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ABARES National Wood Processing Survey

2016–17

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Summary

ABARES estimates that a total of 299 mills operated in 2016–17, comprising 182 hardwood sawmills, 58 softwood sawmills, 23 wood-based panel mills, 19 post and pole mills and 17 cypress pine sawmills. The number of sawmills in Australia has decreased significantly since 2006–07, with hardwood sawmills decreasing by 64 per cent and softwood and cypress pine sawmills by 31 per cent. The volume of hardwood and softwood sawlogs harvested for domestic processing has also decreased by 38 per cent and 2 per cent, respectively, over the same period. However, the decline in mill numbers has slowed since 2012–13 and total sawlog processing volumes have increased.

In 2016–17 a total of 10.63 million cubic metres of sawlogs was processed in Australian sawmills, which comprised 1.91 million cubic metres of hardwood sawlogs, 8.58 million cubic metres of softwood sawlogs and 147,000 cubic metres of cypress pine sawlogs.

A total of 4.71 million cubic metres of sawnwood was produced in 2016–17, comprising 742,000 cubic metres of hardwood sawnwood, 3.91 million cubic metres of softwood sawnwood and 57,000 cubic metres of cypress pine sawnwood. In 2016–17 an estimated 280,000 cubic metres of posts and poles and 1.79 million cubic metres of wood-based panels was produced.

In 2016–17 around 27 per cent of hardwood sawnwood production was dry appearance-grade products, followed by green structural (24 per cent) and green other (24 per cent). In contrast, around 52 per cent of total softwood sawnwood production was dry structural-grade timber, followed by green other (23 per cent) and dry other (18 per cent).

An estimated \$2.48 billion of revenue was generated in 2016–17 from the sale of sawnwood processed in Australia, comprising \$930 million from hardwood sawnwood sales and \$1.55 billion from softwood sawnwood sales.

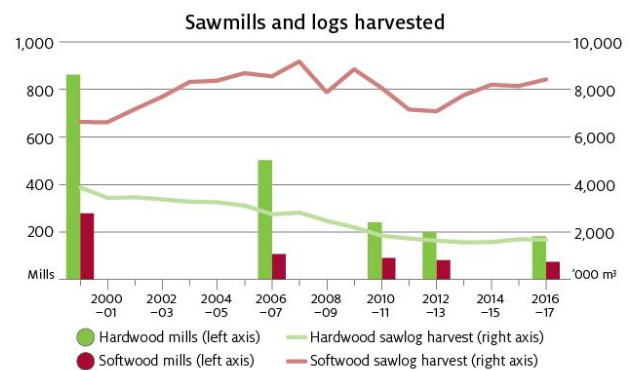
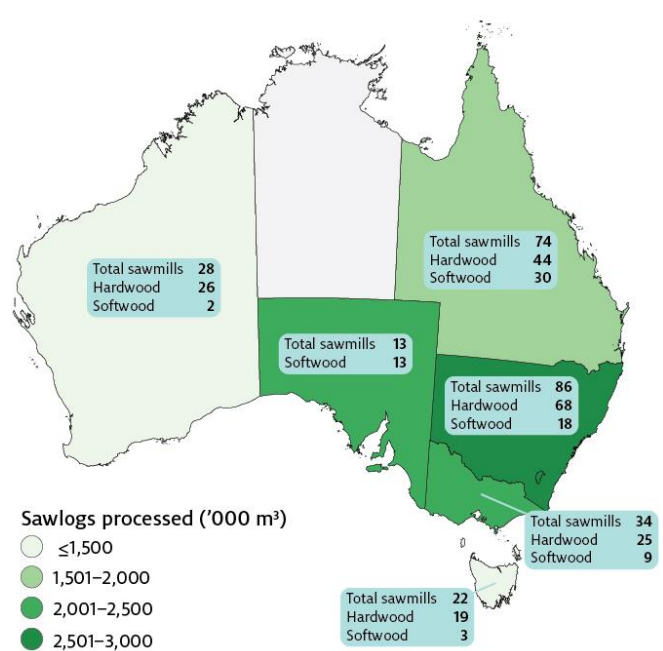
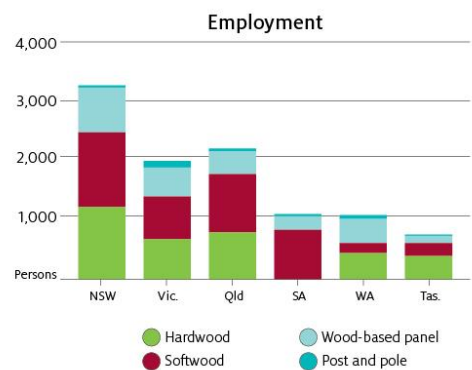
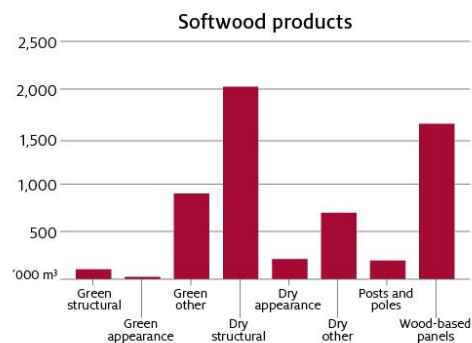
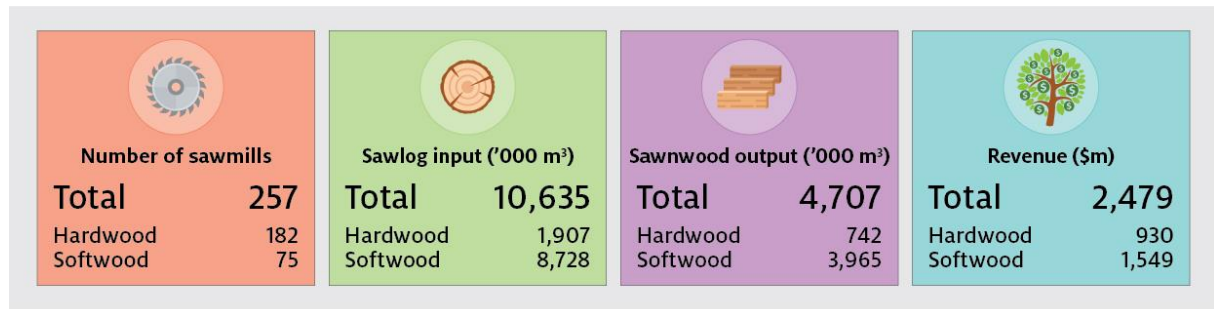
A total of 5.49 million cubic metres of sawlog residues was produced in 2016–17, comprising 1.09 million cubic metres of hardwood residues and 4.40 million cubic metres of softwood residues.

ABARES estimates that Australia's sawmills and post and pole mills employed 8,029 people in 2016–17, of which around 89 per cent were full-time workers (including managers and owners). Males accounted for around 90 per cent of the workforce. Cypress pine sawmills employed the highest proportion of part-time workers (14 per cent) and softwood sawmills employed the lowest (8 per cent). Wood-based panel mills employed a total of 2,390 people in 2016–17.

Around 36 per cent of mills expected an increase in demand for their product in 2017–18. The majority of respondents expected demand for their products to remain constant (60 per cent). Only a small proportion of hardwood sawmills (6 per cent) and wood-based panel mills (11 per cent) expected demand for their products to decrease.

The most common issue facing Australian mills was log supply (43 per cent of responses), followed by skilled labour (17 per cent) and mill costs (13 per cent). Other issues included the quality and size of logs, product demand and log costs.

ABARES National Wood Processing Survey



Note: Softwood includes cypress pine.
Source: ABARES

1 Survey Results

Number of mills

ABARES estimates that a total of 299 mills (see Maps section) operated in 2016–17, comprising 182 hardwood sawmills, 58 softwood sawmills, 23 wood-based panel mills, 19 post and pole mills and 17 cypress pine sawmills (Table 1). These estimates refer to the number of green mills (excluding portable sawmills) that operated in each state or territory during 2016–17. While several wood processors ceased operations during and after 2016–17, they were included in this analysis if they processed logs during 2016–17.

Table 1 Number of mills in Australia, by processing capacity and state, 2016–17

Mill type and log input capacity (m ³ /yr)	NSW ^a	Vic.	Qld	SA	WA	Tas.	Aust.
Hardwood sawmill							
<3,000	30	4	20	0	12	5	71
3,000 to <15,000	16	13	17	0	9	7	62
15,000 to <45,000	19	5	7	0	5	6	42
45,000 to <75,000	2	1	0	0	0	1	4
75,000 to <100,000	0	0	0	0	0	0	0
≥100,000	1	2	0	0	0	0	3
Total	68	25	44	0	26	19	182
Softwood sawmill							
<3,000	2	1	1	3	0	1	8
3,000 to <15,000	0	0	5	3	0	0	8
15,000 to <45,000	3	2	4	1	1	1	12
45,000 to <75,000	2	0	2	1	0	0	5
75,000 to <100,000	3	0	1	1	0	0	5
100,000 to <400,000	1	5	2	1	0	0	9
≥400,000	3	1	2	3	1	1	11
Total	14	9	17	13	2	3	58
Wood-based panel mill							
MDF/Hardboard	2	1	2	0	0	0	5
Particleboard	2	1	1	2	1	0	7
Plywood/Veneer/LVL	3	1	1	0	1	5	11
Total	7	3	4	2	2	5	23
Post and pole mill ^b	2	8	2	2	4	1	19
Cypress pine sawmill	4	0	13	0	0	0	17

^a Includes ACT. ^b Excludes sawmills that also produce posts and poles.

Source: ABARES

There is a significant difference in the structure of the hardwood and softwood sawmilling industries in Australia. In 2016–17 almost all hardwood sawmills processed less than 45,000 cubic metres of logs (96 per cent), whereas only 48 per cent of softwood sawmills fell

into this category. ABARES estimates that there were 23 sawmills with a log input capacity greater than 100,000 cubic metres in 2016–17; three of these were hardwood sawmills. While this category represents a small proportion of the sawmill population, it accounts for a significant proportion of total sawnwood production. The category also represents a variety of mill sizes: 11 sawmills (all softwood) had an estimated annual log input capacity greater than 400,000 cubic metres.

Most hardwood sawmills were located in New South Wales and Queensland (62 per cent combined). In 2016–17 the proportion of hardwood sawmills in the smallest size category (less than 3,000 cubic metres) was estimated to be 44 per cent in New South Wales and 45 per cent in Queensland, compared to 67 per cent and 78 per cent, respectively, in 2006–07. Almost all of the softwood sawmills in Australia were located in Queensland, New South Wales, South Australia and Victoria (91 per cent combined). Cypress pine sawmills are located near Australia's native cypress pine resource, in Queensland and New South Wales.

Australia's 23 wood-based panel mills comprised seven particleboard mills, six plywood mills, four veneer mills, four medium-density fibreboard (MDF) mills, one hardboard mill and one laminated veneer lumber (LVL) mill.

Sawlog input

In 2016–17 a total of 10.63 million cubic metres of sawlogs (including post and pole logs) was processed in Australian sawmills, comprising 1.91 million cubic metres of hardwood sawlogs, 8.58 million cubic metres of softwood sawlogs and 147,000 cubic metres of cypress pine sawlogs (Table 2).

Logs sourced from New South Wales accounted for the largest proportion of hardwood sawlogs processed (36 per cent) in 2016–17, followed by Victoria (27 per cent) and Queensland (15 per cent). The majority of softwood sawlogs were sourced from New South Wales (27 per cent), South Australia (25 per cent), Victoria (20 per cent) and Queensland (18 per cent). As the native cypress pine resource is located in New South Wales and Queensland, the cypress pine sawmilling industry is located exclusively in these states, with Queensland processing 75 per cent of the sawlogs.

Table 2 Sawlog input, by state and tree ownership, 2016–17

State ('000 m ³)	Hardwood logs			Softwood logs			Cypress pine logs		
	Private	Public	Total	Private	Public	Total	Private	Public	Total
NSW ^a	179	511	690	298	2,009	2,307	0	37	37
Vic.	34	490	524	1,710	2	1,712	0	0	0
Qld	154	130	284	1,500	5	1,504	2	108	110
SA	0	0	0	2,008	108	2,116	0	0	0
WA	6	184	190	51	487	538	0	0	0
Tas.	56	163	219	387	17	404	0	0	0
Australia	430	1,478	1,907	5,953	2,628	8,581	2	145	147

^a Includes ACT.

Note: Sawlog input includes post and pole logs; state indicates source of log input, not mill location.

Source: ABARES

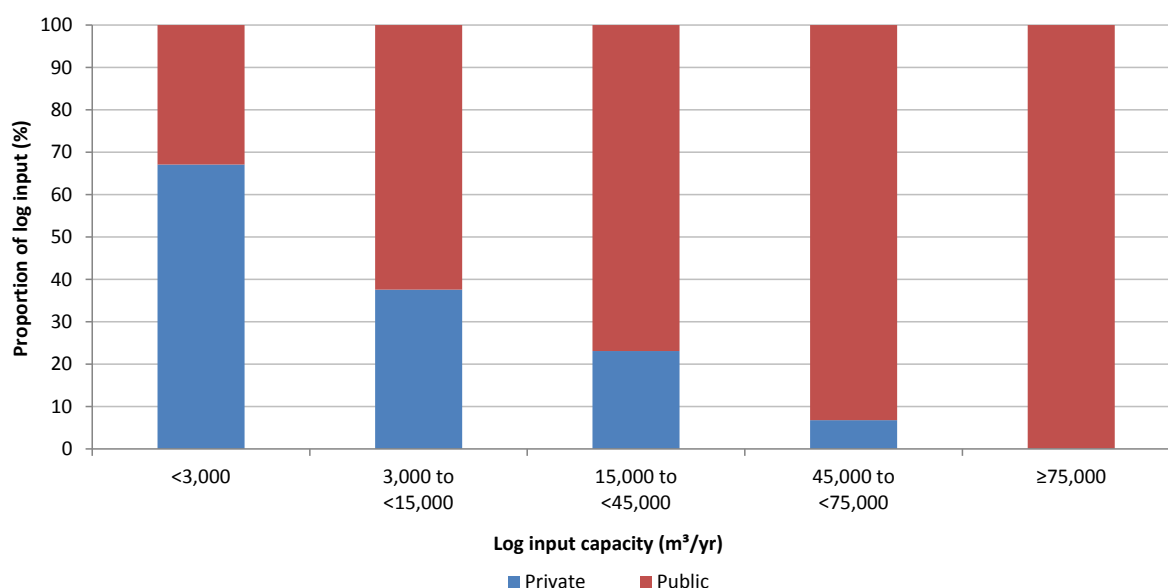
An estimated 23 per cent of hardwood sawlogs were sourced from private forests, based on tree ownership, in 2016–17, compared with 14 per cent in 2012–13 and 22 per cent in the 2006–07. The remaining 77 per cent of hardwood sawlogs were sourced from public forests, predominantly in New South Wales (35 per cent) and Victoria (33 per cent).

The majority of hardwood sawlogs sourced from private forests in 2016–17 were from New South Wales (42 per cent) and Queensland (36 per cent). In New South Wales, the volume of hardwood sawlogs sourced from private forests increased by 72 per cent compared with the volume estimated in the previous sawmill survey, from 104,000 cubic metres in 2012–13 to 179,000 cubic metres in 2016–17. The estimated volume of hardwood sawlogs sourced from private forests in Queensland increased by 16 per cent, from 133,000 cubic metres in 2012–13 to 154,000 cubic metres in 2016–17.

In 2016–17 an estimated 69 per cent of softwood sawlogs processed in Australia were sourced from private plantation forests, up from 59 per cent in 2012–13. The majority of private plantation softwood sawlogs were sourced from South Australia (34 per cent), Victoria (29 per cent) and Queensland (25 per cent). Most of the public plantation softwood sawlogs were sourced from New South Wales (76 per cent). Almost all of the cypress pine sawlogs were sourced from public forests (99 per cent) and only 1 per cent was sourced from private forests.

The proportion of hardwood sawlogs sourced from private forests is inversely related to the size of mills (Figure 1). For example, hardwood mills with an annual log input capacity less than 3,000 cubic metres sourced 67 per cent of their log input from private forests. In contrast, larger hardwood mills with a capacity of more than 45,000 cubic metres sourced logs mainly from state-managed public forests. Hardwood sawmills with an annual log input capacity of less than 45,000 cubic metres accounted for 97 per cent of total private hardwood log processing in Australia in 2016–17, which is similar to the proportion in 2012–13 (99 per cent).

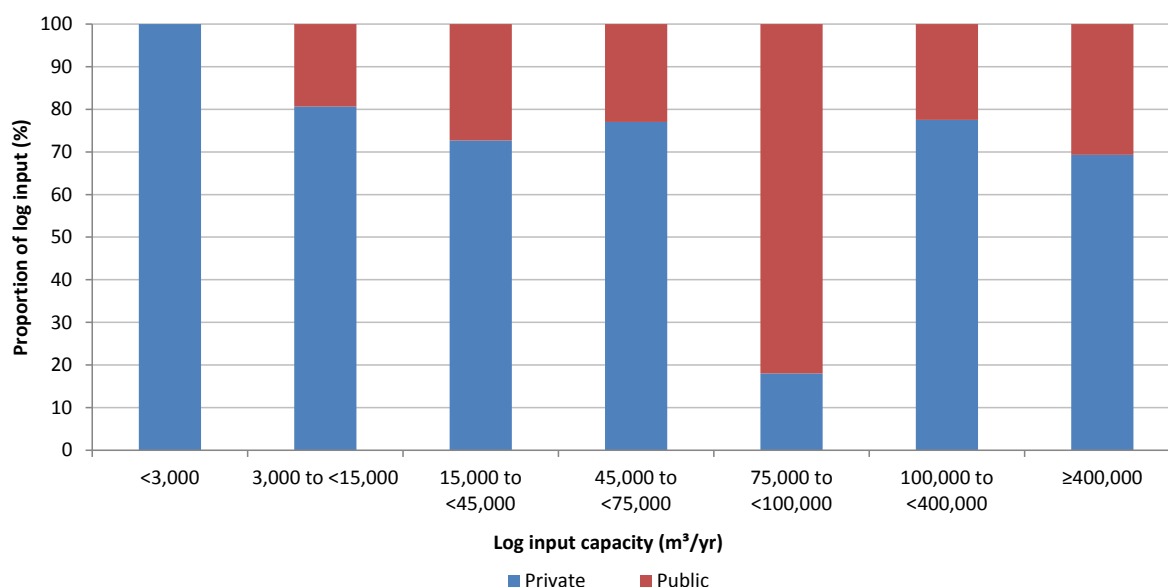
Figure 1 Proportion of hardwood sawlog input, by processing capacity and tree ownership, 2016–17



Source: ABARES

Softwood sawmills with an annual log input capacity of less than 3,000 cubic metres sourced all of their logs from private forests (Figure 2). Larger sawmills sourced between 69 per cent and 81 per cent of their logs from private forests, except for mills with a processing capacity between 75,000 and 100,000 cubic metres that only sourced 18 per cent of their log input from private forests.

Figure 2 Proportion of softwood sawlog input, by processing capacity and tree ownership, 2016–17



Source: ABARES

Characteristics

Australia's wood processing industry is diverse, with mills of all types and sizes producing a wide range of wood products. Most wood processing facilities (93 per cent) in Australia were wholly Australian owned and operated in 2016–17. Around 7 per cent of wood processing facilities were partially or wholly owned by New Zealand, United States and other foreign investors.

Characteristics of hardwood and softwood sawmills by size

Many differences in the characteristics of Australia's hardwood and softwood mills relate to the scale of these mills. The average size of hardwood mills, based on log input, in 2016–17 was 10,096 cubic metres, compared with 140,838 cubic metres for softwood mills (Table 3). Most hardwood products are produced by small mills—74 per cent of the national output of hardwood sawmills in 2016–17 was produced by mills with an annual log input capacity less than 45,000 cubic metres (175 mills). In contrast, around 88 per cent of the national output of softwood sawmills was produced by only 20 mills—all with an annual log input capacity above 100,000 cubic metres. In general, smaller mills in the hardwood and softwood sawmill industries have higher than average recovery rates. Smaller mills typically produce a wider range of products than larger mills and have different processing methods and infrastructure, allowing for greater utilisation of log resources.

Table 3 Characteristics of hardwood and softwood sawmills, by log input capacity, 2016–17

Mill type and log input capacity (m ³ /yr)	No. of mills	Total input	Average input	Recovery rate	Average output a	Total output a	Share of national output
		'000 m ³	m ³ /mill	%	m ³ /mill	'000 m ³	%
Hardwood sawmill							
<3,000	71	66	936	46.6	437	31	4.1
3,000 to <15,000	62	356	5,743	47.3	2,714	168	22.2
15,000 to <45,000	42	919	21,870	39.6	8,657	364	48.1
45,000 to <75,000	4	161	40,261	36.6	14,747	59	7.8
75,000 to <100,000	0	na	na	na	na	na	na
≥100,000	3	335	111,802	40.1	44,798	134	17.8
Total	182	1,838	10,096	41.2	4,155	756	100
Softwood sawmill b							
<3,000	8	9	1,172	50.0	586	5	0.1
3,000 to <15,000	8	57	7,141	61.7	4,404	35	0.9
15,000 to <45,000	12	281	23,428	48.5	11,359	136	3.5
45,000 to <75,000	5	189	37,760	47.9	18,074	90	2.3
75,000 to <100,000	5	375	74,961	52.3	39,233	196	5.0
100,000 to <400,000	9	1,665	184,964	45.8	84,697	762	19.5
≥400,000	11	5,593	508,425	48.0	243,852	2,682	68.6
Total	58	8,169	140,838	47.8	67,369	3,907	100

a Output sums all products produced. **b** Excludes cypress pine sawmills.

Note: Average log input may be less than log input capacity for some strata.

Source: ABARES

Characteristics of sawmills and other mills by state

There are significant regional differences in the characteristics of Australian mills. Hardwood sawmills in New South Wales accounted for the largest proportion of national output (34 per cent) in 2016–17, followed by Victoria (30 per cent), Queensland (15 per cent), Tasmania (10 per cent) and Western Australia (10 per cent) (Table 4). Victoria and Tasmania were the only states with an average mill input greater than the national average. While Victoria had fewer hardwood sawmills than Queensland, these mills were larger on average and contributed almost twice as much to the total national output across all sawlog grades.

Softwood sawmills in New South Wales accounted for the largest proportion of national output (33 per cent) in 2016–17, followed by South Australia (23 per cent), Queensland (18 per cent), Victoria (17 per cent), and Western Australia and Tasmania (9 per cent). The average mill input in Queensland was significantly lower than all other states and 39 per cent lower than the national average.

Recovery rates were generally higher among softwood sawmills, compared with hardwood sawmills, with distinct differences between states. The recovery rates reported in Table 4 are the result of factors including the species and size of sawlogs in each state, as well as each mill's sawing technology and the products produced.

The variation in recovery rates between the three wood-based panel categories is due to the different production processes involved and their input sources. Overall, wood-based panel mills have higher recovery rates for processing wood fibre into panel products, in comparison to sawmills processing sawlogs into sawnwood. Post and pole mills generally have very high recovery rates due to the nature of products processed.

Table 4 Characteristics of sawmills and other mills, by state, 2016–17

Mill type and state	No. of mills	Total input a	Average input a	Recovery rate	Average output b	Total output b	Share of national output
		'000 m ³	m ³ /mill	%	m ³ /mill	'000 m ³	%
Hardwood sawmill c							
NSW	68	620	9,121	41.5	3,785	257	34.0
Vic.	25	539	21,565	42.7	9,203	230	30.4
Qld	44	276	6,276	42.3	2,655	117	15.4
WA	26	191	7,348	38.4	2,819	73	9.7
Tas.	19	211	11,105	37.3	4,141	79	10.4
Australia	182	1,838	10,096	41.2	4,155	756	100
Softwood sawmill							
NSW d	14	2,593	185,186	49.9	92,386	1,293	33.1
Vic.	9	1,412	156,886	46.8	73,477	661	16.9
Qld	17	1,460	85,870	48.0	41,182	700	17.9
SA	13	1,973	151,743	45.0	68,331	888	22.7
WA & Tas. e	5	732	146,314	49.8	72,860	364	9.3
Australia	58	8,169	140,838	47.8	67,369	3,907	100
Wood-based panel mill							
MDF/Hardboard	5	650	129,942	88.8	115,351	577	32.2
Particleboard	7	1,122	160,317	79.1	126,769	887	49.6
Plywood/Veneer/LVL	11	608	55,257	53.4	29,527	325	18.2
Total	23	2,380	103,468	75.2	77,780	1,789	100
Post and pole mill f	19	322	16,947	80.8	13,694	260	na
Cypress pine sawmill	17	147	8,635	43.3	3,736	64	na

a Input for wood-based panel mills includes wood fibre other than logs. **b** Output sums all products produced. **c** There are no hardwood sawmills in ACT or SA. **d** Includes ACT. **e** State results combined to protect individual mill confidentiality.

f Excludes sawmills that also produce posts and poles.

Source: ABARES

Production

In 2016–17 a total of 4.71 million cubic metres of sawnwood, 280,000 cubic metres of posts and poles and 1.79 million cubic metres of wood-based panels was produced (Table 5). An estimated 742,000 cubic metres of hardwood sawnwood was produced in 2016–17, of which 37 per cent was dry. In contrast, 3.91 million cubic metres of softwood sawnwood was produced in 2016–17, with 75 per cent of this sold as dry product. Around 73 per cent of the 57,000 cubic metres of cypress pine sawnwood produced in 2016–17 was sold as green product.

Estimates of green and dry sawnwood production represent sawnwood produced by processing sawlogs onsite and include green sawnwood sold to value-adding mills for further processing. Dry mills that did not have an associated green mill were excluded from the survey.

Around three quarters of total hardwood sawnwood output was distributed fairly evenly across three main product types, with shares of 'dry appearance', 'green structural' and 'green other' output ranging between 24 to 27 per cent. Hardwood mills prioritised the production of appearance-grade products, with total green and dry appearance product output accounting for 42 per cent of total output. In contrast, around 54 per cent of output from softwood mills was green and dry structural-grade timber and only 6 per cent was green and dry appearance-grade products.

A total of 1.79 million cubic metres of wood-based panels was produced in 2016–17, with the majority being softwood products (91 per cent) and almost half being particleboard products. An estimated 78,000 cubic metres of hardwood posts and poles and 196,000 cubic metres of softwood posts and poles were also produced.

Table 5 Production of mills, by product type, 2016–17

Product type	Hardwood products		Softwood products		Cypress pine products	
	Total output	Share of output	Total output	Share of output	Total output	Share of output
	'000 m ³	%	'000 m ³	%	'000 m ³	%
Green structural	178	24.0	86	2.2	18	31.8
Green appearance	112	15.1	16	0.4	8	14.6
Green other a	176	23.7	887	22.7	15	26.9
Dry structural	61	8.2	2,019	51.7	3	5.9
Dry appearance	199	26.8	200	5.1	12	20.8
Dry other b	16	2.1	699	17.9	0	0.0
Total sawnwood	742	100	3,908	100	57	100
Posts and poles	78	na	196	na	6	na
Wood-based panels	155	na	1,634	na	0	na

a Includes pallets, fencing and landscaping. **b** Includes flooring, framing, furniture and pallets.

Source: ABARES

Product prices

An estimated \$2.48 billion of revenue was generated (ex-mill) in 2016–17 from the sale of sawnwood processed in Australia, comprising \$930 million from hardwood sawnwood sales and \$1.55 billion from softwood sawnwood sales (Table 6).

Hardwood sawnwood prices were significantly higher than softwood sawnwood prices—the average price across all hardwood product types was around 3.2 times greater than the average for all softwood products. Appearance-grade products were sold for the highest prices, followed by structural-grade products and other products. The variation in sawnwood prices can be attributed to differences in sawlog species, resource quality, regional market availability and market destinations.

Dry product prices were higher than green product prices, due to the additional processing and value-adding involved in producing dry products. Average prices for dry hardwood structural- and appearance-grade products were around 40 per cent higher than equivalent green products, and average prices for dry softwood products ranged from 22 to 39 per cent higher than for equivalent green products. The average price for dry other hardwood products was around 3 times greater than the equivalent green product category. This can be explained by survey respondents providing a combined average price across a wide range of products of varying value, such as flooring, framing, furniture and pallets, compared to green other products predominantly comprising pallets, fencing and landscaping products.

Weighted average prices were derived using mill gate prices averaged across all products within a product type and associated output volumes, as provided by survey respondents. Total revenue estimates were subsequently derived using these weighted average prices and estimates of total output.

Table 6 Sawnwood product prices and revenue, by product type, 2016–17

Product type	Hardwood products			Softwood products a		
	Total output	Average price b	Total revenue	Total output	Average price b	Total revenue
	'000 m ³	\$/m ³	\$m	'000 m ³	\$/m ³	\$m
Green structural	178	1,155	205.9	104	349	36.3
Green appearance	112	1,373	154.0	25	424	10.4
Green other c	176	377	66.3	902	234	211.2
Dry structural	61	1,621	98.8	2,023	465	939.8
Dry appearance	199	1,951	387.5	212	516	109.7
Dry other d	16	1,136	17.8	699	326	228.1
Total sawnwood	742	1,254	930.3	3,965	391	1,548.9

a Includes cypress pine. **b** Weighted average prices were derived using mill gate prices averaged across all products within a product type and associated output volumes, as provided by survey respondents. **c** Includes pallets, fencing and landscaping. **d** Includes flooring, framing, furniture and pallets.

Source: ABARES

Sawlog residues

A total of 5.49 million cubic metres of sawlog residues was produced in 2016–17, comprising 1.09 million cubic metres of hardwood residues and 4.40 million cubic metres of softwood residues (Table 7).

Mills prioritise the production of higher value residues, such as woodchips, which can be sold to supplement primary product revenue. Around 408,000 cubic metres of hardwood woodchip (38 per cent of total hardwood residues) and 2.53 million cubic metres of softwood woodchip (58 per cent of total softwood residues) was sold in 2016–17. Woodchip was the only residue that was reported by surveyed mills as being exported—864,000 cubic metres of softwood woodchip (34 per cent of total softwood woodchip) and 43,000 cubic metres of hardwood woodchip (11 per cent of total hardwood woodchip) was exported in 2016–17. Woodchips are typically sold to other mills, such as wood-based panel mills and pulp and paper mills, to be used as a wood fibre input, and are also sold for landscaping purposes.

The share of sawdust for hardwood mills (19 per cent) was almost twice as much as the share for softwood mills (10 per cent). This difference can be explained by the types of products produced, quality and size of logs processed, and scale and mill infrastructure. Sawdust is typically sold as animal bedding to agricultural producers, such as chicken farms, as well as for landscaping and boiler fuel.

Hardwood mills sold 15 per cent of their residues as fuelwood, which includes the sale of firewood, fuel blocks and kindling. In comparison, only 1 per cent of softwood mill residues was sold as fuelwood. Other sale includes bark, shavings and mulch sold for various uses, predominantly landscaping. The 'Used by mill' category represents residues used onsite to support various production processes, such as energy generation and fuelling kilns. All remaining residues are grouped into the 'Other' category, which includes residues that were disposed of rather than sold and also residues of unknown type or unspecified use.

Table 7 Sawlog residues, by residue type, 2016–17

Residue type	Hardwood residues		Softwood residues ^a	
	Total residue	Share of residue	Total residue	Share of residue
	'000 m ³	%	'000 m ³	%
Woodchip	408	37.6	2,530	57.5
Fuelwood	159	14.7	54	1.2
Other sale	32	3.0	279	6.3
Used by mill	31	2.9	629	14.3
Sawdust	206	19.0	431	9.8
Other ^b	249	22.9	479	10.9
Total	1,086	100	4,402	100

^a Includes cypress pine. ^b Includes residues that were disposed of rather than sold and also residues of unknown type or unspecified use.

Source: ABARES

Employment

Australia's sawmills and post and pole mills employed 8,029 people in 2016–17, including around 89 per cent full-time workers (including managers and owners) (Table 8). Males accounted for around 90 per cent of the workforce. Cypress pine sawmills employed the highest proportion of part-time or casual workers (14 per cent) and softwood sawmills employed the lowest proportion (8 per cent).

Softwood sawmills processed around 3.9 times more logs per employee than hardwood sawmills and 3.6 times more than cypress pine sawmills. This reflects the smaller scale of hardwood and cypress pine sawmills in general and the large-scale, capital-intensive nature of softwood sawlog processing.

Wood-based panel mills employed a total of 2,390 people in 2016–17. In comparison to sawmills and post and pole mills, wood-based panel mills reported significantly fewer managers and owners—5 per cent of total employees compared to 10 per cent. Particleboard mills had the highest input per full-time equivalent, followed by MDF/Hardboard and Plywood/Veneer/LVL.

The estimates include people directly employed in mill operation and administration and exclude contractors involved with the harvesting and delivery of log inputs, as well as those employed in downstream activities such as wood product wholesaling.

Table 8 Direct employment in the wood processing industry, 2016–17

Mill type	Managers / Owners	Full time	Part time	Total	Male	Female	FTE	Input per FTE ^a
	no.	no.	no.	no.	%	%	no.	m ³ /FTE
Hardwood sawmill	404	2,685	461	3,550	89	11	3,574	514
Softwood sawmill	312	3,275	307	3,894	91	9	4,036	2,024
Cypress pine sawmill	26	205	37	268	92	8	264	557
Post and pole mill	33	242	42	317	92	8	326	986
Total	775	6,407	847	8,029	90	10	8,199	1,278
Wood-based panel mill								
MDF/Hardboard	35	640	41	715	na	na	708	918
Particleboard	39	824	51	914	89	11	920	1,220
Plywood/Veneer/LVL	38	609	114	761	88	12	752	809
Total	112	2,073	206	2,390	89	11	2,379	1,000

^a Input for wood-based panel mills includes wood fibre other than sawlogs.

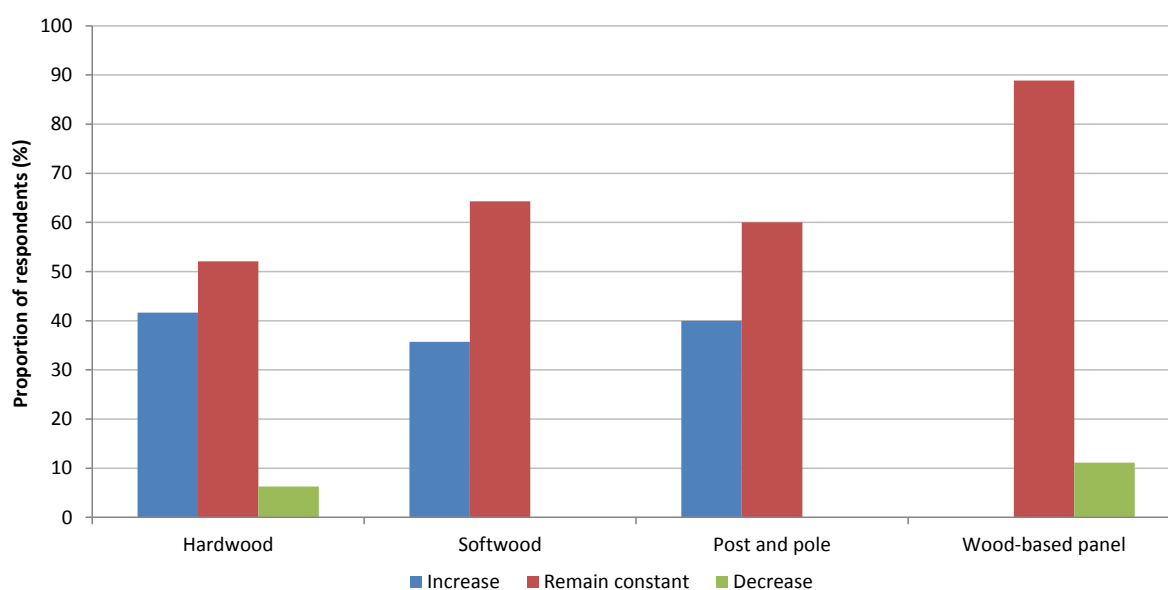
Note: FTE = full-time equivalents (calculated as number of employee hours worked divided by 38 hour working week).

Source: ABARES

Future outlook and issues

The survey included a question regarding the demand for products over the next 12 months. The most optimistic respondents were hardwood, softwood and post and pole mills (Figure 3). Each of these mill types had a similar outlook—around 40 per cent of these mills expected an increase in demand for their product in 2017–18. The majority of respondents expected demand for their products to remain constant (60 per cent). Only a small proportion of hardwood sawmills (6 per cent) and wood-based panel mills (11 per cent) expected demand for their products to decrease in 2017–18.

Figure 3 Outlook for demand of mill products, by industry, 2016–17



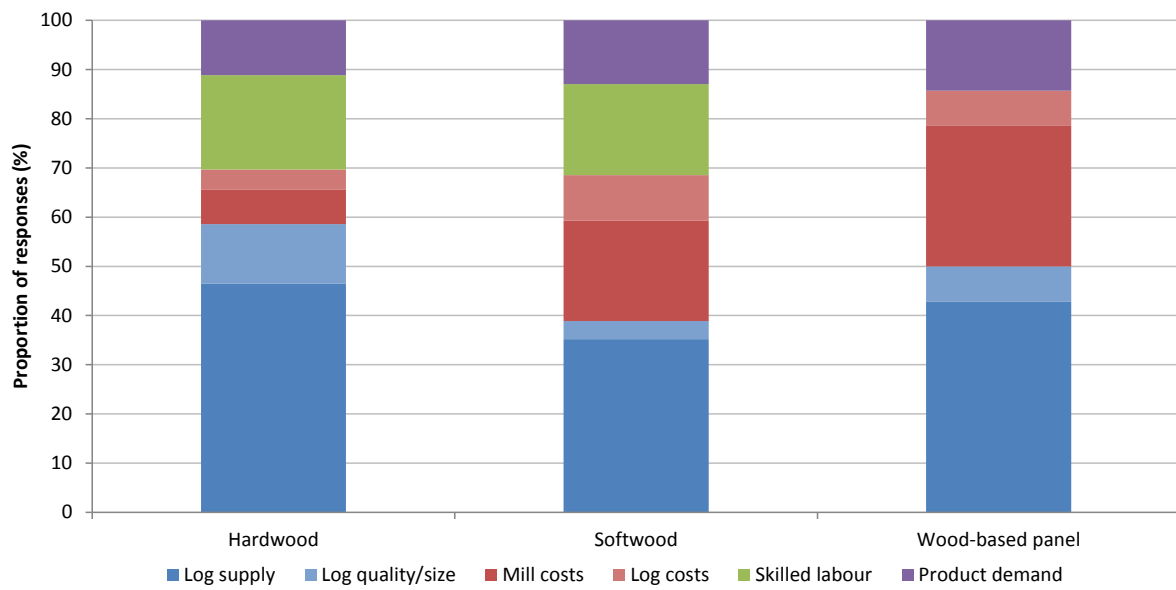
Note: Softwood includes cypress pine.

Source: ABARES

Respondents also identified the main issues facing their mill. The most common issues related to log resources (51 per cent of responses), which comprised uncertainty of log supply (43 per cent) and log quality and size (9 per cent) (Figure 4). A substantial portion of responses relating to log supply included concerns about government contracts and access to public forest resources, and a relatively minor portion mentioned the export of logs. The second most frequent response was processing costs (19 per cent of responses), comprising mill costs (13 per cent) and log costs (6 per cent), with mill costs including the cost of energy, processing infrastructure and wages. Other major issues identified by mills were skilled labour (17 per cent of responses) and product demand (12 per cent), which included demand issues relating to housing construction, international markets and competition from imported products.

Hardwood mills expressed the most concern about log resource issues (59 per cent of hardwood mill responses). Both hardwood and softwood mills had the same level of concern about skilled labour (19 per cent of hardwood and softwood mill responses), whereas wood-based panel respondents did not mention skilled labour as an issue. Wood-based panel mills were the most concerned about processing costs (36 per cent of wood-based panel mill responses) and all mill types mentioned product demand issues to a similar extent (around 12 per cent).

Figure 4 Main issues facing mills, by mill type, 2016–17



Note: Hardwood includes post and pole mills; softwood includes cypress pine and post and pole mills.

Source: ABARES



2 Trends over time

Trends in number of mills over time

The total number of sawmills in Australia decreased by 58 per cent between 2006–07 and 2016–17, from 610 mills to 257 mills (Table 9). However, the decline in mill numbers has slowed since 2012–13.

The number of hardwood sawmills, which continue to be dependent on the native forest resource, decreased by 64 per cent between 2006–07 and 2016–17, from 502 mills to 182 mills. This reduction occurred principally among smaller mills (those with an annual processing capacity of less than 3,000 cubic metres), whose number declined by 79 per cent.

The number of softwood (including cypress pine) sawmills decreased by 31 per cent between 2006–07 and 2016–17, from 108 mills to 75 mills. The decline in softwood sawmill numbers was primarily due to the closure of smaller softwood sawmills. Since 2006–07 the number of softwood mills with an annual log processing capacity less than 15,000 cubic metres decreased by 46 per cent. Over the same period, the number of softwood mills with a log processing capacity of 15,000 cubic metres or more decreased by 15 per cent. However, the softwood sawmill estimates in Table 9 include native forest based cypress pine sawmills, which have different products and processing infrastructure than softwood sawmills based on Australia's plantation resource.

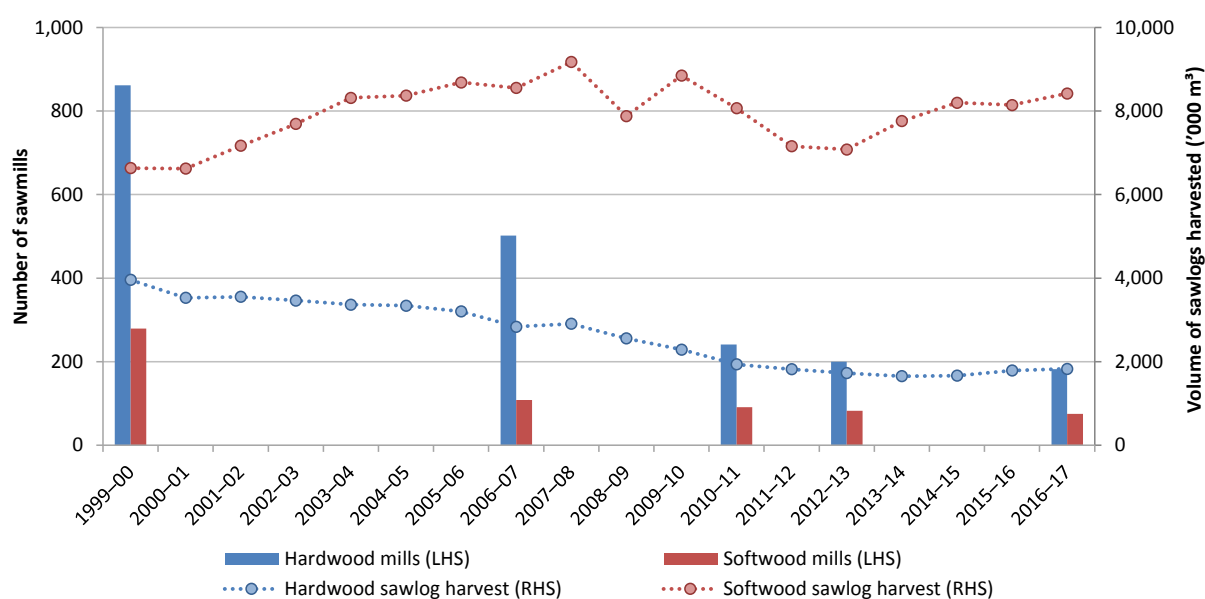
Table 9 Number of sawmills in Australia, by processing capacity, selected years

Log input capacity (m ³ /yr)	Hardwood sawmills			Softwood sawmills ^a			Total		
	2006– 07	2012– 13	2016– 17	2006– 07	2012– 13	2016– 17	2006– 07	2012– 13	2016– 17
<3,000	337	81	71	13	7	11	350	88	82
3,000 to <15,000	101	74	62	41	27	18	142	101	80
15,000 to <45,000	55	38	42	21	18	16	76	56	58
45,000 to <75,000	7	4	4	8	5	5	15	9	9
75,000 to <100,000	1	1	0	3	4	5	4	5	5
≥100,000	1	2	3	22	20	20	23	22	23
Total	502	200	182	108	81	75	610	281	257

^a Includes cypress pine sawmills.

Source: ABARES

The volume of hardwood and softwood sawlogs harvested for domestic processing decreased by 38 per cent and 2 per cent, respectively, between 2006–07 and 2016–17 (Figure 5). More recently, the volume of softwood sawlogs harvested has increased since 2012–13 and the volume of hardwood sawlogs harvested has remained relatively stable. Over the past decade, the domestic softwood sawmilling industry has become significantly more capital intensive and larger in scale. This has limited the reduction in total log processing despite the decline in mill numbers.

Figure 5 Number of sawmills and volume of sawlogs harvested, 1999–2000 to 2016–17

Note: Excludes post and pole mills; softwood includes cypress pine; sawlog harvest excludes estimates of sawlog exports.
Source: ABARES

Comparison of log input volumes with other estimates

The log input volumes estimated in this report are intended to be comparable with other estimates of the volume of sawlogs harvested in Australia. ABARES conducts annual gross value of production (GVP) surveys of Australia's public and private forest growers and some large processors to estimate the volume and value of logs harvested, including logs harvested for domestic production. A comparison of these estimates for 2016–17 is provided in Table 10.

The observed discrepancies in the estimates in Table 10 may be explained in various ways. Firstly, the wood processing survey covered only a subset of the total wood processing population; it is not a census and estimations of the total population from the sample may be subject to sampling errors. Secondly, definitions of log types differ between the wood processing survey and the GVP survey—because, in the GVP log harvest surveys, ABARES identifies these categories by forest grower or processor—and volumes may differ from the volumes actually delivered to, or processed by, mills. Harvest estimates include logs harvested for domestic sawlogs, posts and poles, piles and fences.

Estimates based on survey results for the volume of hardwood sawlogs processed by mills exceed the ABARES (2018) GVP survey estimates in all states other than Western Australia (Table 10). This may be attributed to the reasons mentioned above. The largest difference was in New South Wales (12 per cent higher), which is mostly due to a revised estimate of private native hardwood log harvest. Overall, the differences between the two estimates are small and, at the national level, the estimated volume of hardwood logs processed based on the wood processing survey is around 5 per cent higher than the estimate based on the GVP log harvest survey.

Estimates of the volume of softwood sawlogs processed by mills based on the wood processing survey were also different from the ABARES (2018) GVP survey estimates, with South Australia having the largest difference in log volume. These discrepancies are significantly lower than

those estimated in the 2012–13 survey because data on the source of logs were incorporated in the 2016–17 estimation process. At the national level, the difference between the two estimates is small and the wood processing survey estimate is around 1 per cent higher. The wood processing survey estimate of cypress pine sawlogs processed was around 15 per cent lower and can largely be explained by a relatively low survey response rate.

Table 10 Comparison of estimates based on the National Wood Processing Survey with GVP logs harvested, 2016–17

State (’000 m ³)	Hardwood logs			Softwood logs			Cypress pine logs		
	Survey log input	GVP logs harvested a	Difference	Survey log input	GVP logs harvested a	Difference	Survey log input	GVP logs harvested a	Difference
NSW b	690	618	72	2,307	2,380	-73	37	43	-6
Vic.	524	502	22	1,712	1,768	-56	0	0	0
Qld	284	279	4	1,504	1,470	35	110	131	-21
SA	0	0	0	2,116	1,926	189	0	0	0
WA	190	202	-12	538	486	52	0	0	0
Tas.	219	211	9	404	444	-40	0	0	0
Australia	1,907	1,812	95	8,581	8,473	107	147	173	-27

a Gross value of production (GVP) survey estimates include logs harvested for domestic sawlogs, poles, piles and fences and exclude sawlogs exported or sold to other forest industries; includes ABARES estimates of private logs harvested. **b** Includes ACT.

Source: ABARES



Appendix A: Methodology

Background

The 2016–17 National Wood Processing Survey is the fourth comprehensive survey undertaken by ABARES since 2006–07 to provide information on structural changes in Australia’s wood processing industry. Between October 2017 and March 2019, ABARES surveyed Australian wood processors to obtain up-to-date mill-specific data on production, mill inputs and employment to support effective government policies and private business investment decisions.

The survey provides a snapshot of the wood processing industry’s current structure, the amount and source of logs for processing and the efficiency of log processing. The survey also gave wood processors an opportunity to comment on the outlook for their products and report on the level of foreign ownership in the industry.

The results from this survey provide consistent and reliable estimates of the production of hardwood and softwood wood products, using a standardised approach and standardised definitions across each state in Australia. Estimates based on results from this survey are broadly consistent with comparable datasets, such as the estimated volumes of logs harvested in Australia in 2016–17.

Validating the number of wood processors in Australia

ABARES maintains a comprehensive database of wood processing facilities in Australia. However, each year the wood processing sector changes, with mill openings and closures, investments to change capacity or product lines, and changes in ownership. To maintain an up-to-date database of wood processing mills in Australia, ABARES consulted state forest agencies, industry associations and internet and telephone listings.

For this survey, ABARES updated and crosschecked its mill population database. ABARES contacted all mills in the database to ensure mill-specific data were correct, such as mill type, log species and input capacity. Where ABARES could not contact mills, it assumed they were closed and removed them from the mill population list if sufficient supporting evidence was available. Although ABARES tried to include all mill sizes in the survey, it was difficult to estimate the number of small mills as many mills did not belong to existing mill registers and were difficult to contact. It was also difficult to define and identify differences between small sawmills and other manufacturers that produce craft products. ABARES received assistance from several state-based industry associations to identify operational mills for the survey.

ABARES validated the number of mills processing logs for the 2012–13 survey and again comprehensively validated mill population estimates for this report. A comparison of mill numbers across different surveys is presented in Section 2 Trends over time.

Developing the survey questionnaire

The 2016–17 survey questionnaire was designed to be consistent with the questionnaire developed in 2012–13, which provides continuity between reports and allows for robust comparisons over time. Slight adjustments were made to the questionnaire based on the feedback received from the 2012–13 survey respondents. For further explanation of the survey methodology, see ABARES (2014).

In 2012–13 ABARES developed the survey questionnaire in consultation with forestry sector representatives and with input from state forest agencies and other forest sector stakeholders. The 2016–17 survey included questions on log inputs, recovery rates, production volumes, product prices, use of residues, employment, ownership and future outlook. A copy of the 2016–17 questionnaire is provided in Appendix B: 2016–17 questionnaire.

The log input question included respondents' estimates of the tree ownership of the logs they processed. For this survey, public logs are those derived from forests managed by government agencies or public corporations on either public or private land. Thus, for the purpose of this survey, logs derived from a private forest on farmland managed by a state forest agency are classified as public logs. Private logs are those sourced from forests managed by private companies or individuals on private land.

The figures presented in this report are based on survey respondents' estimates of the ownership of the logs and have not been otherwise verified. Nevertheless, by estimating the volume of logs used from public and private native forests, estimates based on the survey results can be compared with other ABARES data, both to validate the quality of data gathered through this survey (for example, public native hardwood sawlog input should approximately equal ABARES estimates of logs harvested from these forests) and to improve other ABARES datasets, such as private native forest harvesting estimates.

This survey also presents an opportunity to estimate the type of sawnwood produced in Australian sawmills, such as the share of hardwood and softwood sawnwood going to structural- or appearance-grade timbers. This information could be used to estimate the end use of sawnwood (for example, between construction and furniture) and examining trends between these uses.

This survey also collected direct employment estimates from mills. These estimates included all people employed in operating and administering the mill. Contractors for log harvest and haulage were not included. Where businesses operated across several forestry sector classifications, such as mills that also wholesale sawnwood, ABARES attempted to identify only employees involved in sawmill processing and administration.

The survey collected the number of employees classified as managers/owners—including owners who had a management role (as opposed to shareholders)—and full-time and part-time/casual employees. ABARES also collected employment information by gender, although some mills provided only total employment numbers, and an estimate of the average hours worked per week for each employee category. These data were used to estimate full-time equivalent employment, based on a 38-hour week.

Selecting a representative sample and conducting the survey

ABARES utilised survey data from around 53 per cent of hardwood sawmills (84 per cent of estimated industry capacity) and 72 per cent of softwood sawmills (96 per cent of industry capacity) (Table 11). Complete survey responses were received from around 38 per cent of hardwood sawmills (56 per cent of estimated industry capacity) and 53 per cent of softwood sawmills (87 per cent of industry capacity). ABARES also surveyed post and pole mills, cypress pine sawmills and wood-based panel mills, with the sample accounting for 74 per cent, 53 per cent and 87 per cent of those mills, respectively. Post and pole mills and cypress pine sawmills had the lowest completed survey response rate at 26 per cent and 29 per cent, respectively.

Table 11 Wood processor population, sample and proportion sampled, 2016–17

Mill type and state	Population	Sample surveyed	Sample derived a	Proportion of population sampled	
	no.	no.	no.	% by mill number	% by mill capacity
Hardwood sawmill					
New South Wales	68	21	14	51	87
Victoria	25	12	4	64	89
Queensland	44	16	4	45	72
South Australia	0	0	0	na	na
Western Australia	26	8	4	46	76
Tasmania	19	13	1	74	88
Australia	182	70	27	53	84
Softwood sawmill					
New South Wales b	14	9	1	71	98
Victoria	9	4	2	67	92
Queensland	17	7	5	71	90
South Australia	13	8	2	77	99
Western Australia	2	1	1	100	100
Tasmania	3	2	0	67	100
Australia	58	31	11	72	96
Wood-based panel mill					
MDF/Hardboard	5	3	0	60	65
Particleboard	7	1	5	86	74
Plywood/Veneer/LVL	11	9	2	100	100
Total	23	13	7	87	78
Post and pole mill	19	5	9	74	91
Cypress pine mill	17	5	4	53	64

a Based on partial 2016–17 survey responses, 2012–13 survey data, publicly available information and other ABARES survey data. b Includes ACT.

Source: ABARES

The survey was voluntary and required cooperation of both large and small wood processors across Australia. ABARES asked industry associations, such as Forest and Wood Products Australia and Timber Queensland, to encourage stakeholders to participate in the survey. ABARES contacted mills by email and telephone. Those interested in participating were emailed or posted a copy of the questionnaire and an Australian Government Solicitor approved Data Supply Agreement detailing the use, storage and confidentiality guidelines for collected survey data.

Telephone interviews were undertaken between October 2017 and March 2019. In some instances wood processors preferred to complete the survey in their own time and emailed their responses to ABARES. In the process of conducting the survey, more than 5,000 attempts were made to contact mills over the duration of the survey, averaging around 17 attempts per mill, including email and phone correspondence and site visits. The sample also incorporated partial 2016–17 survey responses, 2012–13 survey data, publicly available information and other ABARES survey data to account for non-responding mills in the population and provide a more representative sample.

Many wood processors did not participate in the survey because they had already participated in many other surveys during the surveying period, such as compulsory levies obligations and ABS surveys, and other non-compulsory surveys including the ABARES wood processing survey, private consultant surveys and industry organisation surveys. Some mills, particularly hardwood sawmills, refused to participate in the survey because they were disgruntled with state governments due to log supply and quality issues, management of forest resources and the red tape around private native forest harvesting, and with the commonwealth government in regard to the Regional Forest Agreements.

Aggregating and weighting the results

Each mill in the ABARES mill population database was assigned to a stratum based on the type of processor (hardwood sawmill, softwood sawmill, cypress pine sawmill, post and pole mill or wood-based panel mill), the state in which the mill operated and the size of the mill based on the categories presented in Table 1. In total, 77 strata were used for this survey.

The sample results from the survey were aggregated and then weighted by the population of mills in each stratum, divided by the number of mills sampled for that stratum. Almost all strata were sampled in this survey. Where mills did not complete the entire survey, data from the 2012–13 wood processing survey, publicly available information and other ABARES surveys were used to supplement information provided by the mill.

In presenting the results of the ABARES 2016–17 wood processing survey, ABARES aggregated some data to maintain individual mill confidentiality and to ensure reported results were statistically robust. Specifically, production data for softwood sawmills were aggregated for Tasmania and Western Australia, due to the small number of softwood sawmills operating in these states, and wood-based panel mills were grouped into three categories—MDF/Hardboard, Particleboard, and Plywood/Veneer/LVL—to provide more detailed results while also maintaining confidentiality.

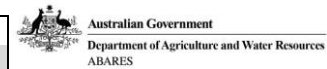
Appendix B: 2016–17 questionnaire

Please complete all grey shaded areas.

ABARES mill survey 2016-17

Sawmill-Poles

Mill No.: <i>Office Use Only</i>	Contact Name and position:	Mill Name (legal and trading):
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Location (street address):	Phone/Fax:	Email:	% Foreign ownership:
Please select		Specify country:	

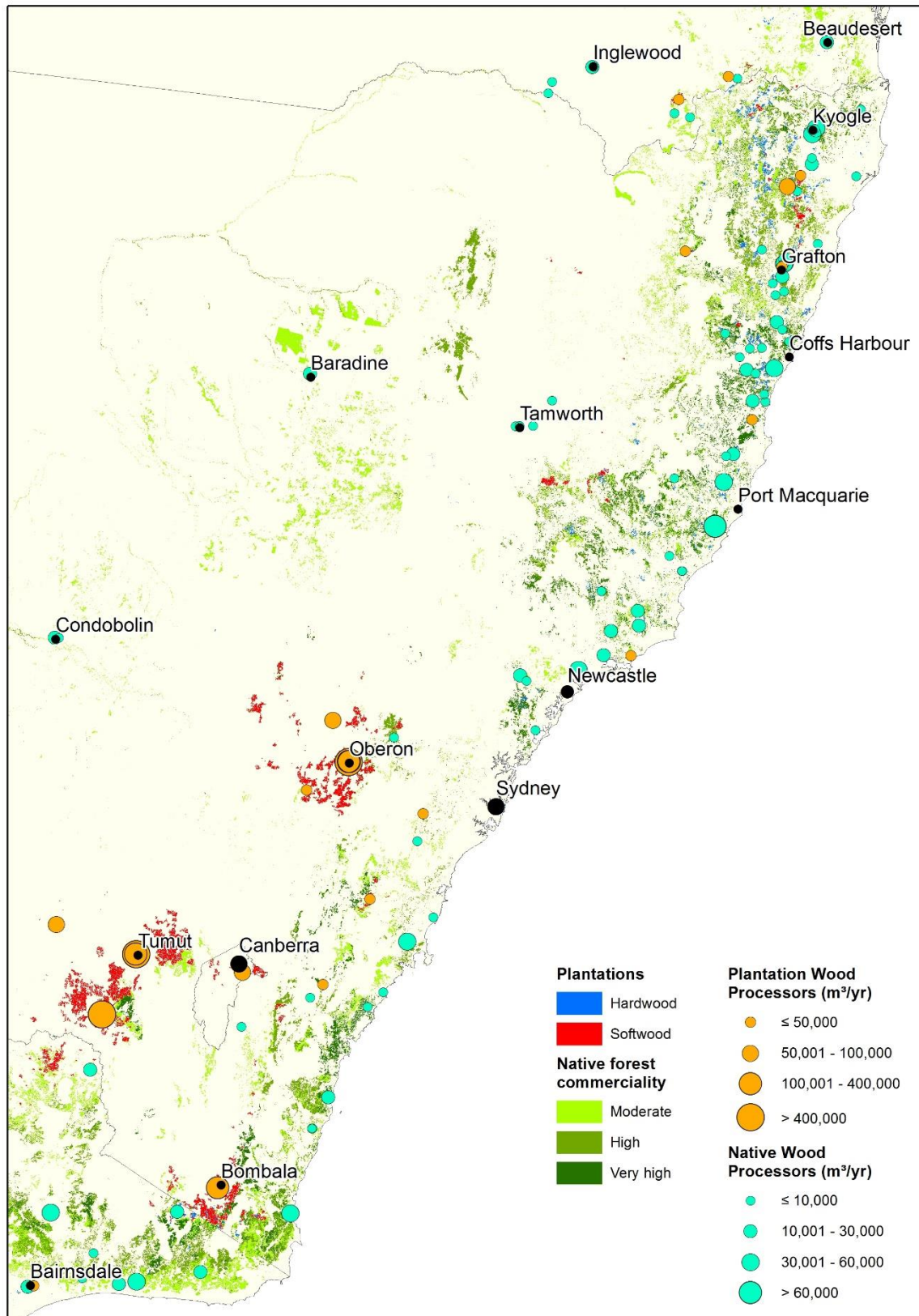
Mill information						Employment 2016-17:						Functional description			
Mill Type:						Owners/Managers	M (male)	F (female)	X (indeterminate/intersex/unspecified)	Total	Average hours per week	Greenmill	☐ Portable	☐ Fixed	☐ N/A
Input capacity (m3):	Output capacity (m3):					Full-time			0			Kilns	☐ Fuelled	☐ Air dry	☐ N/A
Year commenced production:	Still operating? (Y/N):					Part-time/casual			0			Moulding	☐ Yes	☐ No	
No. weeks operating in 2016-17:	Date closed (if applicable):														
Total input (2016-17)	Species	Description	Source of input	SED	Public Native (m3)	Avg milldoor price (\$/m3)	Private Native (m3)	Avg milldoor price (\$/m3)	Public Plantation (m3)	Avg milldoor price (\$/m3)	Private Plantation (m3)	Avg milldoor price (\$/m3)	Total (m3)	Future Outlook	
Log type and quality			(State/Territory)	cm	0	N/A	0	N/A	0	N/A	0	N/A	0	Over the next 12 months, demand for my business' product is likely to:	
Input type - please select	Please select													Please select	
Input type - please select	Please select													Comments: Main factors/pressures facing your company's outlook:	
Input type - please select	Please select													.	
Input type - please select	Please select													.	
Input type - please select	Please select													.	
Input type - please select	Please select													.	
Input type - please select	Please select													.	
Input type - please select	Please select													.	

Recovery by input type	(% for each output type, each row must equal 100%)					Value added final product					Residues (waste)					Check
	Veneer or Post/Pole		Green Sawmwood final product			Dry appearance			Residue used for Energy		Other destination for Residue					
Input type (log, species etc)	Type 1 (specify)	Type 2 (specify)	GOS appearance	GOS structural	GOS other (specify)	Dry appearance	Dry structural	Dry other (specify)	Sale of fuelwood/firewood	Use by mill (specify)	Woodchip	Other sale (specify)	Sawdust	Other residue (specify disposal type)	should add to 100%	
Further specification:	e.g., post and poles					e.g., flooring				e.g., pellets		e.g., shavings		e.g., bark		
Input type 1																
Input type 2																
Input type 3																
Input type 4																
Input type 5																
Input type 6																
Input type 7																
Input type 8																
Input type 9																
Notes:									e.g., used in furnace		e.g., sold as mulch		e.g., disposed of at tip			

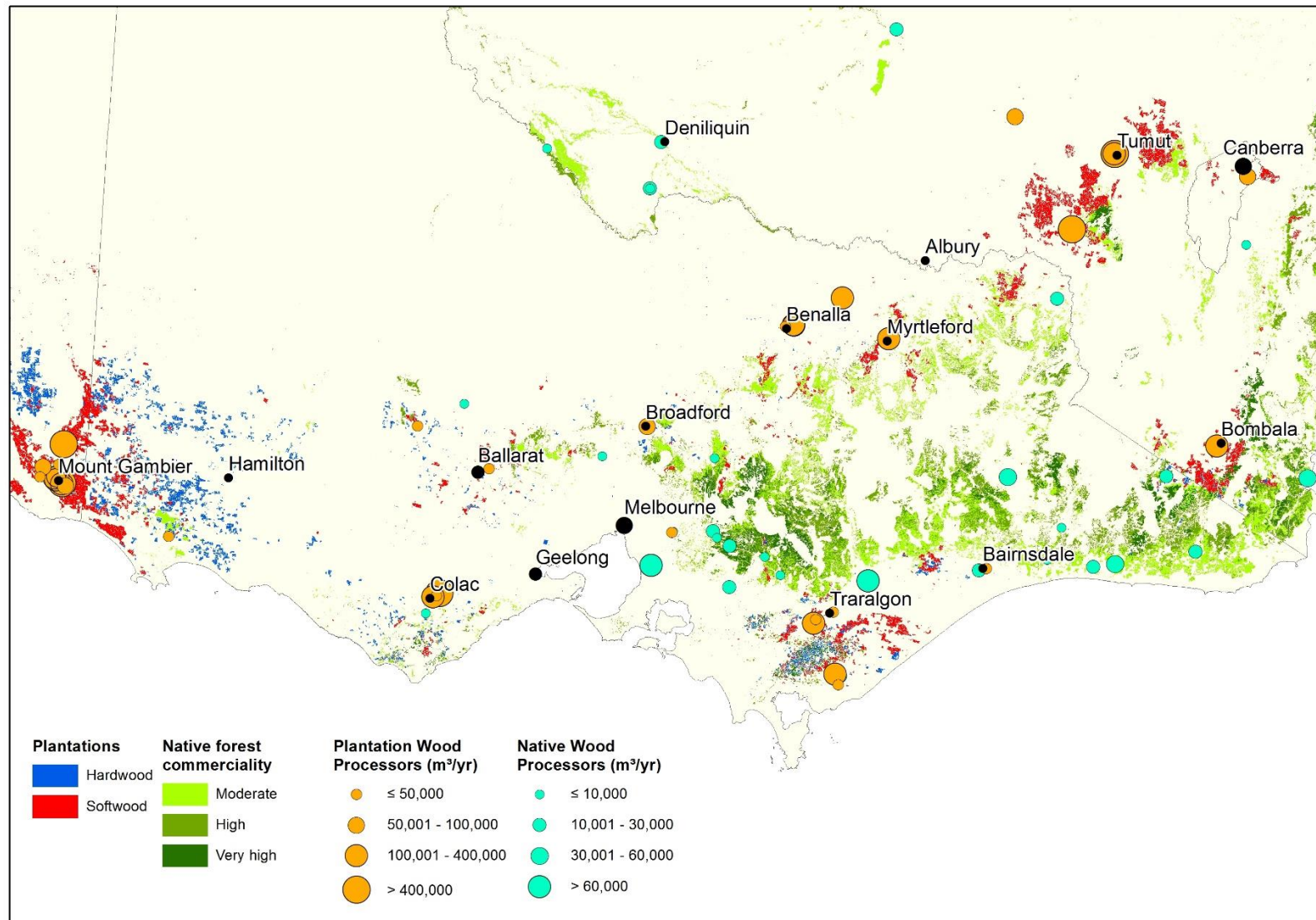
Production by log grade	(m3 for each product, each column must equal 100%)														
Total Production:															
Total Production (check):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average sale price (\$/m3)															
Destination: direct to retail (%)															
Destination: local wholesale (%)															
Destination: export (%)															
Destination: other (specify) (%)															
Further specification															
Market check															
Comments:															

Maps

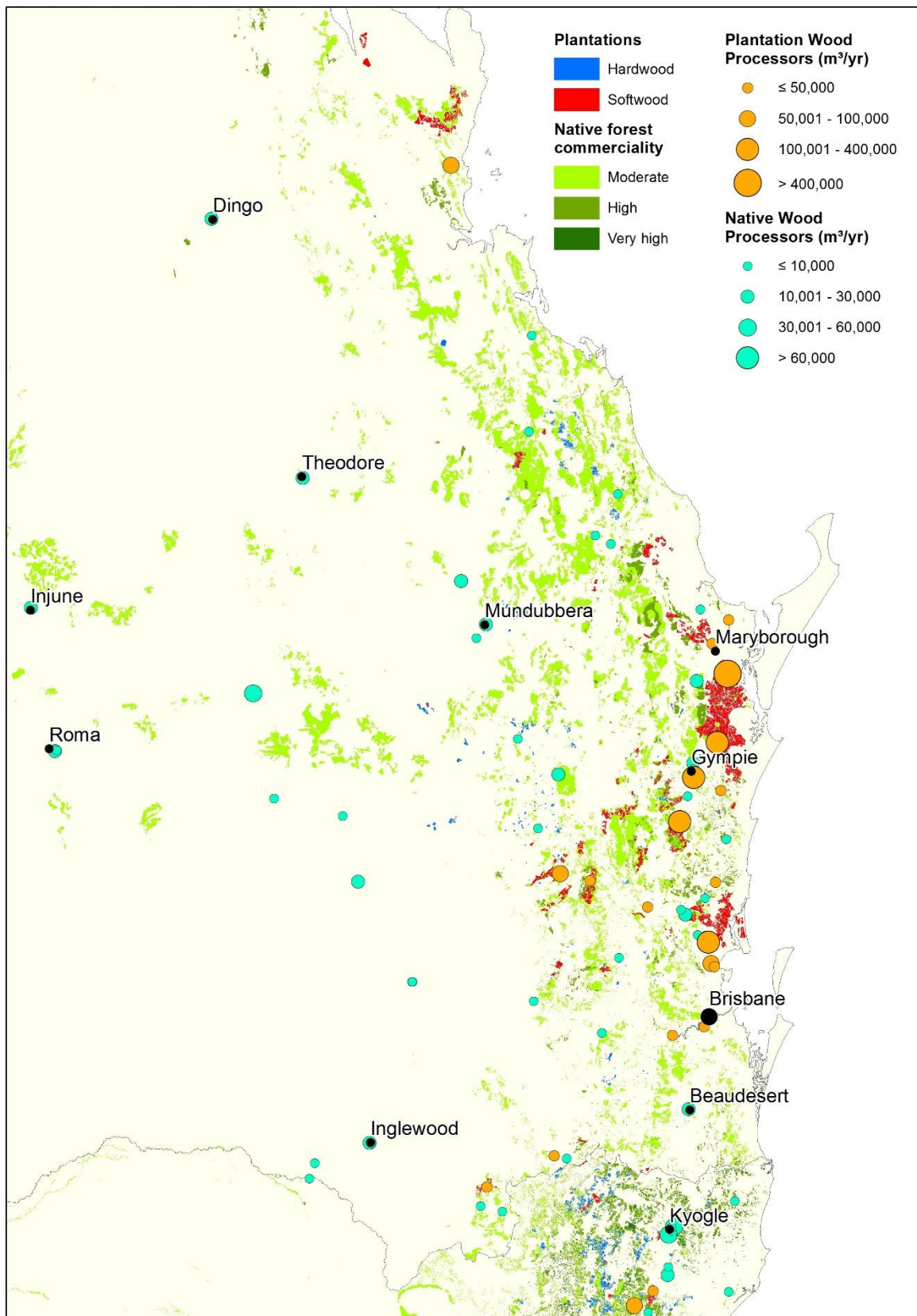
Map 1 New South Wales' wood processing industry



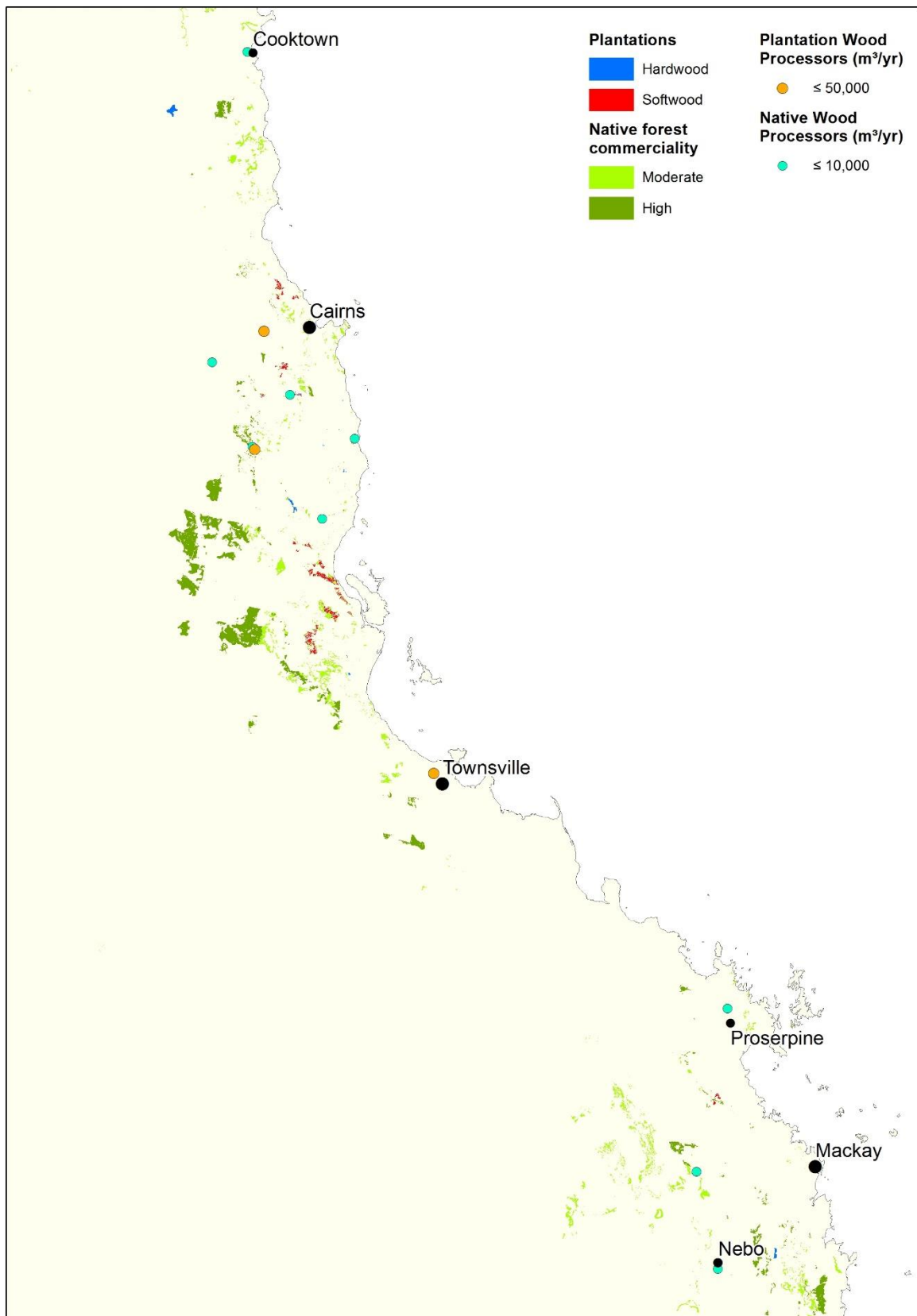
Map 2 Victoria's wood processing industry



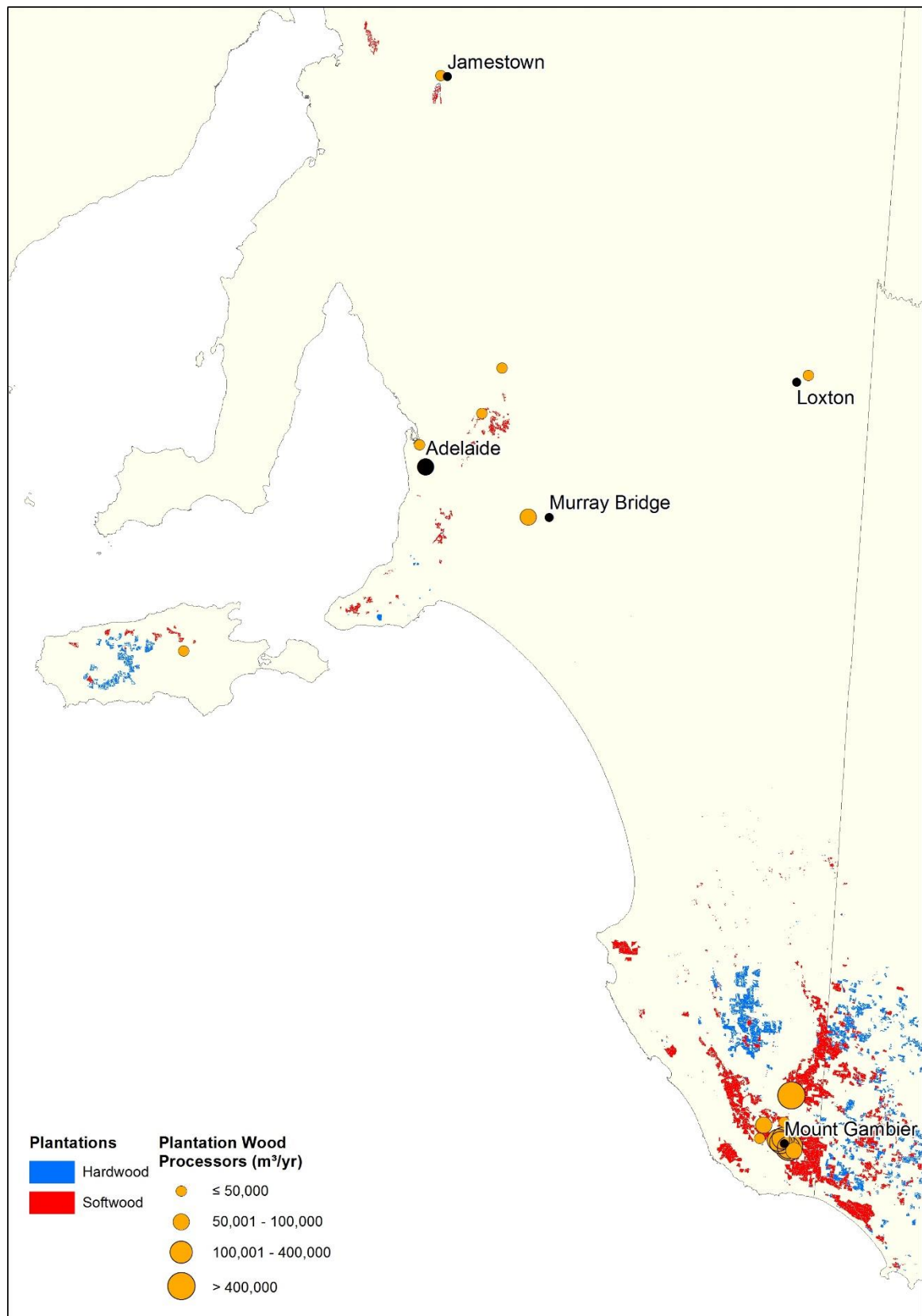
Map 3 South East Queensland's wood processing industry



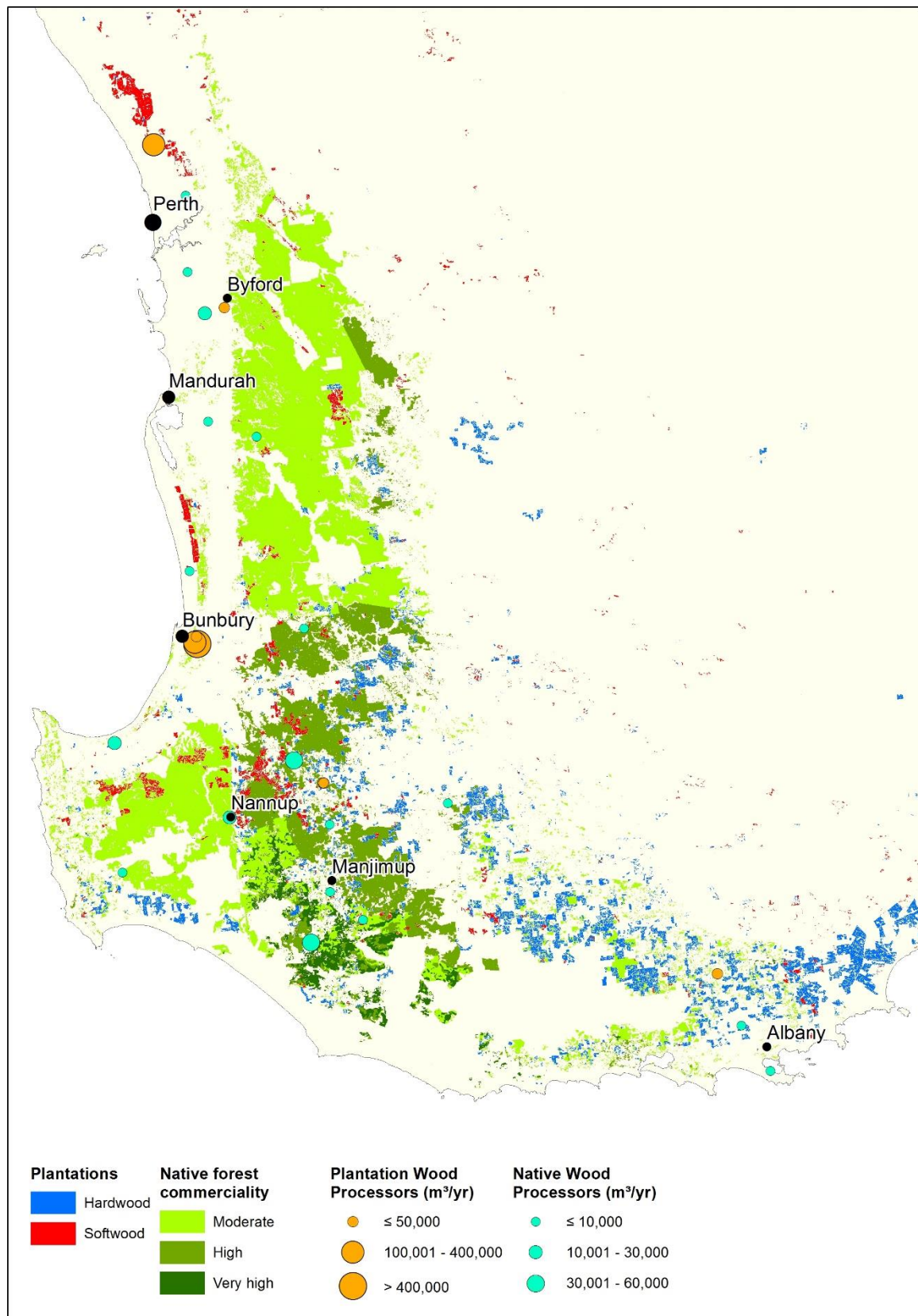
Map 4 Northern Queensland's wood processing industry



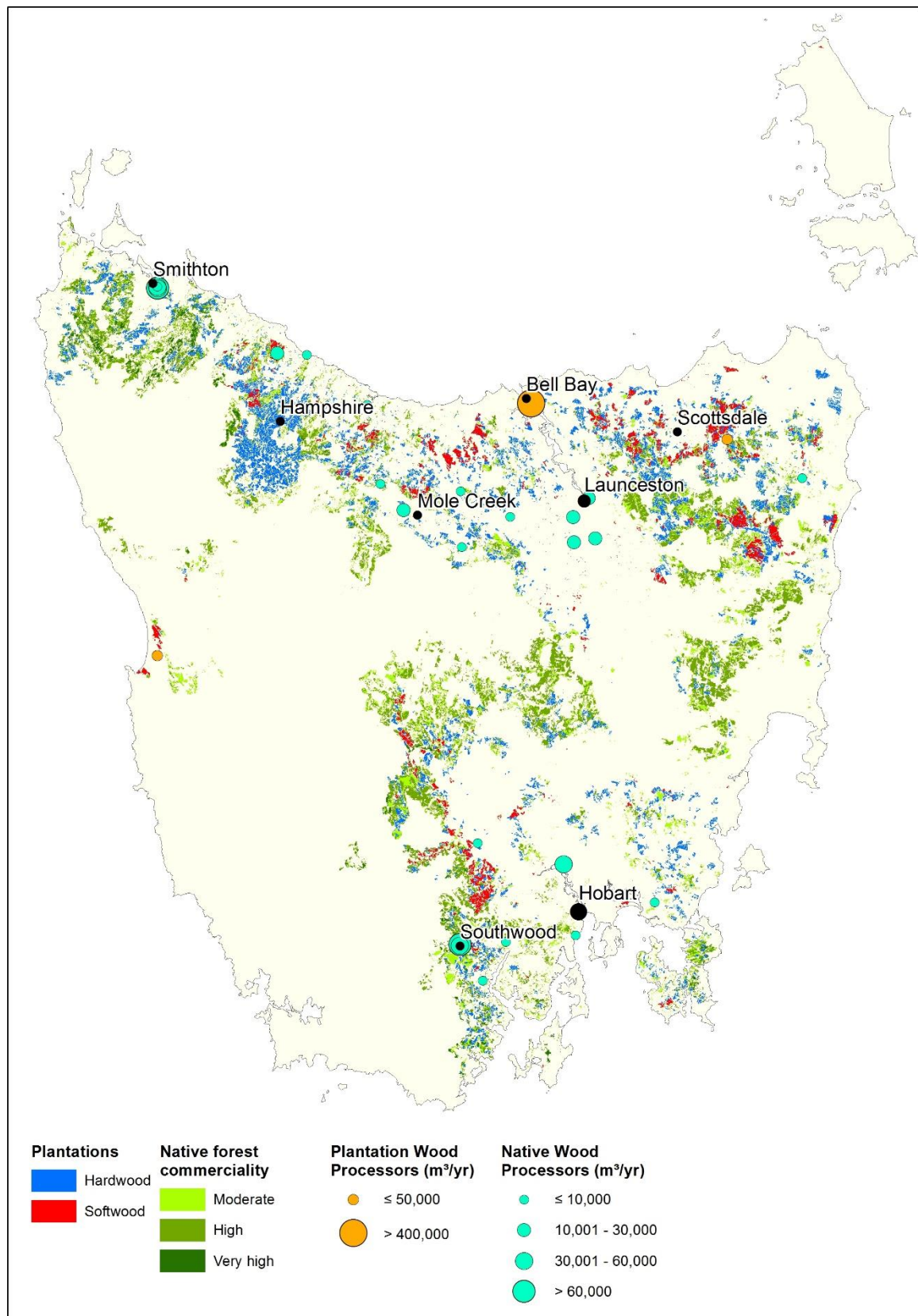
Map 5 South Australia's wood processing industry



Map 6 Western Australia's wood processing industry



Map 7 Tasmania's wood processing industry



Glossary

Term	Definition
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
Commerciality	Forest available and suitable for commercial wood production, as determined by tenure and potential yield of merchantable sawlogs
GVP	Gross value of production
LVL	Laminated veneer lumber
MDF	Medium-density fibreboard
Recovery rate	Proportion of product yield from raw materials processed

References

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Gavran, M, Burns, K, Hug, B, Frakes, I & Gupta, M 2014, [ABARES National Wood Processing Survey: 2012–13](#), ABARES research report 14.6, Canberra, July.