Indicator 2.1a: Native forest available for wood production, area harvested, and growing stock of merchantable and non merchantable tree species (2024)

This indicator reports the capacity of forests to sustainably produce wood to meet society's needs into the future. The area of native forest available for wood production, the nature of the growing stock, and the area harvested over time provide means to demonstrate the sustainability of forest management.

Context and definitions

In Australia, the area of native forest available for wood production is a function of tenure, legislation and regulation, as well as economic constraints.

This indicator reports on four separate metrics:

- the area of native forest on which wood production is not legally restricted
- the area of native forest on leasehold, private and multiple-use public forest tenures available and suitable for commercial wood production (a subset of the area of native forest on which wood production is not legally restricted)
- the net harvestable area of multiple-use public native forest when additional local restrictions are taken into account
- the annual area of multiple-use public native forest harvested for wood production.

Data up to July 2021 are reported and as such a detailed analysis to account for changes resulting from subsequent decisions by some states to cease commercial harvesting in public native forests was not possible.

Key points

- The major source of Australia's native wood and wood-based products has been multiple-use public forests in New South Wales, Queensland, Tasmania, Victoria and Western Australia; forests on land with leasehold and private tenure also contribute to supply in some states.
- The area of native forest not legally restricted from commercial wood harvesting was 81.3 million hectares in 2021, a decrease of 3% from the 83.6 million hectares reported in 2016.
- The area of native forest on leasehold, private and multiple-use public forest tenures available and suitable for commercial wood production was 27.4 million hectares in 2021, a decrease of 2% from the 28.1 million hectares reported in 2016.
- The net area available and suitable for commercial wood production in multiple-use public native forests (the net harvestable area) was 4.3 million hectares in 2020-21, a decrease of 14% from the 5.0 million hectares reported in 2015-16.
- Over the period 2016-17 to 2020-21, the average annual area of multiple-use public native forests from which wood was harvested was 77 thousand hectares, unchanged from the period 2011-12 to 2015-16. Within this area, most (86%) was harvested using selection silvicultural systems. The proportion harvested by clearfelling systems was 9%.

Native forest not legally restricted from wood harvesting

The native forest area available for wood production is reported as the area in which harvesting is not legally restricted.

Commercial wood harvesting is legally restricted on:

- nature conservation reserve tenure
- informal reserves on all other tenure (see Indicator 1.1c)
- private and leasehold forest that is under conservation covenant or reserved by other mechanisms
- other Crown land where harvesting is inferred to be legally restricted by government policy
- all native forest in South Australia and the Australian Capital Territory.

A total of 81.3 million hectares of Australia's native forest was not legally restricted from wood harvesting in 2021, which is 62% of Australia's total area of native forest (Table 2.1a-1). Within this area, regulatory prescriptions and exclusions substantially reduce the area from which wood can be legally harvested. This is discussed further below.

Queensland has the largest area of native forest not legally restricted from harvesting (41.9 million hectares), comprising mostly leasehold and private forest. This is followed by the Northern Territory and New South Wales, with 15.3 million hectares and 12.6 million hectares respectively.

The total area of multiple-use public native forest not legally restricted from harvesting is 7.8 million hectares. Most native forest wood harvesting in Australia occurs on this tenure class.

Table 2.1a-1: Areas of native forest legally restricted and not legally restricted from wood harvesting, by tenure and jurisdiction, 2021

National tenure class	Area ('000 hectares)											Proportion of forest not legally restricted from wood harvesting (%)
	Total native forest	Forest legally restricted from wood harvesting	Forest not legally restricted from wood harvesting									
			ACT	NSW	NT	Qld	SA	Tas.	Vic.	WA	Total	
Leasehold forest	47,926	5,437	0	3,760	7,856	25,717	0	0	0	5,156	42,490	89
Multiple-use public forest	9,927	2,113	0	1,487	0	2,892	0	528	1714	1,193	7,813	79
Nature conservation reserve	22,037	22,037	0	0	0	0	0	0	0	0	0	0
Other Crown land	9,763	9,505	0	0	0	257	0	0	0	0	257	3
Private forest	41,631	10,969	0	7,338	7,422	12,950	0	719	978	1,256	30,662	74
Unresolved tenure	218	94	0	65	22	37	0	0	0	0	124	57
Total	**131,501**	**50,155**	**0**	**12,649**	**15,300**	**41,854**	**0**	**1,247**	**2,691**	**7,604**	**81,346**	**62**

Data as at 2021 and thus does not account for changes resulting from subsequent decisions by some states to cease commercial wood harvesting in public native forests.
Legal restrictions on wood harvesting apply in all native forests in the ACT and SA; on nature conservation reserves; on informal reserves on all other tenures; on private and leasehold land that is under conservation covenant, or regulated or reserved by other mechanisms (see Indicator 1.1c Area of forest in protected area categories); and are presumed to apply to areas of 'other Crown land' that are not available for commercial wood harvesting.
Wood harvesting on Tasmania's Future Potential Production Forest (FPPF) land is currently restricted through regulation and is classed here as 'other Crown land' and legally restricted from harvesting.
Tenures are national tenure categories (see Indicator 1.1a.ii Forest area by tenure) and may not coincide with state or territory tenure categories.
Totals may not tally due to rounding.
Source: ABARES.
Click here for a Microsoft Excel workbook of the data for Table 2.1a-1.

Since 2016, the total area of native forest not legally restricted from wood harvesting decreased from 83.6 million hectares to 81.3 million hectares (a 3% decrease). This decrease is a continuation of the trend of decreasing area legally available for harvest since reporting began in 1998. For example, in Victoria between 2016 and 2021, the area of multiple-use public native forest where wood harvesting was legally restricted increased by 0.43 million hectares, in large part due to new harvest exclusion zones for old growth forest, greater glider (*Petauroides volans*) and Leadbeater's possum (*Gymnobelideus leadbeateri*) (D'Ambrosio, Minister for Energy, Environment and Climate Change 2019). Forests across all tenures, but particularly multiple-use public native forests, are increasingly managed for a wider range of non-wood values, which further reduces area available for harvest.

A range of other legal considerations influence the availability of forest for wood harvesting. In New South Wales, wood harvesting from native forest on some other Crown land tenures may be allowed under the *Crown Land Management Act 2016* subject to approval by the relevant Minister. However, since approval is not assured these areas are treated as legally restricted from harvesting until approval is given.

In Queensland, the area available for wood production by the state (the Crown) comprises all State Forest and Timber Reserves, large areas of other Crown land (including leasehold land, Forest Entitlement Areas and unallocated state-owned land) and some freehold land over which the state retains ownership of forest products.

In Tasmania, 0.36 million hectares of native forest were designated as Future Potential Production Forest (FPPF) land under the *Forestry (Rebuilding the Forest Industry) Act 2014.* On this land, special-species timber harvesting may be undertaken subject to relevant approvals. FPPF land may also be converted to Permanent Timber Production Zone (PTPZ) land upon application and approval by the relevant Minister. As at 2023, no special-species timber harvesting had occurred on FPPF land and none had been converted to PTPZ land. Therefore, for this analysis, FPPF land is classified as other Crown land and treated as legally restricted from harvesting.

In May 2023, the Victorian Government announced that commercial native timber harvesting on state forests would end by 01 January 2024. Processes to determine the future use and management of these areas are underway.

In September 2021, the Western Australian Government announced the end of commercial wood harvesting from southwest public native forests from 01 January 2024. Legislative changes have been introduced to restrict the salvage and removal of forest products to only areas cleared ahead of mining and infrastructure development, and to activities consistent with a conservation purpose, such as ecological thinning. Further, the *Forest Management Plan 2024-2033* provides for an additional 400 thousand hectares of multiple-use public forest to be transferred to nature conservation reserve tenure.

Forest available and suitable for commercial wood production

The reported area of native forest not legally restricted from wood harvesting substantially overestimates the actual area available and suitable for wood production. This is because it includes forests that are not available for wood production because of jurisdictional regulations that apply to wood harvesting operations on these areas including codes of practice, management plans and requirements to manage forests for multiple values relating to biodiversity, heritage, recreation, and soil and water (see Indicator 7.1a and Indicator 7.1b), forest management intent, and local operational prescriptions and restrictions. Furthermore, there will be areas not commercially suitable for wood harvesting due to species and volume constraints, economic viability constraints and accessibility issues.

The use of a national sawlog commerciality database, previously assembled by ABARES using historical merchantability and productivity data, provides insight into the areas of multiple-use public native forest available and suitable for wood production. 'Commerciality' is determined by assessing the merchantability and productivity of forests for sawlogs (Davey and Dunn 2014).

As of 2021, there was an estimated 27.4 million hectares of native forest available and suitable for wood harvesting on leasehold, private and multiple-use public forest tenures, a decrease of 2% from the 28.1 million hectares reported in 2016 (Table 2.1a-2). The decline observed between 2016 and 2021 is part of a long-term decline (Figure 2.1a-1), which can be attributed to several factors including, changes in tenure (such as transfers of multiple-use public forests to nature conservation reserves), continuing increases in the area of multiple-use public native forest to which harvesting restrictions apply, and reclassification of forest to non-forest based on improved mapping techniques.

Table 2.1a-2: Australia's native forest available and suitable for commercial wood production, by sawlog commerciality rating, 2016 and 2021

Tenure[a]	Area ('000 hectares)								Proportion of total forest that is commercial (%)	Proportion of total forest that is rated moderate, high or very high (%)
			Commercial forest (forest available and suitable for harvesting)							
			Commerciality rating							
	Total forest[b]	Non-commercial forest and forest legally restricted from harvesting[c]	Very low	Low	Moderate	High	Very high	Total		
2016										
Leasehold forest	47,246	39,094	0	7,596	390	164	2	**8,151**	17	1
Multiple-use public forest	9,772	3,476	0	2,465	2,063	1,284	484	**6,296**	64	39
Private forest	41,031	27,421	0	10,346	2,049	840	374	**13,611**	33	8
Total	**98,049**	**69,991**	**0**	**20,407**	**4,502**	**2,289**	**861**	**28,058**	**29**	**8**
2021										
Leasehold forest	47,926	40,063	0	7,360	356	147	1	**7,864**	16	1
Multiple-use public forest	9,927	3,874	0	2,494	1,951	1,145	463	**6,053**	61	36
Private forest	41,631	28,104	0	10,166	2,137	843	380	**13,527**	32	8
Total	**99,484**	**72,041**	**0**	**20,019**	**4,445**	**2,136**	**844**	**27,444**	**28**	**7**

Data as at 2021 and does not account for changes resulting from subsequent decisions after this date by states to cease some public native forest harvesting. The relatively small area of native forest on Other Crown land and Unresolved tenure that is not legally restricted from harvesting was not considered in this analysis.

[a] Tenure classes of Other Crown land, Nature conservation reserve, and Unresolved tenure were not considered in this analysis, even though harvesting is not legally restricted on some areas of Other Crown land and Unresolved tenure (see Table 2.1a-1).

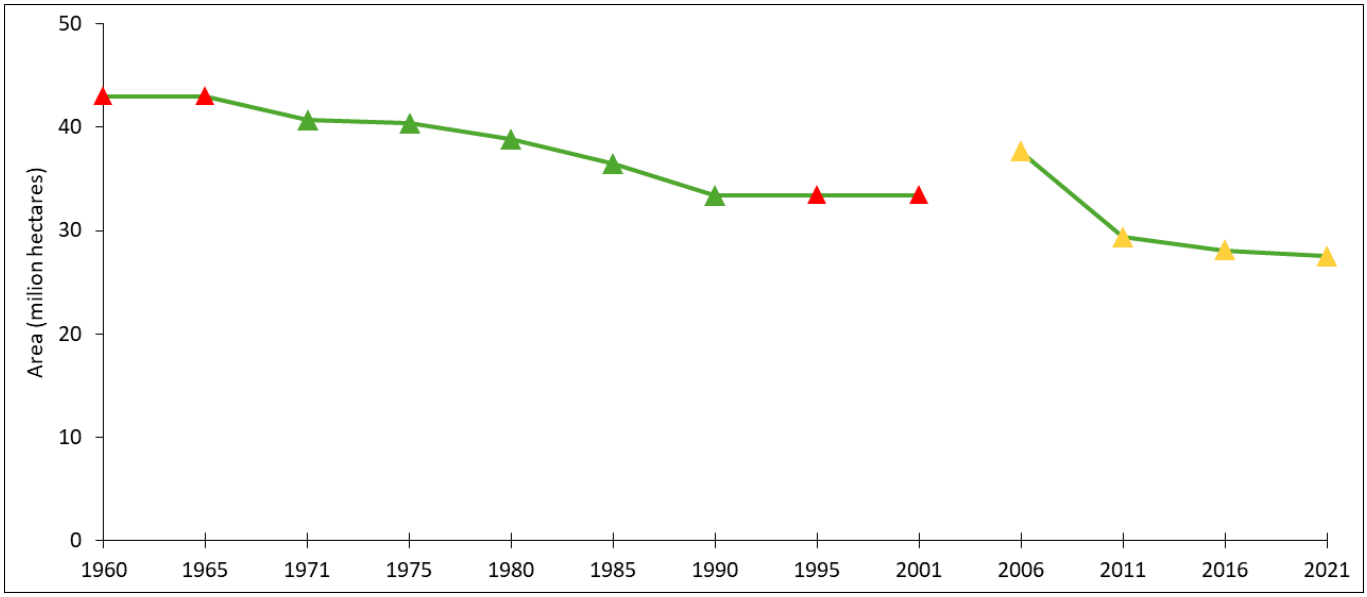
[b] Values for total forest in each tenure category for 2016 and 2021 use the forest coverages available at those times. Areas of forest of various commerciality ratings at those dates were obtained by overlaying these coverages and the sawlog commerciality forest layer described in Davey and Dunn (2014).

[c] 'Non-commercial forest' includes forest of limited, possible or no commerciality; sandalwood (where not associated with other commercial species); forest of unknown floristics and structure. Forest legally restricted from harvesting includes conservation reserves on private and public land where harvesting is excluded by conservation covenant, regulation or other mechanisms.

Source: ABARES; Davey and Dunn (2014).

Click here for a Microsoft Excel workbook of the data for Table 2.1a-2.

Figure 2.1a-1: Australia's native forest available and suitable for commercial wood production, 1960–2021



Data points in green are derived from tabular data provided by state and territory agencies to Australian Government agencies and used for reporting in Resource Assessment Commission (1992). Data points in red are estimates based on those tabular data and ancillary historical data. Data points in yellow are based on the spatial assessment of forest commerciality reported in Davey and Dunn (2014) and the various National Forest Inventory forest cover datasets (Table 2.1a-2). Methodological changes caused the increase after 2001. Spatial data for the 2006 data point was incomplete and poor.
Only leasehold, private and multiple-use public native forest is considered in this analysis.
Source: ABARES (including historical forest resource datasets and publications from the Bureau of Agricultural Economics and the Commonwealth Forestry and Timber Bureau); Davey and Dunn (2014); Resource Assessment Commission (1992).
Click here for a Microsoft Excel workbook of the data for Figure 2.1a-1.

Of Australia's 27.4 million hectares of commercially suitable native forest, as at 2021 (Table 2.1a-2):

- 6.1 million hectares (22%) is on multiple-use public forest tenure, which is 61% of the total 9.9 million hectares of multiple-use public native forest nationally
- 7.9 million (29%) hectares is on leasehold tenure (16% of total native forest on leasehold tenure)
- 13.5 million (49%) hectares is on private tenure (32% of total native forest on private tenure).

Of the 27.4 million hectares of commercially suitable native forest, 7.4 million hectares (27%) are of moderate, high or very high commerciality (Figure 2.1a-2):

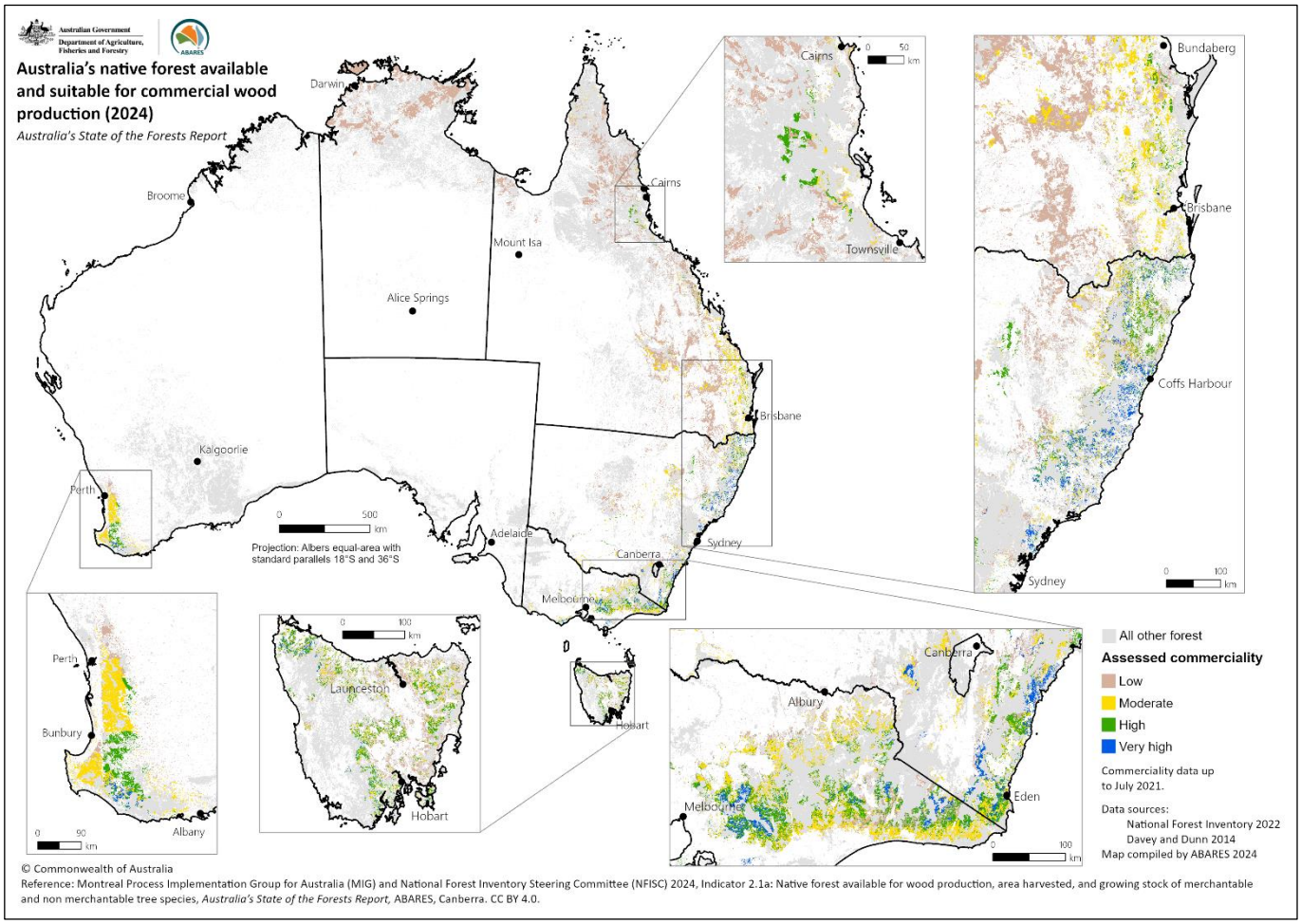
- 3.6 million hectares (48%) occurs on multiple-use public forest tenure, concentrated in the higher rainfall parts of south-west, south-east and eastern Australia
- 3.4 million hectares (45%) occurs on private tenure
- 0.5 million ha (7%) occurs on leasehold tenure.

A large proportion (82%) of native forest on leasehold and private land available and suitable for commercial wood production has a low commerciality rating and contributes minimally to commercial wood supply. This is due to these forests generally being of low merchantability and productivity, isolated from existing markets, or located where harvesting is not operationally feasible or financially viable.

The ending of commercial harvesting in multiple-use public native forests in Victoria and Western Australia from 01 January 2024 is anticipated to reduce the total area available and suitable for commercial wood harvesting by 2.2 million hectares (or 8% of the national total) from the areas reported for 2021. Most (1.9 million hectares) of

this area is rated as moderate, high or very high commerciality, which is 26% of the total moderate, high and very high commerciality native forest area across Australia. Victoria and Western Australia each account for 1.1 million hectares of the total reduction, of which 0.9 million hectares in Victoria and 1.0 million hectares in Western Australia is rated as moderate, high or very high commerciality. It is noted that the Western Australian *Forest Management Plan 2024-2033* (CPC 2023) allows for the salvage, removal and sale of wood products arising from ecological thinning operations and clearing for mining, however, this is not considered in this analysis.

Figure 2.1a-2: Australia's native forest available and suitable for commercial wood production, 2021



Native forest 'available and suitable' for harvesting is native forest with a commerciality rating of very low, low, moderate, high or very high, assessed across the leasehold, private and multiple-use forest estate. 'All other forest' on this map includes native forest of limited, possible or no commerciality; sandalwood; forest of unknown floristics and structure; conservation reserves where harvesting is excluded, including on private land by conservation covenant, regulation or other mechanism; plus forests on formal nature conservation reserves, other Crown land, or land of unresolved tenure.
Areas of very low commerciality were reassessed as non-commercial in 2021, based on the findings of Forest Solutions (2013).
Source: Davey and Dunn (2014); National Forest Inventory, ABARES.
Click here for a high-definition copy of Figure 2.1a-2.

Net harvestable area of forest

Net harvestable area is used as a basis to calculate sustainable yield from multiple-use public native forests. Net harvestable area is determined after subtracting the following areas from the total multiple-use public native forest area:

- areas within multiple-use forests that are reserved for the protection of values relating to biodiversity, heritage, recreation, visual amenity and soil and water and/or are zoned for management purposes that are not compatible with wood harvesting
- forest exclusion zones resulting from the application of conditions in codes of practice or other regulatory instruments (such as Integrated Forestry Operations Approvals in New South Wales)
- forests determined to have operational constraints, such as roading and extraction track access constraints, steepness or rockiness, or the occurrence of unacceptable safety risk
- forests determined to be unmerchantable, or unsuitable for wood production because of the age, size and species of trees, insufficient product volumes to cover production costs, or because trees have been damaged by fire or disease.

Only a proportion of the regulatory forest exclusion zones can be mapped in advance of forestry operations. Some prescriptions such as those relating to riparian zones, threatened fauna and flora, threatened ecological communities, Indigenous cultural heritage and other biophysical and cultural exclusions are applied as a result of field observations during preparation of a site for wood harvesting. This often results in actual harvested areas being less than the estimated net harvestable area for a discrete harvesting unit.

The estimated net harvestable area of multiple-use public native forest in Australia was 4.3 million hectares in 2020-21 (Table 2.1a-3), which was a decline of 0.71 million hectares (14%) from the area reported in 2015-16, and a decline of 5.8 million hectares (57%) from the 10.1 million hectares reported in 1995-96. The decline since 1995-96 includes reductions resulting from the implementation of Regional Forest Agreements that saw significant areas of multiple-use public native forest transferred to the conservation reserve system (Davidson et al. 2008). The net harvestable area of multiple-use public native forest was 10% of the total area of public native forest in Australia in 2020-21, compared to 22% in 1995-96.

Table 2.1a-3: Net harvestable area of multiple-use public native forest, and proportion of total public native forest[a], by jurisdiction, 1995-96 to 2020-21

State		Net harvestable area of public native forest					
		1995-96	2000-01	2005-06	2010-11	2015-16	2020-21
NSW	Area ('000 hectares)[b]	2,352	1,516	966	1,229	1,020	1,115
	Proportion of total public native forest (%)	35	20	12	16	12	13
Qld	Area ('000 hectares)[c]	3,186	2,340	2,178	2,030	1,921	1,369
	Proportion of total public native forest (%)	40	26	27	22	22	16
Tas.[d]	Area ('000 hectares)	811	787	607	563	376	363
	Proportion of total public native forest (%)	36	35	27	23	15	14
Vic.	Area ('000 hectares)	2,555	1,010	930	835	824	586
	Proportion of total public native forest (%)	41	15	14	13	12	9
WA	Area ('000 hectares)	1,157	904	848	848	849	850
	Proportion of total public native forest (%)	6	6	7	7	6	6
Total	**Area** ('000 hectares)	**10,061**	**6,557**	**5,528**	**5,505**	**4,989**	**4,282**
	Proportion of total public native forest (%)	**22**	**14**	**13**	**14**	**12**	**10**

[a] Public native forest comprises the tenures multiple-use public native forest, nature conservation reserve and other Crown land. Data do not include harvestable areas on leasehold or private lands accessible to public forest agencies for wood harvesting.

[b] The increase in the net harvestable area for NSW public native forests between 2005-06 and 2010-11 resulted from use of a new standardised methodology and corporate geo-database.

[c] Data for Queensland are net harvestable area on multiple-use public native forest only, but not other Crown land or unresolved tenure.

[d] Data for net harvestable area for Tasmania for 1995-96 to 2010-11 apply to all state forests (multiple-use public native forest) and other Crown land available for harvesting. Data for 2015-16 and 2020-21 are only for Permanent Timber Production Zone Land managed by Sustainable Timber Tasmania and not for other public tenures.

Area statements of public forest for relevant reporting year are used to calculate proportion of total public native forest.

Source: ABARES; State government agencies, including FPA (2007, 2012, 2017, 2022), Forest Practices Board (2002) and DSE (2003, 2008).

Click here for a Microsoft Excel workbook of the data for Table 2.1a-3.

New South Wales

In New South Wales, the net harvestable area decreased by 53% from 2.4 million hectares in 1995-96 to 1.1 million hectares in 2020-21. However, net harvestable area increased slightly since 2015-16 from 1.0 million hectares to 1.1 million hectares in 2020-21. This increase is associated with significant changes made to the regulations applying to harvesting operations in New South Wales coastal multiple-use public native forests when the Coastal Integrated Forestry Operations Approvals commenced in 2018. Under these regulations, exclusion zone requirements for certain environmental features were modified, and a new condition was introduced requiring the identification and permanent protection of a proportion of the net harvestable area in 'habitat clumps'.

In 2023, the New South Wales Government announced a process to establish a 'Great Koala National Park' on the state's mid-north coast (DCCEEW 2023). During the park establishment planning phase, the government implemented a halt to timber harvesting in 8 thousand hectares of the state forest within the assessment area, with agreement from the state's multiple-use public native forest management agency. The total park assessment area covers approximately 176 thousand hectares of multiple-use public native forest (DCCEEW 2024), much of which contains highly productive blackbutt (*Eucalyptus pilularis*) forest. This area remains as net harvestable area in Table 2.1a-3.

Queensland

In Queensland, the net harvestable area of multiple-use public native forest steadily decreased from 3.2 million hectares in 1995-96 to 1.4 million hectares in 2020-21 (a 57% reduction). The decrease observed between 2015-16 and 2020-21 (0.55 million hectares, or 29%) was due to improvements made to the process of delineating net area, rather than from any significant tenure changes.

In 2019, the Queensland Government announced the Native Timber Action Plan and committed to ending state-owned native timber production in the South East Queensland Regional Plan area on 31 December 2024, which includes 68 thousand hectares (gross) of multiple-use public native forest (Qld Government 2019).

In June 2024, the Queensland Government announced the Queensland Sustainable Timber Industry Framework which will be developed by mid-2025. Under the Framework, approximately 50 to 60 thousand hectares of high-value ecosystems within the Eastern Hardwoods region and adjacent areas will transition to a new 'Natural Capital Reserve' (Qld DPC 2024). While the Framework is developed, harvesting permits for the Eastern Hardwoods region in areas not transitioning to Natural Capital Reserve, will be issued by the end of 2024 for a further two years to the end of 2026 (Qld Government 2024).

Tasmania

In Tasmania, the net harvestable area as at 2020-21 was 0.36 million hectares. This represents a 55% reduction in the net harvestable area since 1995-96 when the figure was 0.81 million hectares. Most of this reduction can be attributed to:

- the reallocation of areas of multiple-use public native forest to nature conservation reserves resulting from the implementation of the 1997 Regional Forest Agreement and the 2005 Tasmanian Community Forest Agreement (Davey 2018)
- successive changes to Tasmanian *Forest Practices Code* prescriptions in 2000, 2015 and 2020 (FPA 2022)
- the implementation of the 2013 Tasmanian Forest Agreement, including an extension to the Tasmanian Wilderness World Heritage Area (TWWHA) in 2013 (FPA 2012; FPA 2017). Note that the land earmarked for reservation in the TWHHA has since been re-classified as Future Potential Production Forest (FPPF) land, however, the area does not contribute to the net harvestable area figure reported in Table 2.1a-3.

Victoria

The net harvestable area of multiple-use public native forest in Victoria was 0.59 million hectares in 2020-21, a decrease of 29% from the 0.82 million hectares reported in 2015-16. This decrease was due primarily to additional exclusion zones for old growth forest, and protection for greater glider and Leadbeater's possum. Since 1995-96, there has been a steady decline in net harvestable area from the 2.6 million hectares that was available at that time. Processes are underway to determine the future use and management of the reported net harvestable area after the ending of commercial wood harvesting in Victoria's multiple-use public native forests from 01 January 2024.

Western Australia

The net harvestable area of multiple-use public native forest in southwest Western Australia was 0.85 million hectares in 2020-21, which was slightly more than area reported in 2015-16 (Table 2.1a-3). Since 1995-96, the net harvestable area decreased from 1.2 million hectares, representing a 27% reduction. This was a result of the transfer of parts of the state forests to nature conservation reserves and the introduction of a policy by the Western Australian Government to protect all old-growth forests.

In Western Australia, the ending of commercial wood harvesting from 01 January 2024 will also impact on net harvestable area, however, the Western Australian *Forest Management Plan 2024-2033* (CPC 2023) allows for ecological thinning operations to occur within specified 'Forest Enhancement Areas'. The primary objective of ecological thinning is to promote forest health and resilience, and conserve biodiversity by removing a proportion of trees to reduce competition for resources (primarily water, but also nutrients) on the retained trees (Burrows et al. 2022). Salvage, removal and sale of wood products arising from ecological thinning operations is permitted under the forest management plan.

The Western Australian *Forest Management Plan 2024-2033* identifies approximately 134 thousand hectares of potential ecological thinning area in jarrah (*Eucalyptus marginata*), karri (*E. diversicolor*) and wandoo (*E.* wandoo) regrowth forests and mining rehabilitation. The actual area that will be thinned each year (up to 8,000 hectares in state forest and timber reserves is permitted) will depend on a range of factors including the comparative vulnerability to future forest health pressures and contractor capacity.

Net harvestable area on privately managed land

Definitive statistics of the net harvestable area of private or leasehold forests in any jurisdiction were not available. However, an estimated 0.36 million hectares of Victoria's private and leasehold native forests were available and suitable for timber production in 2000-01 (DSE 2003), and more recent work by the New South Wales Department of Primary Industries identified 0.40 million hectares of potential net harvestable area in the private native forests of north-eastern NSW (NSW DPI 2019) and 0.08 million hectares of potential net harvestable area in the private native forests of southern NSW (NSW DPI 2024).

Area of native forest harvested for wood

State agencies that manage Australia's public forests for wood production report annually or five-yearly on the area of forest harvested and regenerated under various silvicultural (forest management) systems (Figure 2.1a-3). In contrast, limited data are available on the area of private native forests harvested in Australia, with only some data available for the area harvested in private forests of Tasmania and in leasehold forests of Queensland.

A total of 65 thousand hectares of multiple-use public native forest was harvested in 2020-21 (Table 2.1a-4), which represents 0.7% of Australia's total area of multiple-use public native forest and 0.05% of Australia's total native forest. This represents a 54% decrease from the 140 thousand hectares of multiple-use public native forest that was harvested in 2001-02. Many of the drivers for this decrease are described in the previous section by jurisdiction.

Between the periods 2011-12 to 2015-16 and 2016-17 to 2020-21 the average annual area harvested remained steady at 77 thousand hectares (Table 2.1a-4). This is despite reduced harvesting in Victoria, New South Wales and south-eastern Queensland in 2019-20 and 2020-21 when wood production was interrupted by the 2019-20 'Black Summer' bushfires. For example, the harvested area in New South Wales dropped from an annual average of 21 thousand hectares for the four years from 2016-17 to 2019-20 to 12 thousand hectares in 2020-21 (44% decrease). In Queensland and Victoria, the decrease over the same periods were 14% and 16% respectively (Table 2.1a-4). The 'Black Summer' bushfires impacted large parts of the east coast and interrupted harvesting operations both directly (for example, approaching fire-fronts), and indirectly through impacts to harvesting schedules, threatened species concerns, increased safety risks and the reallocation of staff and machinery to

assist with fire-fighting efforts. Forest harvesting machinery played a critical role in fire-fighting and post-fire environmental rehabilitation and recovery.

Table 2.1a-4: Forest area harvested annually from multiple-use public native forest in Australia

	Area (hectares)					
Reporting year	**NSW[a]**	**Qld[b]**	**Tas.[c]**	**Vic.**	**WA[e]**	**Total**
2001-02	50,351	47,700	14,900	10,500	16,630	140,081
2002-03	49,062	48,300	16,900	8,500	13,950	136,712
2003-04	45,337	48,400	17,090	8,100	9,725	128,652
2004-05	42,523	41,100	17,500	7,600	9,610	118,333
2005-06	43,233	47,700	12,500	7,800	7,440	118,673
2006-07	44,806	43,900	11,520	6,900	9,670	116,796
2007-08	52,960	44,200	12,990	7,800	8,820	126,770
2008-09	27,952	32,500	12,370	6,400	7,640	86,862
2009-10	38,499	32,300	8,710	5,900	10,660	96,069
2010-11	27,484	28,200	10,500	5,800	6,140	78,124
2011-12	27,444	34,000	2,590	5,398	7,490	76,922
2012-13	31,221	35,000	4,190	5,427	7,780	83,618
2013-14[d]	23,807	35,000	3,610	4,481	6,540	73,438
2014-15[d]	22,235	40,000	4,700	4,332	5,360	76,627
2015-16[d]	17,878	38,000	5,010	4,819	6,400	72,107
2016-17	24,308	40,880	5,375	4,809	7,790	83,162
2017-18	24,048	41,880	5,726	5,126	6,260	83,040
2018-19	17,075	45,340	5,984	4,163	5,760	78,322
2019-20	17,036	42,120	5,795	3,487	5,760	74,198
2020-21	11,528	36,630	5,019	3,694	7,790	64,661
Annual average, by five-year reporting period						
2001-02 to 2005-06	46,101	46,640	15,778	8,500	11,471	128,490
2006-07 to 2010-11	38,340	36,220	11,218	6,560	8,586	100,924
2011-12 to 2015-16	24,517	36,400	4,020	4,891	6,714	76,542
2016-17 to 2020-21	**18,799**	**41,370**	**5,580**	**4,256**	**6,672**	**76,676**
Annual average, long-term						
2001-02 to 2020-21	**31,939**	**40,158**	**9,149**	**6,052**	**8,361**	**95,658**

[a] 2001-02 to 2015-16 are "total area planned for harvest" values. Net area harvested is reported for 2016-17 to 2020-21.

[b] Also includes areas harvested on native forests with Crown timber rights on the national tenure categories leasehold forest and other Crown land (2011-12, 7,500 hectares; 2012-13, 7,500 hectares; 2013-14, 10,000 hectares; 2014-15, 7,500 hectares; 2015-16, 16,000 hectares; 2020-21, 10,400 hectares).

[c] Harvest areas include areas harvested before plantation establishment (Tas.).

[d] Harvest areas previously reported for WA in *Australia's State of the Forests Report 2018* have been amended based on a review carried out for the *End-of-term review of performance of the Forest Management Plan 2014-2023* (CPC 2022).

[e] The equivalent table in previous reports in the *Australia's State of the Forests Report* series included area cleared for bauxite mining in WA. Areas cleared for mining is now reported separately.

No harvesting of public native forests is permitted in SA, NT or ACT.

Source: Data provided by NSW, Qld, Tas., Vic. and WA.

Click here for a Microsoft Excel workbook of the data for Table 2.1a-4.

In contrast to the trend observed in New South Wales, Queensland and Victoria, in Tasmania there was an increase in average annual harvest area since the 2010-11 to 2015-16 period (Table 2.1a-4). Between the periods

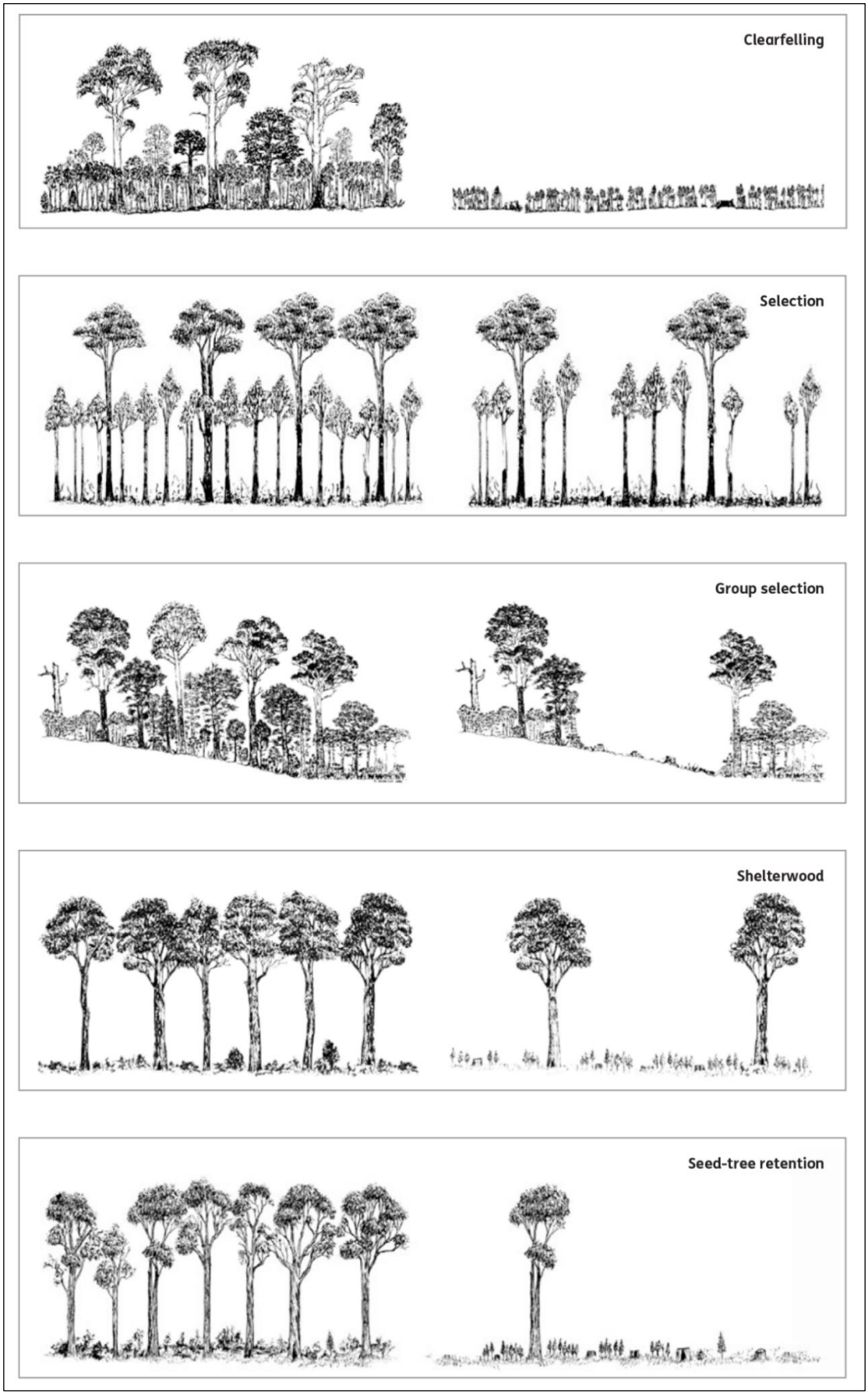
2011-12 to 2015-16 and 2016-17 to 2020-21, the average annual area harvested in Tasmania increased from 4.0 thousand hectares to 5.6 thousand hectares (a 28% increase). This was primarily due to a shift away from more intensive silvicultural systems (such as clearfelling and 'intensive silviculture with retention') towards selection harvesting and other less intensive systems that harvest from larger areas to yield the same wood volumes (see Figure 2.1a-3).

New South Wales and Queensland together contributed 78% of the multiple-use public native forest harvested in the period 2016-17 to 2020-21 (Table 2.1a-4). This high proportion was primarily due to the dominant use of selection silvicultural systems.

In Victoria, 540 hectares of multiple-use public native forest were subject to 'fallen product recovery' windthrow salvage operations during the period 2016-17 to 2020-21, primarily in the state's west. These areas have not been included in the harvested area summaries provided in Tables 2.1a-4 and 2.1a-5.

The *Forest Management Plan 2014-2023* for south-west Western Australia (CCWA 2013) discusses the sustainability of wood volumes and growing stock of jarrah, karri and wandoo forests, and Western Australia has a long history of reporting the annual area of forest harvested for wood and cleared for mining (Table 2.1a-6). The average annual area of jarrah, karri and wandoo forest types harvested for wood or cleared for mining decreased from 30,180 hectares in 1976-80 to 7,610 hectares in 2016-20, a 75% reduction. The majority of harvesting occurred using selection and shelterwood silvicultural systems (see Figure 2.1a-3).

Figure 2.1a-3: Silvicultural systems used in Australia's native forests



Source: Adapted from original artwork by Fred Duncan in Wilkinson (1994).

Selection silvicultural systems are proportionally the most common systems used in the multiple-use public native forests of Australia and are practiced in New South Wales, Queensland, Tasmania, Victoria and Western Australia. Selection silvicultural systems include group/gap selection, single-tree selection (including light, medium and heavy selection systems and diameter limit cutting), native cypress pine silviculture (applied in New South Wales and Queensland), commercial thinning and mixtures of group selection and single tree selection. The specific selection system is chosen based on the growth stage and structure of the forest stand and the known regeneration responses of different forest types. Of the area of multiple-use public native forest harvested during the 2016-17 to 2020-21 period, 86% was carried out using selection silviculture systems. This compares to 87% during the preceding five-year period (2011-12 to 2015-16) (Table 2.1a-5).

Clearfelling is used as a silvicultural system to promote forest regeneration in Tasmania, Victoria and Western Australia in certain native forest types. Annual native forest clearfelling data presented in Table 2.1a-5 includes native forest regenerated to native forest and native forest converted to plantation between 2001-02 and 2010-11 (the conversion of native forest to plantation on public land in Tasmania was stopped in 2010). Salvage of fire-damaged native forests using clearfelling systems in Victoria and Tasmania, and areas clearfelled in association with bauxite mining in Western Australia are reported separately (Table 2.1a-5 and Figure 2.1a-4, respectively). Intensive silviculture with retention is also considered a clearfelling silvicultural system and includes areas harvested with seed-tree and/or habitat-tree retention and was practiced in Tasmania, Victoria, Western Australia and the Eden region of New South Wales during the 2016-17 to 2020-21 period. Of the area of multiple-use public native forest harvested during the period 2016-17 to 2020-21, 9% was carried out using clearfelling silvicultural systems. This proportion was also 9% during the preceding five-year period (2011-12 to 2015-16) (Table 2.1a-5).

Variable retention is a silvicultural system implemented in wet sclerophyll forests as an alternative to clearfelling systems. This silviculture has the explicit goal of maintaining habitat and structural features within the forest stand (Baker and Read 2011) to provide biodiversity benefits and satisfactory silvicultural outcomes (Scott et al. 2019). The use of this type of silviculture commenced in Tasmania in 2003 and in Victoria in 2013. Of the area of multiple-use public native forest harvested between 2016-17 and 2020-21, 1.3% was carried out using variable retention silviculture. This compares to 0.2% during the preceding five-year period (2011-12 to 2015-16) (Table 2.1a-5).

Shelterwood silvicultural systems are used for promoting and nurturing regeneration in specific forest types in Victoria and Western Australia. Of the area of multiple-use public native forest harvested between 2016-17 and 2020-21, 3.4% was carried out using shelterwood silviculture. This compares to 3.7% during the preceding five-year period (2011-12 to 2015-16) (Table 2.1a-5).

Table 2.1a-5: Area of silvicultural systems used in multiple-use public native forest in Australia, 2001 to 2021

Reporting year	Area (hectares)								
	Silvicultural system								
	Clear-felling[a]	Fire salvage (clear-felling)	Intensive silviculture with retention[a]	Shelterwood	Variable retention[b]	Selection[c,d]	Native cypress pine silviculture[c,d]	Commercial thinning[c]	Total area harvested
2001-02	10,607	100	7,958	7,920	0	68,968	29,576	14,952	140,081
2002-03	11,184	400	6,546	6,500	0	67,631	29,767	14,684	136,712
2003-04	10,440	1,800	5,862	4,330	38	60,112	33,075	12,995	128,652
2004-05	9,680	600	5,118	4,310	39	56,146	29,693	12,747	118,333
2005-06	7,580	900	5,719	2,870	0	60,755	30,954	9,895	118,673
2006-07	8,310	500	4,855	2,780	342	64,411	25,120	10,478	116,796
2007-08	6,710	1,500	3,566	3,040	413	61,302	38,200	12,039	126,770
2008-09	5,410	1,000	3,662	2,700	336	40,193	21,300	12,261	86,862
2009-10	3,900	3,000	4,508	5,260	190	43,139	27,450	8,622	96,069
2010-11	3,880	2,850	6,877	3,890	330	30,792	22,512	6,993	78,124
2011-12	2,668	290	4,040	3,590	70	30,655	29,311	6,298	76,922
2012-13	3,597	440	3,053	4,800	270	30,995	32,210	8,253	83,618
2013-14[e]	2,936	320	3,996	2,380	47	31,934	27,684	4,141	73,438
2014-15[e]	3,014	310	3,811	1,490	415	36,814	27,910	2,863	76,627
2015-16[e]	3,291	266	3,832	1,880	150	29,076	30,678	2,934	72,107
2016-17	3,063	12	5,583	2,766	103	30,654	32,559	8,421	83,162
2017-18	2,326	0	5,756	2,473	284	33,497	31,871	6,833	83,040
2018-19	1,799	0	6,082	4,356	375	30,591	28,872	6,247	78,322
2019-20	1,774	78	4,191	2,029	1,347	34,295	27,161	3,322	74,198
2020-21	1,362	128	3,261	1,494	2,761	27,082	25,649	2,926	64,661
Annual average, by five-year reporting period									
2001-02 to 2005-06	9,898	760	6,241	5,186	15	62,722	30,613	13,055	128,490
2006-07 to 2010-11	5,642	1,770	4,694	3,534	331	47,959	26,916	10,079	100,924
2011-12 to 2015-16	3,101	325	3,746	2,828	190	31,895	29,559	4,898	76,542
2016-17 to 2020-21	**2,065**	**44**	**4,974**	**2,624**	**974**	**31,224**	**29,222**	**5,550**	**76,676**
Annual average, long-term									
2000-01 to 2020-21	**5,177**	**725**	**4,914**	**3,543**	**376**	**43,452**	**29,078**	**8,395**	**95,658**

[a] Clearfelling, fire-salvage clearfelling and intensive silviculture with retention are all clearfelling silvicultural systems. Intensive silviculture with retention includes areas harvested with seed-tree and/or habitat-tree retention, and alternate coupe harvesting.
[b] Variable retention silviculture is a silviculture system implemented in wet forests as an alternative to clearfelling systems with the explicit goal of maintaining species, habitats and structural features.
[c] Selection, native cypress pine silviculture and commercial thinning are all selection silvicultural systems.
[d] For the 2016-17 to 2020-21 period, Queensland data includes harvest values for native forests with Crown timber rights on the national tenure categories leasehold forest and other Crown land (area values given in footnotes to Table 2.1a-4).
[e] Harvest areas previously reported for WA in *Australia's State of the Forests Report 2018* have been amended based on a review carried out for the *End-of-term review of performance of the Forest Management Plan 2014-2023* (CPC 2022).
No harvesting of native forest is permitted from public forests in the Australian Capital Territory, Northern Territory or South Australia.
Source: Data provided by NSW, Qld, Tas., Vic. and WA.
Click here for a Microsoft Excel workbook of the data for Table 2.1a-5.

Table 2.1a-6: Average annual area of multiple-use public native forest harvested and cleared for mining in Western Australia

Period	Area (hectares)			
	Selection, shelterwood and other harvest[a] (jarrah and wandoo)	Clearfelled or partially cut (karri)	Thinned[b] (karri)	Total
1976-80	27,340	2,792	48	30,180
1981-85	23,244	1,722	322	25,288
1986-90	18,266	1,330	656	20,252
1991-95	14,236	1,788	124	16,148
1996-2000	19,436	1,668	180	21,284
2001-05	11,032	724	608	12,364
2006-10	7,486	508	962	8,956
2011-15	6,980	318	640	7,938
2016-20	6,263	421	926	7,610

[a] Includes harvesting for a range of silvicultural objectives, including thinning, selection and shelterwood silviculture systems in jarrah and wandoo forest, and jarrah forest cleared prior to bauxite mining.

[b] Thinning of regrowth karri forests.

Source: *Australia's State of the Forests Report 2018*; Western Australian Department of Biodiversity, Conservation and Attractions.
Click here for a Microsoft Excel workbook of the data for Table 2.1a-6.

Area of native forest cleared for mining in Western Australia

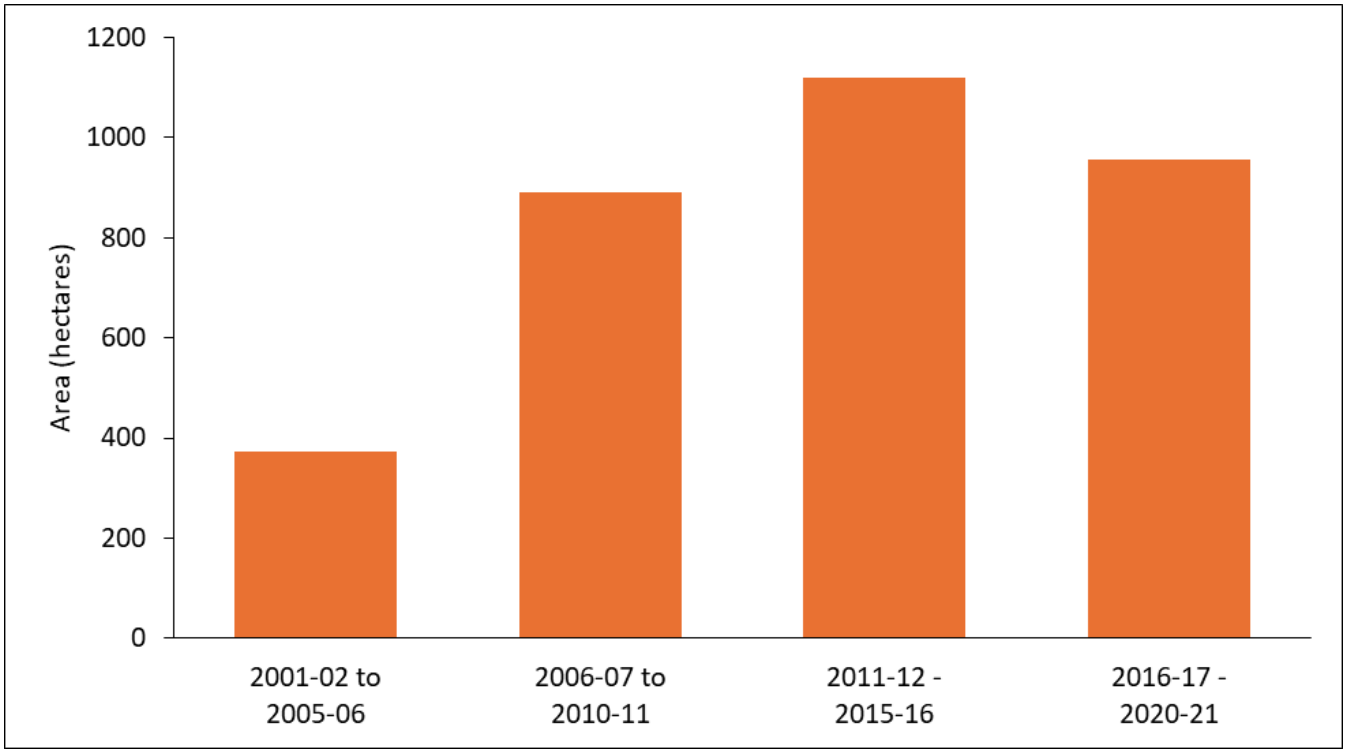
Bauxite mining has occurred within multiple-use public native forests south-east of Perth in Western Australia since the 1960s. While excavations associated with bauxite mining are relatively shallow, they are laterally extensive and involve the clearing of all vegetation and the removal and stockpiling of topsoil prior to mining and subsequent rehabilitation.

From 2001 to 2021, the total area of multiple-use public native forest cleared for bauxite mining in Western Australia was 16,630 hectares. During the 2016-17 to 2020-21 period, the average annual area of multiple-use public native forest cleared for bauxite mining was 956 hectares. This compares to an annual average of 1,118 hectares in the preceding five-year period (a 14% decrease). The total area cleared for bauxite mining fluctuates year-to-year depending on the timing of mining approvals, the progress of scheduled mining operations and market dynamics.

Cleared areas are required to be rehabilitated after mining has concluded, and a range of completion criteria must be met by the mining lessee before a mine site is handed back to the Western Australian government for ongoing management by the Department of Biodiversity Conservation and Attractions (Gardner and Bell 2007).

Areas of multiple-use public native forest in Western Australia are also cleared for mining other minerals including gold, coal, tin, lithium and other rare earth minerals. These operations occur on a much smaller scale than bauxite mining and are not included in Figure 2.1a-4.

Figure 2.1a-4: Average annual area of multiple-use public native forest cleared for bauxite mining in Western Australia, 2001 to 2021, by five-year period



Source: Western Australian Department of Biodiversity, Conservation and Attractions.
Click here for a Microsoft Excel workbook of the data for Figure 2.1a-4.

Growing stock

'Growing stock' is the total volume of wood (both merchantable and non-merchantable) in the forest at a particular time. Increases and decreases in growing stock can indicate (among other things) the sustainability of resource use. In practice, forest managers measure growing stock of merchantable tree species to forecast sustainable yields in multiple-use public forests and private plantations, however, there are insufficient data available to estimate current growing stock in native forests at a national level. There is little to no information available on the growing stock of non-merchantable tree species (i.e. tree species that do not produce saleable products).

The Resource Assessment Commission (1992) compiled estimates of the growing stock of commercial standing wood, but no national estimates have been made since that work. Subsequent estimates of available growing stock have been used to estimate sustainable harvesting levels in multiple-use public native forests in New South Wales, Tasmania, Victoria and Western Australia (see Indicator 2.1c).

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Acknowledgement of Country

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.

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