceptions of the forest industry.¹⁹² This includes continuing existing community engagement activities demonstrating how sustainable management practices align with community concerns relating to the protection of the environmental and ecological services forest provide, including water flows, the use of chemicals, and the protection of forests from fire and other hazards¹⁹³.

Some of the apparent improvement in community attitudes towards the forest industry was attributed to an increased level of professionalism amongst operators, as well as increased open and bipartisan support for the forest industry by government. Investment by major players within the industry was considered vital to help drive broader acceptance of forestry as a sustainable industry: “the community tend to listen to big industry” (stakeholder interview).

Industry initiatives such as the marketing of timber as the ‘the ultimate renewable’ and ‘wood is good’ and the Responsible Wood Certification Scheme¹⁹⁴ were perceived to help promote a more positive attitude towards forestry within the industry.

In Tasmania industry led programs such as those offered by the Forest Education Foundation, the Arbre Forest Industries Training and Career Hub, the Tasmanian Agricultural Education Network and Forest and Wood Products Australia are helping promote an awareness of forestry within schools (Box 6).

Box 5 The FOLS program

FOLS: A portfolio of skills

FOLS is a national electronic system of recording training and verifying the currency of forestry industry workers’ skills. Managed by ForestWorks, FOLS is an industry-led program to support the professionalism and safety of industry.

Source:
<https://fols.forestworks.com.au/about/>

¹⁹² Commonwealth of Australia, "Transforming Australia’s Forest Products Industry: Recommendations from the Forest Industry Advisory Council."

¹⁹³ Forest and Wood Products Australia.

¹⁹⁴ <https://www.responsiblewood.org.au/>

Forest Education Foundation Inc.

The Forest Education Foundation Inc. (FEF) is a not-for-profit educational institution staffed by qualified and experienced teachers. The Foundation provides learning experiences throughout Tasmania for teachers and students from early years (Kindergarten to Year 2) to senior secondary (Years 11 to 12).

FEF programs provide teachers and students with the opportunity to engage with forest environments. FEF programs explore forest systems and the connection between humans and natural environments. Experienced teachers at FEF provide learning experiences that are hands-on, collaborative and encourage problem-solving skills.

The Foundation receives its core funding by way of sponsorship from Sustainable Timber Tasmania and the Tasmanian Forest Products Association. Other projects are supported through Australian Government grants and limited income is generated through school activities and resource sales.

Source: <http://www.forest-education.com/>

Arbre Forest Industries Training and Careers Hub

The Arbre Forest Industries Training and Careers Hub is a not-for-profit organisation. The Arbre Hub was established by industry leaders in Tasmania to promote the forest industry and related jobs. The Arbre Hub is overseen and managed by a governing board represented by Forico, Sustainable Timber Tasmania, Timberlands Pacific, Norske Skog, Reliance Forest Fibre, Waratah Forestry Equipment Pty Ltd, Casagrande Lumber Pty Ltd and Technical Forest Services

The purpose of the Arbre Hub is to facilitate the promotion of the forest industry training and careers with particular focus on harvesting, transport and silviculture. The Arbre Hub has a community engagement program promoting an awareness of forestry careers within schools.

Source: <https://www.arbre.net.au/>

Tasmanian Agricultural Education Network

The Tasmanian Agricultural Education Network (TAEN) promotes the delivery of a high-quality agricultural education in Tasmania and inspires interest in agriculture throughout the Tasmanian community.

Source: <https://taen.org.au/>

FWPA ForestLearning program

The ForestLearning Program is an Australia-wide initiative of Forest and Wood Products Australia (FWPA). The ForestLearning Program free quality resources for teachers, parents and students with the aim of integrating forestry and sustainable wood product information into young people's learning, while also aligning with Australian curriculum outcomes. Much of the course content is designed for online delivery, with resources ranging from virtual reality (VR) to live webinars with forestry professionals. Recent program developments include the ForestVR™ initiative, which allows students to experience forest and mill environments firsthand through the magic of VR.

Source: <https://www.fwpa.com.au/forwood-newsletters/2038-forestlearning-boosts-innovative-online-learning-options-for-kids.html>

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Appendix A. Questions from Terms of Reference

Community attitude, social licence and industry culture

- What is the existing knowledge about community attitude, social licence and industry culture?
- How do stakeholders perceive community attitude, social licence and industry culture as impeding or promoting growth within the sector?

Education, training and skills development

- What education, training and skills development programs are currently available for the forest growing and forest processing sectors within Tasmania?
- In what way do education, training and skills development opportunities promote or limit growth within the sector?
- What changes to education, training and skills development are needed to promote growth within the sector?

Workforce development and career pathways; attraction and retention of new employees

- What workforce development and career pathways are currently available?
- What is the current state of the workforce within the forest growing and forest processing sectors?
- In what ways do the current workforce development and career pathways promote or limit growth within the sector?
- What are the perceived strengths and weaknesses for attracting and retaining new employees?
- What changes in workforce development and career are needed to help attract and retain new employees?

Access to skilled operators

- What skilled operators are currently employed within the sector?
- In what way does access to skilled operators promote or limit growth within the sector?

Skills and labour force market

- What is the current market for skills and labour force within the sector?
- How does the current skills and labour force market promote or constrain growth within the sector?
- What changes in the skills and labour force market could promote growth within the sector?

Demographics of forestry workforce and potential workforce

- What are the demographics of the forestry workforce and potential workforce?
- What constraints or opportunities do the forestry workforce and potential workforce demographics pose for growth in the sector?

Technology changes and advancements; greater automation, artificial intelligence etc

- What is the current state of technology changes and advancements in the sector?
- What are the implications of the current technology for growth within the sector?
- What technological changes and advancements are needed to promote growth in the sector?

Skills and training funding availability

- What skills and training funding is available?
- What constraints or opportunities does the current skills and training funding pose for growth in the sector?
- What changes are needed to skills and training funding to promote growth in the sector?

Appendix B: Stakeholder survey

Tasmanian forest industry: Culture, skills and training needs

Forest industry role

1. What category best describes your participation in the forestry industry? Tick as many as apply.

- Forest owner or grower
- Forest management company
- Primary wood processing (e.g. sawmilling, veneer manufacturing, chipping)
- Secondary wood processing
- Silvicultural contractor
- Harvesting and haulage service provider (e.g. road transport)
- Training provider
- Technology development (e.g. IT, GIS, forestry equipment, harvesting, processing technology)
- Tasmanian State or local government
- Commonwealth Government
- Nursery
- Researchers
- Marketing and sales
- Business and financial management
- Industry association
- Other, please provide details
- No role within the forest industry

2. Which best describes the main forest resources for your business or organisation. Select as many that apply.

- Plantation grown timber
- Private native forests
- Public native forests
- Farm forestry
- None of the above, please give details.....

3. Which best describes the region(s) where you operate? Select as many that apply

- Northern Tasmania** (includes local government areas Break O’Day, Dorset, Flinders Island, George Town, Launceston, Meander Valley, Northern Midlands and West Tamar)
- North-west Tasmania** (includes local government areas Burnie, Central Coast, Circular Head, Devonport, Kentish, King Island, Latrobe, Waratah/Wynyard and West Coast)
- South Tasmania** (includes local government areas Brighton, Central Highlands, Clarence, Derwent Valley, Glamorgan-Spring Bay, Glenorchy, Hobart, Huon Valley, Kingborough, Sorell, Southern Midlands and Tasman)
- Statewide**, all of Tasmania
- None of the above, please give details.....

Factors impacting your business or area of work

4. How do the following impact the operation of your business or area of work? Select 'Not applicable' for any factor that does not apply in your situation.

Response option 5-point scale: 1 = Negatively affect, 2 = Somewhat negatively affect; 3 = No affect; 4 = Somewhat positively affect; 5 = Positively affect; 6 = Not applicable

- Community attitudes towards forestry in general
- Community acceptance of forest industry operation and business practices
- Industry culture - innovation, workplace flexibility, and willingness to adopt new technologies
- Forest education in schools
- Availability of formal education and training places
- Opportunities for in-house skill development
- Availability of workforce development and career pathways
- Ability to attract new employees
- Ability to retain employees
- Availability of skilled operators
- Availability of younger workers (aged under 35 years)
- A workforce that is getting older
- Technology changes within the sector
- The availability of funding for skills and training

5. Are there any other factors relating to culture, skills and training that have an impact on your business or organisation? Please give details.

Skills

6. Which of the following skills are needed in your business or your area of work? Select as many as apply and indicate if formal accreditation is required.

Two response options: Skill is needed; Formal accreditation required

- Occupational health and safety training
- Chainsaw and other hand-held machinery
- Compliance training
- Heavy machinery operation
- Fire-fighting
- IT/ software training specialised to the industry
- Marketing/sales
- Community relations/ engagement
- Business and financial management
- Forest operations planning and management
- Forest ecology and silviculture
- Road transport/driver training for haulage drivers

Workforce

7. How easy or difficult is it to recruit and retain the following workers and contractors? Select 'Not applicable' for roles that are not needed in your business.

Response option five-point scale: 1 = Very difficult; 2 = Somewhat difficult; 3 = Neither easy or difficult: 4 = Somewhat easy; 5 = Very easy; 6 = Not applicable

- Managers/high level professional staff
- Administration staff
- Finance manager/book keepers
- Transport/drivers e.g. log haulage
- Heavy machine operators

Education, skills and training

8. In the last three years how easy or difficult has it been to access the following education skills and training required in your area of work

Response option five-point scale: 1 = Very difficult; 2 = Somewhat difficult; 3 = Neither easy or difficult: 4 = Somewhat easy; 5 = Very easy; 6 = Not applicable

- Road transport/driver training for haulage drivers
- Forest operations planning and management
- Chainsaw and other hand-held machinery (e.g. brushcutter, pruning)
- Heavy machinery operation
- Fire fighting
- Forest ecology and silviculture including plant identification
- Business and financial management
- Compliance training e.g. training in compliance needed for regulatory or certification bodies
- IT/ software training specialised to the industry e.g. for plant operation, in-field survey
- Occupational health and safety training.
- Marketing/sales
- Community relations/community engagement

9. What other skills and training is needed that is not mentioned above? Please give details.

10. Which type of training do you use for the following areas of operation?

Response options: In-house training by other staff; In-house training by experts; Registered training organisation; Not applicable

- Road transport/driver training for haulage drivers
- Forest operations planning and management
- Chainsaw and other hand-held machinery (e.g. brushcutter, pruning)
- Heavy machinery operation
- Fire fighting
- Forest ecology and silviculture including plant identification
- Business and financial management
- Compliance training e.g. training in compliance needed for regulatory or certification bodies
- IT/ software training specialised to the industry e.g. for plant operation, in-field survey
- Occupational health and safety training.
- Marketing/sales
- Community relations/community engagement
- Other, please give details.

11. What barriers, if any, are there to accessing either necessary or desired training, skills or education opportunities in your business or area of work, e.g. cost, time commitment, location?

12. What would help remove or reduce barriers to training, skills or education?

New and emerging technologies

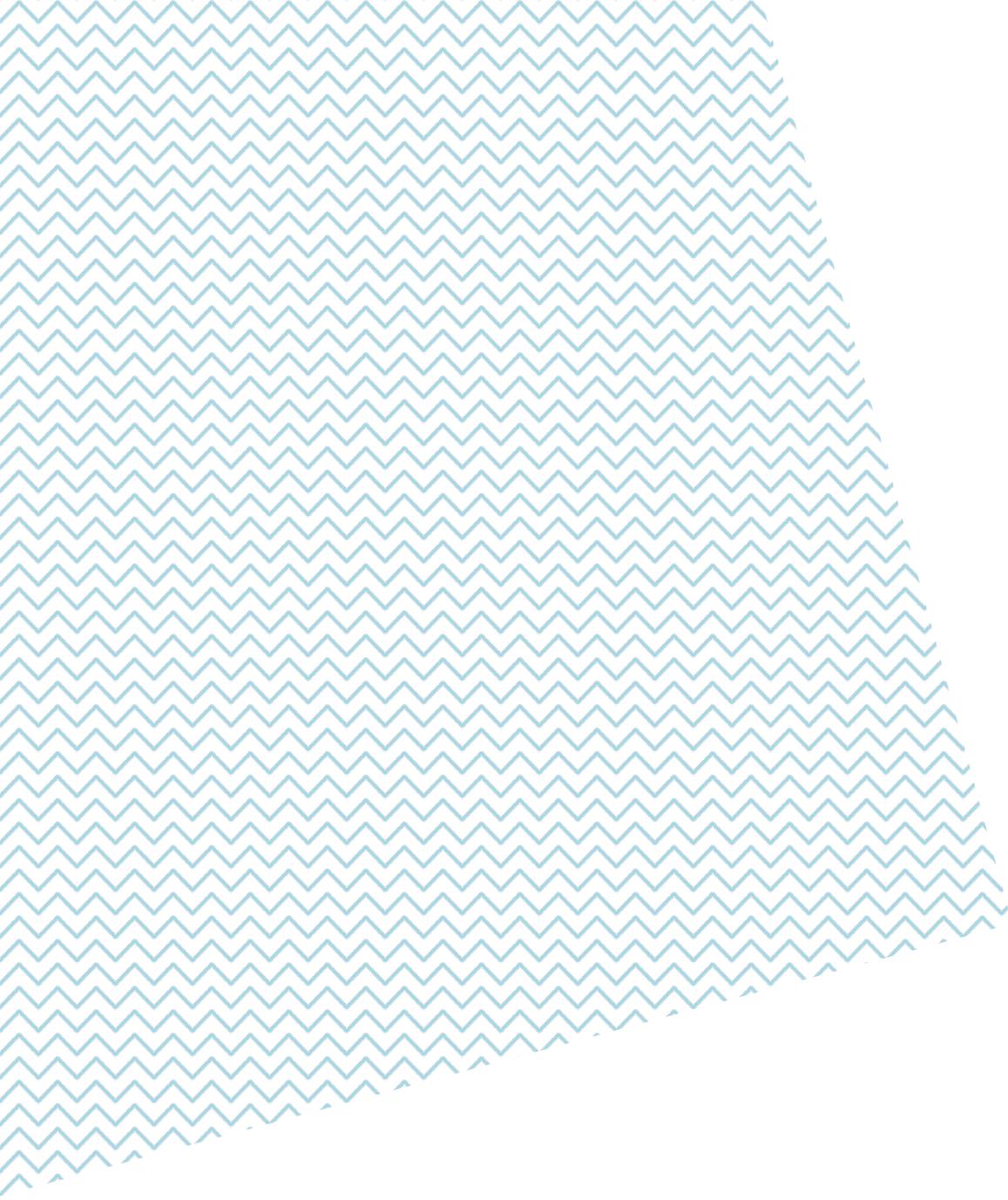
13. What are the new or emerging technologies in your area of work? Please give details.

14. What training opportunities are needed to take advantage of any new or emerging technologies in your business or area of work?

15. Which three factors are the **most** limiting for the future growth of your business or area of work – select up to three.

- Industry culture
- Skills and training
- Government regulations
- Market availability
- Community attitudes to forestry
- Stewardship requirements
- Other – please describe

16. Finally, have we missed anything? Please indicate below any other important factors relating to culture, skills and training that have not been covered above.



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