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ABARES National Wood Processing Survey 2012–13

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Summary

Between September 2013 and March 2014, ABARES surveyed Australian wood processors to obtain up-to-date mill-specific data, including on mill inputs, production and employment. This survey updates the ABARES 2010–11 survey.

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. ABARES received completed survey forms from around 48 per cent of hardwood sawmills, 69 per cent of softwood sawmills and 60 per cent of cypress pine sawmills (150 in total). While estimates based on results from this survey are broadly consistent with comparable datasets, such as the estimated volumes of logs harvested in Australia in 2012–13, some discrepancies remain and future surveys will work toward resolving these.

Because of regular changes in Australia's forestry sector, ABARES validated its database of wood processors before undertaking the survey. This involved consulting industry associations and directly contacting many mills. The validated database comprises 281 sawmills, 24 wood-based panel mills and 14 post and poles mills. About half the sawmills are small processors of hardwood sawlogs, each with an annual processing capacity of less than 15 000 cubic metres of sawlog. ABARES estimated that Australia had 200 hardwood, 61 softwood, and 20 cypress pine sawmills in 2012–13. The number of sawmills in Australia has fallen significantly, with hardwood sawmills falling by 60 per cent and softwood sawmills by 25 per cent since 2006–07. The volume of hardwood and softwood logs harvested has also decreased by 38 per cent and 16 per cent respectively over the same period.

Structural adjustments have continued since the 2006–07 and 2010–11 surveys, with further consolidation of the sawmilling industry. Adjustments also reflect continued changes in Australia's forest management practices, with further restrictions or reductions in availability of logs from public native forests in some states, tighter regulation of private native forests and ongoing privatisation of public plantations.

According to the ABARES wood processing database, the hardwood sawmilling industry is characterised by a large number of relatively small mills in New South Wales, Tasmania and Queensland.

In comparison, the softwood industry, excluding cypress pine mills, consists of relatively large mills with an input capacity above 100 000 cubic metres across Australia. Over the past decade, the domestic softwood sawmill industry has become significantly more capital intensive and larger in scale, which has limited the reductions in total log processing despite the decline in mill numbers.

The cypress pine sawnwood industry consists of relatively small mills in New South Wales and Queensland only. Post and pole mills are more evenly distributed across Australia, with average mill size similar to that of the cypress industry.

Wood-based panel mills are also distributed fairly evenly across the states, with more than half having a processing capacity of 100 000 cubic metres or greater. Detailed results for panel mills are not provided in this report because the survey response rate was too low to be statistically significant.

From the survey results, ABARES estimates that around 10 million cubic metres of sawlogs were processed in Australian sawmills during 2012–13, of which hardwood sawlogs comprised 1.9 million cubic metres, and softwood sawlogs around 8 million cubic metres, of which 187 000 cubic metres was cypress pine sawlogs. Hardwood sawnwood output in 2012–13 was estimated at around 740 000 cubic metres, and softwood sawnwood output at around 3.85 million cubic metres, of which around 78 000 cubic metres was cypress pine sawnwood. ABARES estimates that 24 per cent of hardwood sawnwood production was dry appearance grade sawnwood, while green structural (23 per cent) and green other (32 per cent) sawnwood also accounted for significant shares. In contrast, more than half of total softwood sawnwood production was dry structural timber.

A significant majority of wood processing facilities in Australia is wholly Australian owned and operated. Around 5 per cent of wood processing facilities are partially or wholly owned by New Zealand, United States and other foreign investors.

Background

The National Wood Processing Survey 2012–13 is the third comprehensive survey undertaken by ABARES since 2006–07 to provide information on structural changes in Australia's wood processing industry. This survey provides data on production, mill inputs, and employment in the wood processing sector to support effective government policies and efficient private business investment decisions.

ABARES comprehensively assessed the wood processing industry in Australia to estimate the number and size of mills in operation. 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.

1 Survey results

In presenting the results of the ABARES 2012–13 wood processing survey, ABARES aggregated some data to maintain individual mill confidentiality and to ensure results reported were statistically robust (see Appendix A). Specifically, because of the small number of mills in some categories, production data for hardwood sawmills were aggregated for mills with an annual log intake capacity of greater than 45 000 cubic metres and softwood sawmills were aggregated for Victoria–South Australia and New South Wales–Queensland. Results for softwood sawmills with less than 15 000 cubic metres of log intake capacity were also aggregated to maintain confidentiality. Additionally, data for wood-based panel mills are not presented in this report because the sample was insufficient to derive statistically robust results.

Estimated number of mills

Table 1 presents the number of sawmills estimated to operate in each state in 2012–13. While several wood processors ceased operations during and after 2012–13, they were included in this analysis if they processed logs during 2012–13. The data also show that 155 hardwood sawmills (around 78 per cent of total hardwood sawmills) had a log intake of 15 000 cubic metres or less. It is important to adequately capture these mills in the survey as they contribute significantly to the hardwood processing industry. While ABARES attempted to make contact with all of these mills, responses to the survey were received from around 67 hardwood mills (43 per cent).

Most hardwood sawmills were located in New South Wales, Tasmania and Queensland. In 2006–07 the proportion of hardwood sawmills in the smallest size category (less than 3000 cubic metres) in these states was estimated to be 67 per cent in New South Wales and 78 per cent in Queensland; this is estimated to have declined to 40 per cent and 55 per cent respectively in 2012–13.

In 2012–13, 22 sawmills are estimated to be in the ‘over 100 000’ cubic metres log intake capacity category; only two of these are hardwood sawmills. While this category represents a small proportion of the sawmill population, it accounts for a significant proportion of total sawnwood production (Table 3). In addition, the category represents a variety of mill sizes: five sawmills (all softwood) are estimated to have an annual log input capacity of greater than 500 000 cubic metres.

The survey also illustrates that New South Wales, Queensland and South Australia have the largest number of softwood sawmills in Australia. The cypress pine sawmills are located around Australia’s native cypress pine resource, in Queensland and New South Wales (Table 1).

Australia also has 24 wood-based panel mills—comprising seven particleboard mills, 12 plywood/veneer mills, four medium density fibreboard mills and one laminated veneer lumber mill, one hardboard mill—and 14 post and pole mills (Table 1).

Table 1 Number of mills in Australia, by processing capacity and state, 2012–13

Log intake capacity (m ³ /yr)	NSW a	Vic.	Qld	SA	WA c	Tas.	Aust.
Hardwood							
<3000	25	6	24	0	7	19	81
3 000 to <15 000	18	14	15	0	7	20	74
15 000 to <45 000	17	7	4	0	3	7	38
45 000 to <75 000	2	0	0	0	2	0	4
75 000 to <100 000	1	0	0	0	0	0	1
>100 000	0	2	0	0	0	0	2
Total	63	29	43	0	19	46	200
Softwood b							
<3 000	1	2	0	1	0	1	5
3 000 to <15 000	1	1	6	5	1	0	14
15 000 to <45 000	4	2	4	1	1	1	13
45 000 to <75 000	2	0	2	1	0	0	5
75 000 to <100 000	2	0	1	1	0	0	4
>100 000	4	6	3	5	1	1	20
Total	14	11	16	14	3	3	61
Total post and pole mills	2	5	2	1	3	1	14
Total cypress pine mills	5	0	15	0	0	0	20
Total wood-based panel mills	6	2	6	3	2	5	24

Note: **a** Includes ACT. **b** Excludes cypress pine. **c** includes Northern Territory.

Source: ABARES datasets

Estimated log input

Based on the survey, ABARES estimates that 1.9 million cubic metres of hardwood sawlogs and 7.8 million cubic metres of softwood sawlogs were processed by Australian sawmills in 2012–13 (Table 2). Around 187 000 cubic metres of cypress pine sawlogs were processed in the same period.

New South Wales accounted for 40 per cent of hardwood sawlogs and 32 per cent of softwood sawlogs processed in Australia in 2012–13. After New South Wales, Victoria and Queensland were the largest processors of hardwood sawlogs, while Victoria and South Australia were the largest softwood sawlog processors. As the native cypress pine resource is located in New South Wales and Queensland, the cypress pine sawmill industry is located exclusively in these states.

ABARES estimates that across Australia, 14 per cent of hardwood sawlogs were sourced from private forests in 2012–13, compared with 22 per cent estimated in the 2006–07 survey.

Queensland and New South Wales have the highest volume of hardwood sawlogs sourced from private forests. In Queensland, the volume of hardwood sawlogs sourced from private forests is estimated to have declined by 27 per cent compared with the number estimated in the previous sawmill survey, from 181 000 cubic metres in 2010–11 to 133 000 cubic metres in 2012–13. In contrast, the estimated volume of hardwood sawlogs sourced from private forests in New South

Wales is estimated to have increased by 24 per cent, from 84 000 cubic metres in 2010–11 to 104 000 cubic metres in 2012–13.

Table 2 Mill log input, by source and state, 2012–13

Region (’000m ³)	Hardwood			Softwood			Cypress pine		
	Private	Public	Total	Private	Public	Total	Private	Public	Total
NSW a	104	669	772	224	2 314	2 538	0	52	52
Vic.	14	538	553	1 537	161	1 698	0	0	0
Qld	133	113	247	1 023	107	1 131	7	128	135
SA	0	0	0	1 327	294	1 621	0	0	0
WA b	6	172	178	116	300	416	0	0	0
Tas.	8	191	198	408	0	408	0	0	0
Australia	265	1 684	1 948	4 636	3 176	7 812	7	180	187

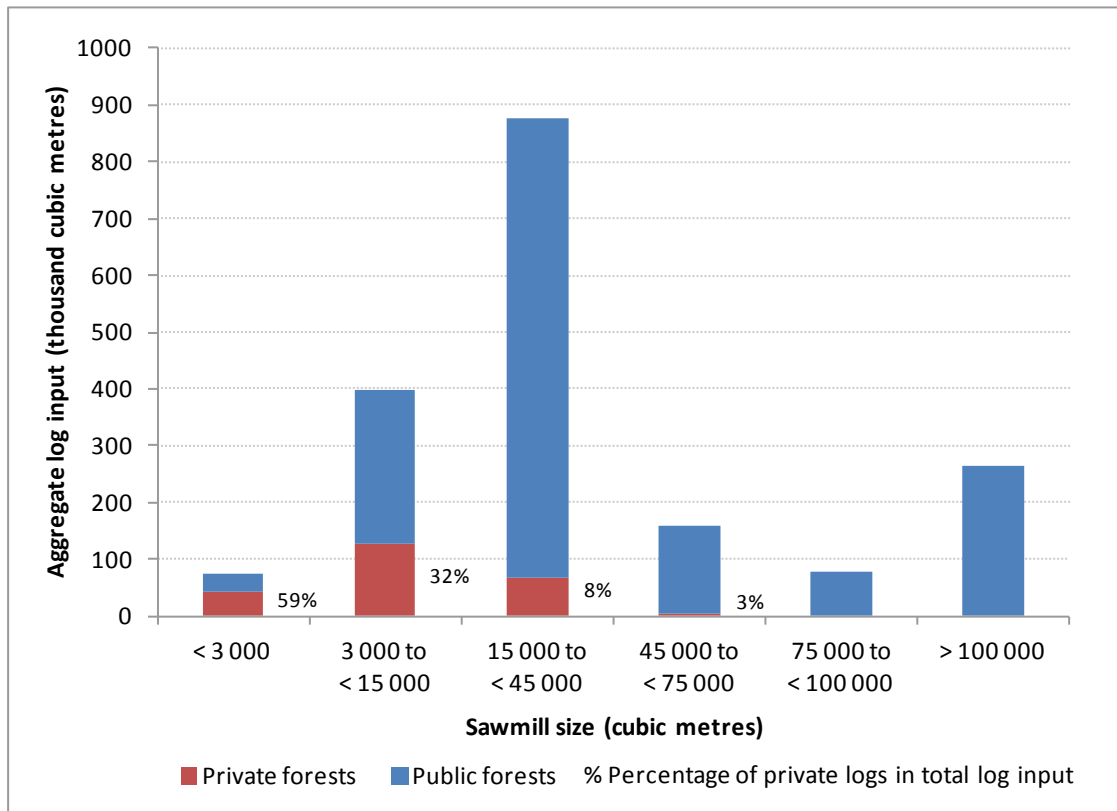
Note: Private and public split based on respondents’ estimates; includes post and pole mills; excludes wood-based panel mills. **a** Includes ACT. **b** includes Northern Territory.

Source: ABARES datasets

ABARES also estimated that 66 900 cubic metres (3.4 per cent) of hardwood sawlogs processed in sawmills nationally was sourced from plantation forests. Native forests remain the principal source of hardwood sawlogs in Australia.

Around 59 per cent of softwood sawlogs processed in Australia were estimated to have been harvested from private plantation forests in 2012–13. Victoria accounted for the largest harvest volume of private plantation softwood sawlogs. Most cypress pine sawlogs were sourced from public forests (96 per cent) and just 4 per cent were sourced from private forests.

The proportion of hardwood sawlogs sourced from private forests is inversely related to the size of mills; that is, small mills currently use a relatively large share of logs sourced from private forests (Figure 1). Mills with an annual log intake capacity of less than 45 000 cubic metres accounted for 99 per cent of aggregate private hardwood log processing in Australia in 2012–13. This is an increase on the 2010–11 results. For example, hardwood mills with a capacity of less than 3000 cubic metres source 59 per cent of their log intake from private forests (Figure 1). In contrast, large hardwood mills with a capacity of more than 75 000 cubic metres currently source logs mainly from state-managed public forests.

Figure 1 National hardwood sawlog input, by sawmill size and forest tenure, 2012–13

Note: Forest tenure was indicated by survey respondents and has not been crosschecked. Excludes post and pole mill input.
Source: ABARES datasets

Structure of Australia's wood processing industry

Australia's wood processing industry is diverse, with mills of all types and sizes spread across all states, producing a wide range of wood products.

Characteristics of hardwood and softwood sawmills by size

Many differences in the characteristics of Australia's hardwood and softwood mills in Australia relate to the scale of these mills. The average size of hardwood mills in 2012–13 (in log intake) was 9263 cubic metres, compared with 125 809 cubic metres for softwood mills (Table 3). Most hardwood products are produced by small mills; 71 per cent of the national output of hardwood sawmills is produced by mills with an annual log intake capacity of less than 45 000 cubic metres (193 mills). In contrast, around 89 per cent of the national output of softwood sawmills was produced by only 20 mills with 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. The notable difference between the two industries is the relatively larger contribution of smaller mills in the hardwood industry.

Table 3 Characteristics of hardwood and softwood sawmills, by size, 2012–13

Log intake capacity (m ³ /yr)	No. mills	Average log intake	Recovery rate	Average output b	Total output b	Share of national output
		m ³ /mill	%	m ³ /mill	'000 m ³	%
Hardwood						
<3000	81	928	45.3	421	34	4.6
3000 to <15 000	74	5384	39.8	2 145	159	21.3
15 000 to <45 000	38	23 024	38.6	8 879	337	45.3
>45 000 c	7	72 029	42.5	30 609	214	28.8
Total	200	9 263	40.2	3 722	744	100.0
Softwood a						
<15000 c	19	5 693	66.8	3 801	72	1.9
15 000 to <45 000	13	20 866	48.4	10 089	131	3.5
45 000 to <75 000	5	29 736	58.5	15 485	87	2.3
75 000 to <100 000	4	54 904	53.9	29 607	118	3.1
>100 000	20	346 333	48.5	168 057	3 361	89.1
Total	61	125 809	49.0	61 809	3 770	100

Note: Average log intake may be less than log intake capacity for some mill groups. **a** Excludes cypress pine. **b** Output sums all products (including post and pole products) sold to market for each mill type. **c** Mill size categories aggregated to protect individual mill confidentiality. Source: ABARES datasets

Characteristics of sawmills and other mills by state

Significant differences exist in the structure of Australia's wood processing industry in each state. There are a large number of relatively small hardwood sawmills in New South Wales and Queensland. In 2012–13, 63 hardwood sawmills (32 per cent) were located in New South Wales. These mills accounted for 37 per cent of the total output of hardwood sawmills in Australia. While Victoria has fewer hardwood sawmills than Queensland, these mills accounted for 33 per cent of national output compared to 12 per cent for mills in Queensland (Table 4).

Table 4 Characteristics of sawmills and other mills, by state, 2012–13

Type and state	No. of mills	Average log intake	Recovery rate	Average output b	Total output b	Share of national output
		m ³ /mill	%	m ³ /mill	'000 m ³	%
Hardwood						
NSW	63	10 740	40.8	4 379	276	37.1
Vic.	29	19 061	44.1	8 408	244	32.8
Qld	43	5 739	36.3	2 081	90	12.0
SA	0	na	na	na	na	0.0
WA	19	9 371	34.4	3 220	61	8.2
Tas.	46	4 314	37.3	1 611	74	10.0
Australia	200	9 263	40.2	3 722	744	100.0

Table 4 Characteristics of sawmills and other mills, by state, 2012–13 (continued)

Type and state	No. of mills	Average log intake	Recovery rate	Average output b	Total output b	Share of national output
		m ³ /mill	%	m ³ /mill	'000 m ³	%
Softwood a						
NSW and Qld c	30	122 024	50.3	61 383	1 841	48.8
Vic. and SA c	25	129 396	48.0	62 088	1 552	41.2
WA	3	126 250	55.1	69 505	209	5.5
Tas.	3	133 333	42.0	56 057	168	4.5
Australia	61	125 809	49.1	61 809	3 770	100.0
Other mills						
Post and pole d	14	16 693	99.3	16 580	e 232	na
Cypress pine	20	9 368	41.8	3 919	78	na

Note: **a** Excludes cypress pine. **b** Output sums all products (including post and pole products) sold to market for each mill type. **c** State results combined to protect individual mill confidentiality. **d** State results, and hardwood and softwood post and pole mills, combined to protect individual mill confidentiality. **e** Output includes other products processed by post and pole mills such as green or dry sawnwood. na = not available.

Source: ABARES datasets

The combined states of New South Wales–Queensland and Victoria–South Australia each accounted for more than 40 per cent of national softwood sawmill output. Recovery rates are 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 products produced.

Post and pole mills had a combined total output of around 232 000 cubic metres, which includes products other than posts and poles processed by these mills (Table 4). Because of the nature of products processed by these mills, they generally have a very high recovery rate. Twenty cypress pine mills in Australia had a total output of around 78 000 cubic metres.

Foreign ownership

A significant majority of wood processing facilities in Australia is wholly Australian owned and operated. Around 5 per cent of wood processing facilities are partially or wholly owned by New Zealand, United States and other foreign investors.

Total output of mills by product type

Table 5 shows estimates for total output of products sold to market by product type. The green sawnwood output estimate represents sawnwood sold to market and excludes green sawnwood sold to other mills. The dry sawnwood output estimate represents sawnwood sold to the market, including sawnwood produced by processing logs onsite, as well as sawnwood sold through purchasing and drying green sawnwood from other mills.

Overall, around 740 000 cubic metres of hardwood sawnwood was produced for sale to market in 2012–13, of which 38 per cent was dried. In contrast, 3.85 million cubic metres of softwood sawnwood was produced for sale to market in 2012–13, with 78 per cent of this sold as dried product. In contrast with the other sectors, 93 per cent of cypress pine sawnwood was sold

green to the market (Table 5). An additional 95 000 cubic metres of hardwood posts and poles and 135 000 cubic metres of softwood posts and poles were also sold to market.

For hardwood sawnwood, shares of 'green appearance', 'dry structural' and 'dry other' output were relatively similar, with 'green other' constituting the largest individual share of hardwood sawnwood. In contrast, around 51 per cent of output from softwood mills was produced as dry structural timber. For cypress pine, green structural sawnwood accounted for nearly half final production.

Table 5 Production of mills, by product type, 2012–13

Product type a	Hardwood		Softwood		Cypress Pine	
	Total output	Share of output	Total output	Share of output	Total output	Share of output
	'000m ³	%	'000m ³	%	'000m ³	%
Green structural	170	23	133	4	38	48
Green appearance	55	7	7	0	18	23
Green other b	236	32	689	18	17	22
Dry structural	71	10	1910	51	3	4
Dry appearance	181	24	114	3	2	3
Dry other b	27	4	924	24	0	0
Total sawnwood	740	100	3776	100	78	100
Other products						
Posts and poles	95	na	135	na	na	na

Note: 'Hardwood' and 'Softwood' categories include products processed by both sawmills and post and pole mills. **a** Lists different sawnwood product types. **b** 'Dry other' and 'Green other' sawnwood categories include pallets, fencing and landscaping.

Source: ABARES datasets

Employment

Table 6 provides estimates of the number of people employed by sawmills and post and pole mills in Australia in 2012–13. The table includes people directly employed in mill operation and administration and excludes contractors involved with the harvesting and delivery of log inputs, as well as those employed in downstream activities such as wood product wholesaling.

The survey indicates that Australia's sawmills and post and pole mills employed about 8 090 people in 2012–13, of which around 90 per cent were full-time workers (including owners). Males accounted for more than 91 per cent of the workforce. Part-time workers constituted 18 per cent of total employees in cypress pine mills and 5 per cent in softwood sawmills.

The hardwood and cypress pine sawmills employed more workers per cubic metre of logs processed than the softwood mills. This reflects the smaller scale of these mills in general and the large-scale, capital-intensive nature of softwood sawlog processing.

The survey's total employment number is lower than reported in the Australian Bureau of Statistics (ABS) labour force survey (ABS 2014). The ABS survey estimates that around 12 300 people were employed in log sawmilling and timber dressing in 2012–13. The ABS

number is higher than the number in this survey because it also includes employment in the wood-chipping sector.

Table 6 Direct employment in the wood processing industry, 2012–13

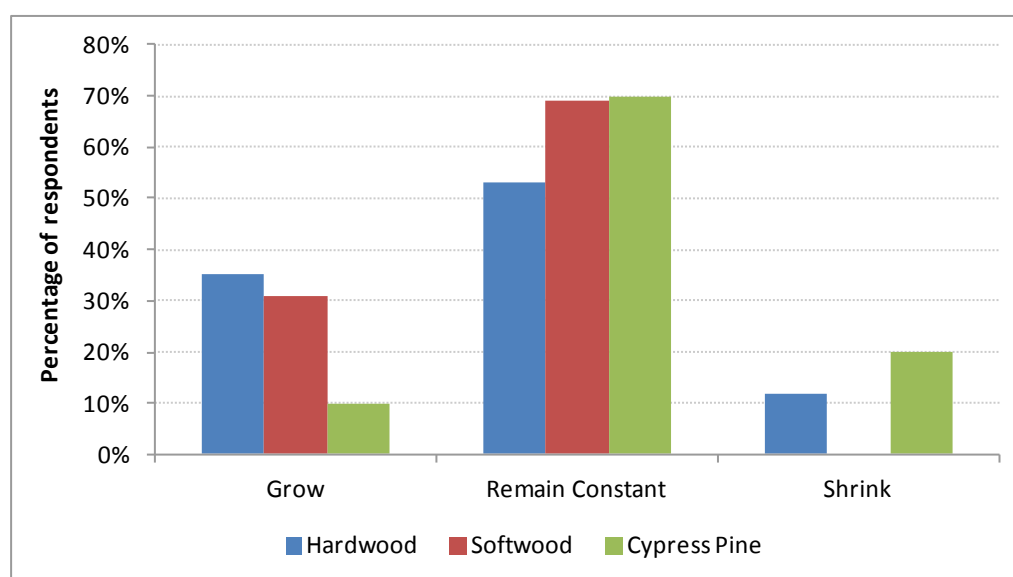
Sawmill type	Owners	Full time	Part time	Total	Male	Female	FTE	FTE/ '000 m ³ logs processed
	no.	no.	no.	no.	%	%	no.	
Hardwood	358	2 584	480	3 422	91.0	9.0	3 434	1.76
Softwood	88	3 726	191	4 004	91.2	8.8	4 046	0.52
Post and pole	22	256	41	319	93.1	6.9	324	1.35
Cypress pine	31	251	63	345	93.4	6.6	335	1.96
Total	499	6 817	774	8 090	91.3	8.7	8 139	0.76

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

Other survey information

ABARES also included optional survey questions (see Appendix B), including one on the respondent's opinion of the industry outlook. Of the 138 sawmills that responded to this question, the least optimistic were cypress pine sawmills—only 10 per cent expected an increase in demand for their product in 2013–14 (Figure 2). Hardwood and softwood mills had similar outlooks, with around one-third of respondents expecting an increase in demand. Around 20 per cent of cypress pine sawmills and around 12 per cent of hardwood sawmills indicated they expected demand for their products to decrease. The main pressures facing the sawmills were access to resources, log prices and transport and electricity costs. Other pressures reported were a lack of skilled workers, labour costs, competition from timber imports, government regulation and product substitution.

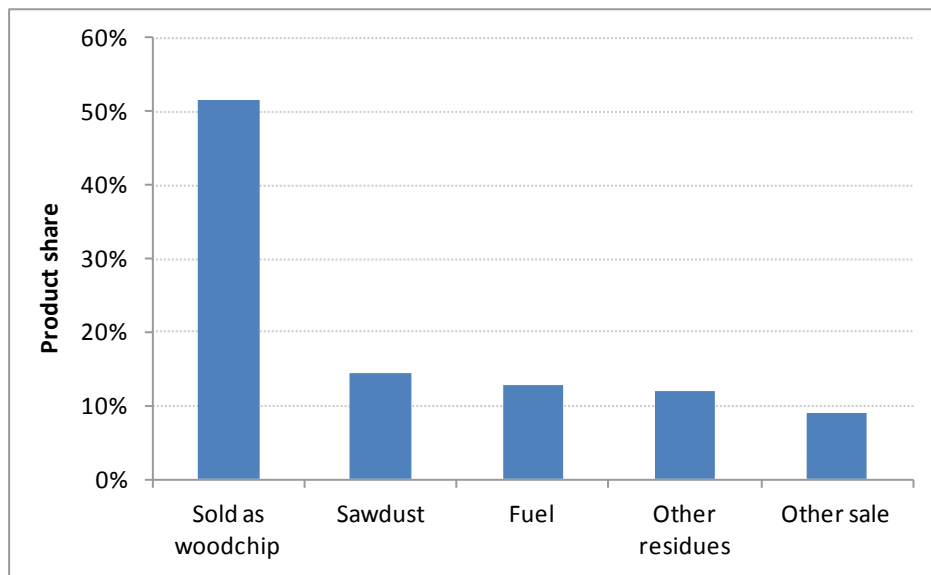
Figure 2 Outlook for demand of sawmill products, by industry, 2012–13



Source: ABARES datasets

117 mills responded to a question on how production by-products (or residue material) were used. Of the total volume of residue material from these mills, 51 per cent was sold as woodchips (Figure 3). Of these sales, 56 per cent were softwood woodchips and 44 per cent were hardwood woodchips. The next most common use was sawdust (around 15 per cent of total residue material), which was mostly used internally to fuel the mill's boiler with a small portion sold for use in landscaping and agriculture. Around 13 per cent of residue material was used for fuel; most was used internally to fuel the mill's boiler and the remainder was sold for use in electricity generation elsewhere. This figure would have been higher if sawdust used to fuel the mill's boiler had also been included in this category. The "Other residues" category (12 per cent) primarily reflects residue material sold for use on farms for animal bedding and firewood, and a small portion was either burnt or sent to landfill if no markets could be found. Finally, 9 per cent of residues were sold for landscape and gardening uses ("Other sale" category).

Figure 3 Use of residue material, 2012–13



Source: ABARES datasets

2 Trends over time

Trends in number of mills over time

Table 7 presents the ABARES 2012–13 sawmill population estimates and previous population estimates of mill numbers in Australia. The data indicate a significant decline in the estimated number of sawmills between 2006–07 and 2010–11 and 2012–13.

The total number of sawmills in Australia in 2012–13 is estimated to be only 46 per cent of the 2006–07 population. Over this period the number of hardwood sawmills, which continue to be dependent on the native forest resource, has fallen by 60 per cent. This reduction occurred principally among smaller mills (with annual processing capacity of less than 3000 cubic metres), the number of which declined by 76 per cent.

The number of softwood (including cypress pine) sawmills also declined—by 24 per cent between 2006–07 and 2012–13. The decline in softwood sawmill numbers was primarily the result of the closure of smaller softwood sawmills—as evidenced in the 37 per cent decline in estimated number of mills with log processing capacity of less than 15 000 cubic metres since 2006–07. Over the same period, the number of softwood mills with log processing capacity of 15 000 cubic metres or more declined by 11 per cent. However, the softwood figures in Table 7 include the native forest based cypress pine mills. These represent significantly different processing infrastructure and products from softwood sawnwood based on Australia's plantation-based resource.

The data in Table 7 also indicate a significant difference in the structure of the hardwood and softwood sawnwood industries in Australia. While 97 per cent of hardwood sawmills processed less than 45 000 cubic metres of log per mill in 2012–13, only 64 per cent of softwood sawmills fell into this category.

While the number of hardwood and softwood sawmills declined substantially between 2006–07 and 2012–13, the volume of hardwood and softwood logs harvested also decreased by 38 per cent and 16 per cent, respectively (Figure 4). Over the past decade, the domestic softwood sawmill industry has become significantly more capital intensive and larger in scale, which has limited the reductions in total log processing despite the decline in mill numbers.

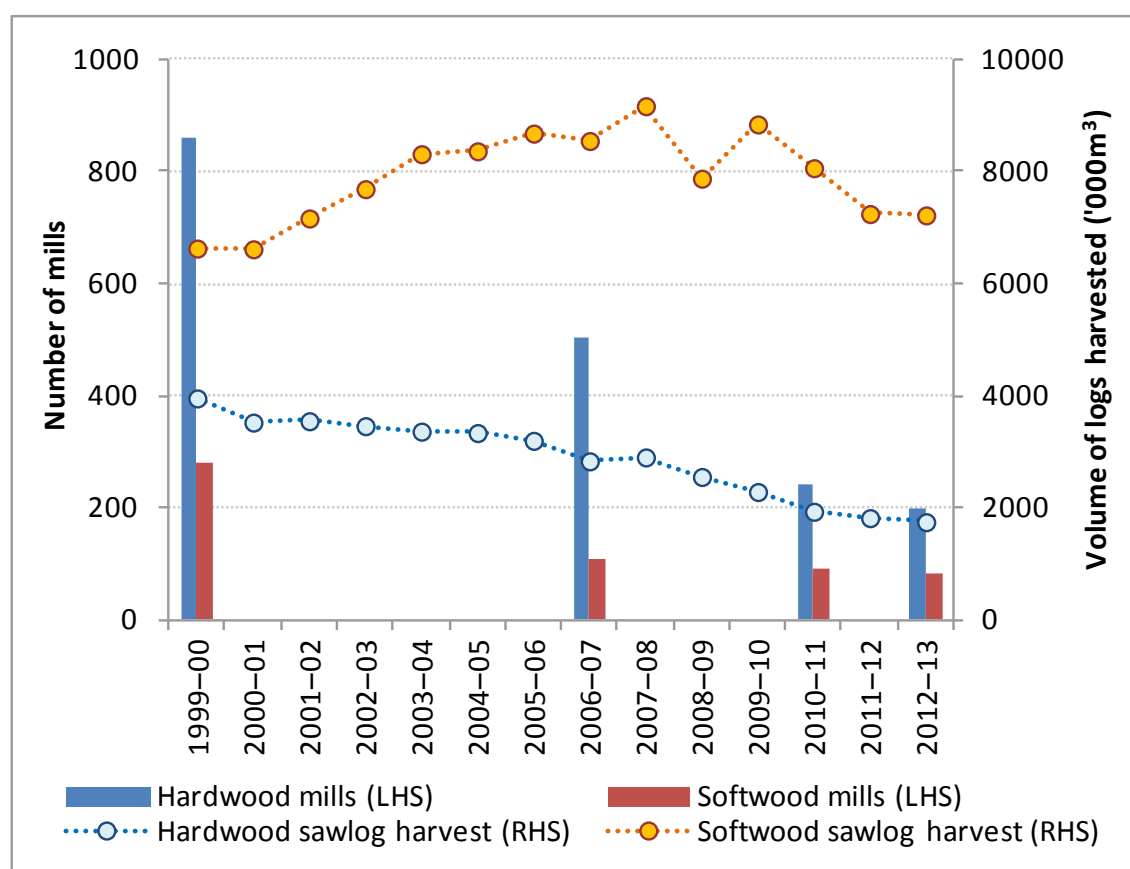
Table 7 Number of sawmills in Australia, by processing capacity and selected years

Log intake capacity (m ³ /yr)	Hardwood a			Softwood a, b			Total		
	2006–07	2010–11	2012–13	2006–07	2010–11	2012–13	2006–07	2010–11	2012–13
<3000	337	91	81	13	4	7	350	95	88
3 000 to <15 000	101	91	74	41	29	27	142	120	101
15 000 to <45 000	55	44	38	21	25	18	76	69	56
45 000 to <75 000	7	7	4	8	7	5	15	14	9
75 000 to <100 000	1	6	1	3	2	4	4	8	5
>100 000	1	2	2	22	24	20	23	26	22
Total	502	241	200	108	91	81	610	332	281

Note: Excludes posts and poles mills.

Source: ABARES datasets

Figure 4 Number of sawmills and volume of sawlogs harvested in Australia, 1999–2000 to 2012–13



Note: Sawmill numbers include cypress pine sawmills and exclude post and pole mills; sawlog harvest excludes estimates of sawlog exports; softwood sawlog harvest includes cypress pine.

Source: ABARES

Comparison of log input volumes with other estimates

The log input volumes estimated in this report should be comparable with other estimates of the volume of sawlogs harvested in Australia. ABARES annually surveys Australia's public and private forest growers and some large processors to estimate the volume of logs harvested for domestic production. A comparison of these estimates for 2012–13 is provided in Table 8.

The observed discrepancies in the estimates in Table 8 may be explained in various ways. Firstly, this 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 have errors. Secondly, the volume of logs each state processed may differ from the volume of logs harvested because logs may have been traded interstate or have been stockpiled after harvesting (by either forest managers or wood processors). Thirdly, definitions of log types differs between this wood processing survey and the ABARES log harvest survey—because, in the 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.

As shown in Table 8, estimates based on survey results for the volume of hardwood sawlogs processed by mills exceeds the ABARES (2014) gross value of production for logs harvested in all states other than Queensland and Western Australia. This may be attributable to the reasons mentioned, in particular stockpiling logs after harvesting. Overall the differences between the two estimates are small and, at the national level, the wood processing survey estimate of the volume of hardwood logs processed is around 1.5 per cent higher than the ABARES estimate of logs harvested.

Similarly, estimates based on survey results for volume of softwood sawlogs processed by mills were significantly different from ABARES (2014) for New South Wales, South Australia and Victoria. Discrepancies may be explained through transfer of logs from Victoria to mills in South Australia. Logs are transferred between Victoria and New South Wales, and between New South Wales and Queensland, and were not reported to maintain confidentiality. These discrepancies are greater than estimated in the 2011 survey. This suggests either that interstate trade has increased or that the survey better captures interstate trade, and log harvest estimates report on source of supply not destination for processing. However, the discrepancy in the Western Australian softwood sawlog estimates is likely to arise from the two surveys using different samples. The two estimates for volume of cypress pine sawlogs processed are similar.

Table 8 Comparison of estimates based on the National Wood Processing Survey with other ABARES estimates for logs harvested, 2012–13

Region (‘000 m ³)	Hardwood			Softwood			Cypress pine		
	Survey log input	Logs harvested b	Difference	Survey log input	Logs harvested b	Difference	Survey log input	Logs harvested	Difference
NSW a	772	757	16	2 538	2 114	424	52	52	0
Vic.	553	531	22	1 698	1 895	- 198	0	0	0
Qld	247	247	0	1 131	1 101	29	135	116	19
SA	0	0	0	1 621	1 355	267	0	0	0
WA c	178	209	- 31	416	454	- 38	0	0	0
Tas.	198	177	21	408	459	- 51	0	0	0
Australia	1 948	1 921	28	7 812	7 378	434	187	168	20

Note: Volumes include posts and poles and exclude wood-based panels. **a** Includes ACT. **b** Preliminary data; includes logs harvested for domestic sawlogs to sawmills, poles, piles and fences and excludes cypress pine and sawlogs exported or sold to other forest industries; includes ABARES estimates of private logs harvested. Errors in totals may exist due to rounding. **c** includes Northern Territory.

Source: ABARES datasets

Appendix A: Methodology

This chapter discusses the ABARES approach to its 2012–13 wood processing survey and its process for estimating population data based on its survey sample of the wood processing industry. Tasks consisted of:

- validating the number of wood processors in Australia
- developing the survey questionnaire
- selecting a representative sample and undertaking the survey
- aggregating and weighting the results.

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 regularly consults 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 (mill type, log species and input capacity) were correct. Where ABARES could not contact mills, it assumed they were closed and removed them from the mill population list. Although ABARES tried to include all mill sizes in the survey, it was difficult to estimate the number of small mills as mobile mills may not belong to existing mill registers or be 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 first validated the number of mills processing logs. ABARES undertook this task for the 2010–11 survey and again comprehensively validated mill population estimates for report. A comparison of mill numbers across different surveys is presented in Chapter 2.

Developing the survey questionnaire

ABARES developed the survey questionnaire in consultation with forestry sector representatives and with input from state forest agencies and other forest sector stakeholders. The survey included questions on use of residues, recovery rates, log input and production volumes, employment, ownership and business confidence. A copy of the questionnaire is provided in Appendix B. Participants had to respond to certain questions to be included in the survey sample: these consisted of questions on log input, volume of production and mill employment estimates. Mills that could not answer one or more of these questions were not included in the survey. Additional questions (such as product prices and input costs) were considered optional without affecting respondents' inclusion in the survey results.

The log input question included respondents' estimates of the tenure 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 both public and private land.

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

Selecting a representative sample and undertaking the survey

The survey was voluntary and required cooperation of both large and small wood processors across Australia. ABARES asked industry associations, including the Australian Forest Products Association, the Australian Timber Importers Federation and the Engineered Wood Products Association of Australasia, to encourage stakeholders to participate in the survey. ABARES contacted mills by telephone. Those interested in participating were emailed or faxed 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 September 2013 and March 2014. In some instances wood processors preferred to complete the survey in their own time and emailed their responses to ABARES.

Around 48 per cent of hardwood sawmills (68 per cent of estimated industry capacity) and 69 per cent of softwood sawmills (76 per cent of industry capacity) participated in the survey (Table 9). This was a significant improvement in the response rate compared to the previous survey, which captured 36 per cent of hardwood sawmills and 57 per cent of softwood sawmills. ABARES also surveyed post and pole mills and cypress pine sawmills. It received responses from 71 per cent and 60 per cent of those mills respectively.

The survey was initially designed to cover a range of sawmills, post and pole mills and wood-based panel processors. The wood-based panel industry is relatively concentrated, with only 24 large processing mills operating across all states of Australia (Table 9). Many wood-based panel processors were unwilling to participate or did not provide a survey response because of commercial confidentiality concerns. As low response rates diminish the reliability of survey results, the results for wood-based panel mills are not provided in this report.

Table 9 Sawmill population, sample and proportion surveyed

Type by state	2012-13 population	Sample surveyed	Proportion of population surveyed	
	no.	no.	% by mill number	% by mill capacity
Hardwood				
New South Wales a	63	28	44	64
Victoria	29	16	55	83
Queensland	43	17	40	55
South Australia	0	0	na	na
Western Australia d	19	7	37	65
Tasmania	46	28	61	58
Australia	200	96	48	68
Softwood b				
New South Wales a	14	9	64	62
Victoria	11	8	73	91
Queensland	16	10	63	88
South Australia	14	10	71	80
Western Australia d	3	3	100	100
Tasmania	3	2	67	94
Australia	61	42	69	76
Total post and pole mills	14	10	71	76
Total cypress pine mills	20	12	60	69
Total wood-based panel mills c	24	14	58	32

Note: **a** Includes ACT. **b** Excludes cypress pine. **c** Consists of plywood/veneer, particleboard, MDF, LVL, hardboard.

d includes Northern Territory.

Source: ABARES datasets

Aggregating and weighting the results

Each mill in the ABARES mill population database was assigned to a strata based on the type of processor (hardwood sawnwood, softwood sawnwood, cypress pine sawnwood, posts and poles or wood-based panels), the state in which the mill operated and the size of the mill based on the categories presented in Table 1. In total, 70 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. ABARES did not receive any completed survey responses from mills across several wood-based panel strata. This contributed to the decision to not report on

these data in this report. In addition, ABARES did not receive any responses from mills in two softwood sawmill strata and one cypress pine sawmill stratum, partly as a result of each stratum being represented by one mill only. To overcome this, ABARES allocated these mills to other strata with similar log input capacities and included the data in the population estimates. However, the data used to weight these mills may differ slightly from the actual log input and recovery rates of the mill. Where sawmills did not complete the whole survey, figures from surveys such as the gross value of production (GVP) were used to supplement information provided by the mill.

ABARES collected data on the production of sawnwood from log processing by the mill, including the volume of green sawnwood and dry sawnwood produced for sale. The survey collected the volume of green-off-sawn (GOS) purchased from other mills and the GOS-to-dry recovery rate. When these survey data were aggregated, the estimated volume of GOS purchased by mills as an input to further production was subtracted from the total output or volume of products sold to market.

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ABARES National Wood Processing Survey ABARES

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