

Indicator 1.1a: Area of forest by forest type and tenure

This indicator uses the area for each forest type over time as a broad measure of the extent to which forest ecosystems and their diversity are being maintained. Reporting on forest tenure aids our understanding of how different land management regimes may impact on forest biodiversity.



1.1a.i Forest area by forest type (2023)

This part of Indicator 1.1a presents the area of Australia's forests by their category, type and structural classes.

The three other parts of Indicator 1.1a are:

1.1a.ii Forest area by tenure

1.1a.iii Forest area in Regional Forest Agreement regions

1.1a.iv Forest area change over time

Context

The forest area data presented here cover Australia's states and mainland territories and their close offshore islands, but not the external territories of Norfolk Island, Lord Howe Island, Cocos (Keeling) Islands and Christmas Island.

The underlying *Forests of Australia (2023)* dataset is assembled using a [Multiple Lines of Evidence \(MLE\) approach](#).

Definition

Forest: An area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres and with existing or potential crown cover of overstorey strata about equal to or greater than 20 per cent. This includes Australia's diverse native forests and plantations, regardless of age. It is also sufficiently broad to encompass areas of trees that are sometimes described as woodlands.

Forest area, cover and extent are used interchangeably in this work.

Other terms used here can be found in [Australia's forests and forestry glossary](#).

Key points

- Australia has 133.6 million hectares of forest, covering 17% of Australia's land area, of which
 - 131.5 million hectares are Native forests
 - 1.82 million hectares are Commercial plantation¹
 - 0.24 million hectares are Other forest.
- Australia's forests are dominated by Eucalypt forests (101 million hectares, 77% of total native forest)
- Acacia forests (10.9 million hectares, 8% of total native forest) and Rainforest (3.44 million hectares, 3% of total native forest) cover significant areas.
- Structurally, most of Australia's native forest is woodland forest (93 million hectares, 71% of total native forest), with a crown cover of 20–50%.

¹ The area of Commercial plantation reported here differs from the area published by the National Plantation Inventory which are compiled from non-spatial data sources that cannot be integrated with the national spatial (mapped) total forest area dataset required to identify the area of all forests in Australia.

Defining forest, forest categories and forest types

Australia's State of the Forests Report is based on Australia's national definition of forest:

An area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres and with existing or potential crown cover of overstorey strata about equal to or greater than 20 per cent. This includes Australia's diverse native forests and plantations, regardless of age. It is also sufficiently broad to encompass areas of trees that are sometimes described as woodlands.²

Woodland, savanna and eucalypt mallee vegetation are all included where they meet the criteria for height and crown cover.

Australia's national definition of forest is different from the definitions of forest that apply in some other countries, or the definition used by the [Food and Agriculture Organization of the United Nations \(FAO\)](#).

In Australia's National Forest Inventory, forests are assigned to three broad categories: Native forest, Commercial plantation and Other forest. Each of these categories is divided into various forest types.

The **Native forest** category comprises areas dominated by the suite of native tree species naturally associated with forest in that location and located within their natural range. Native forest is classified into eight forest types defined by dominant species or structure, namely Acacia, Callitris, Casuarina, Eucalypt, Mangrove, Melaleuca, Rainforest and Other native forest types. The 'Other native forest' type comprises a range of less common native forest types with relatively small individual areas, as well as native forest where the type is unknown.

Native forest is also divided into three crown cover classes (Closed, Open and Woodland), and three height classes (Tall, Medium and Low). The Eucalypt forest type is also sub-divided into mallee and non-mallee subtypes.

The **Commercial plantation** category comprises hardwood or softwood plantations managed commercially to supply logs for the manufacture of wood products, and reported through the National Plantation Inventory. There are three types:

- Softwood (predominantly radiata pine, *Pinus radiata*, in southern Australia, and southern pine varieties, *Pinus* spp., in Queensland)
- Hardwood (most commonly Tasmanian blue gum, *Eucalyptus globulus*)
- Other (sometimes referred to as Unknown or Mixed species).

The **Other forest** category comprises mostly non-commercial plantations and planted forests of various types, including plantations of sandalwood (*Santalum* spp.), smaller farm forestry and agroforestry plantations, environmental plantings, plantations within the reserve system, and plantations regarded as non-commercial. It also includes non-planted forests dominated by trees of introduced species.

Sparse woody vegetation is not reported in *Australia's State of the Forests Report*. This is a non-forest vegetation type of open woodland, heathland or shrubland, generally with a tree crown cover of 5-20%.

² Definition of forest published 15/12/2023. Corrected 13/02/2024.

Forest area by jurisdiction and category

Australia has 133.6 million hectares of forest, covering 17% of Australia's total land area (Table 1.1a.i-1, showing data as at 2021). Australia has the seventh largest area of forest in the world by country, and approximately 3% of the world's forest area.

The areas of forest in the three broad categories of Australia's forest estate are as follows:

- **Native forest:** 131.5 million hectares (98% of Australia's total forest area).
Queensland has the largest area of native forest (39% of Australia's native forest area), with much of the balance in the Northern Territory (18%), Western Australia (16%), and New South Wales (15%).
- **Commercial plantations:** 1.82 million hectares (1.4% of Australia's total forest area)³.
Victoria has the largest area of commercial plantations (22% of Australia's commercial plantation area), with New South Wales (20%), Western Australia (17%), Tasmania (16%) and Queensland (12%) making up the balance.
- **Other forest:** 0.24 million hectares (0.18%) of Australia's total forest area.
The largest areas of Other forest are in South Australia (0.09 million hectares) and Western Australia (0.04 million hectares). All Other forest in the Northern Territory is sandalwood plantations.

The geographic distribution of Australia's forests is shown in Figure 1.1a.i-1, by forest category. Forests are generally confined to regions where average rainfall exceeds 500 millimetres per year. Most forests are in the northern, eastern, south-eastern and south-western coastal zones of Australia, although woodland forests extend into drier areas in many parts of the country.

Table 1.1a.i-1: Australia's forest area, by jurisdiction

Jurisdiction	Native forest		Commercial plantation		Other forest		Total forest	
	Area ('000 hectares)	Proportion of total Native forest (%)	Area ('000 hectares)	Proportion of total Commercial plantation (%)	Area ('000 hectares)	Proportion of total Other forest (%)	Area ('000 hectares)	Proportion of total forest (%)
ACT	130	0.1	10	0.5	3	1	143	0.1
NSW	19,882	15	368	20	34	14	20,284	15
NT	23,280	18	47	3	6	3	23,333	17
Qld	51,750	39	214	12	12	5	51,977	39
SA	4,866	4	176	10	89	37	5,131	4
Tas.	3,393	3	288	16	26	11	3,707	3
Vic.	7,790	6	403	22	30	13	8,224	6
WA	20,409	16	317	17	41	17	20,766	16
Australia	131,501	100	1,821	100	243	100	133,565	100

The area figure for Commercial plantation used in this update of *Australia's State of the Forest Report* is calculated from a rasterised (gridded) version of the National Plantation Inventory vector-format coverage used to produce the area data reported in [Australian plantation statistics and log availability report 2021](#). Conversion of the vector format to the 1-hectare raster format results in the area figure for Commercial plantations reported here (1.82 million hectares) being slightly higher than the area figure reported in [Australian plantation statistics and log availability report 2021](#) (1.77 million hectares).

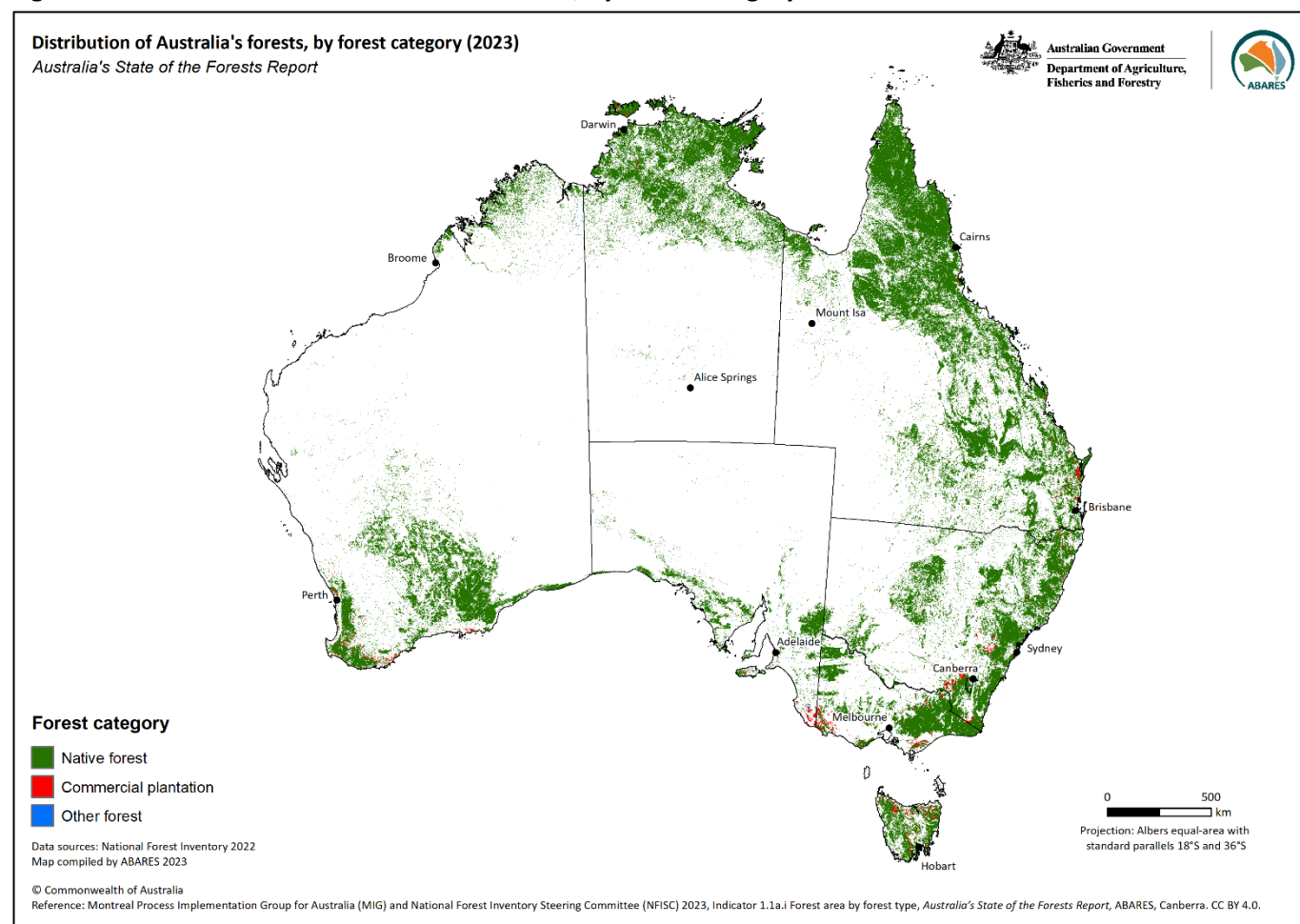
Totals may not tally due to rounding.

Source: ABARES, National Forest Inventory, National Plantation Inventory.

[Click here for a Microsoft Excel workbook of the data for Table 1.1a.i-1.](#)

³ The area figure for Commercial plantations used in *Australia's State of the Forests Report* is calculated from a rasterised (gridded) version of the National Plantation Inventory vector-format coverage used to produce the data reported in [Australian plantation statistics and log availability report 2021](#), and the area figures thus differ.

Figure 1.1a.i-1: Distribution of Australia's forests, by forest category



Source: ABARES, National Forest Inventory

[Click here for high-definition copy of Figure 1.1a.i-1.](#)

Native forest area by type

The Native forest category is dominated by Eucalypt (77% by area) and Acacia (8%) hardwood forest types (Table 1.1a.i-2). Callitris, the only native forest type dominated by coniferous (softwood) tree species, makes up 2% of native forests. The Rainforest forest type accounts for 3% of native forests, and includes tropical, subtropical, warm-temperate, cool-temperate and dry rainforests.

Table 1.1a.i-2: Australia's native forest area, by type and by jurisdiction

Forest type	Area ('000 ha)								
	ACT	NSW	NT	Qld	SA	Tas.	Vic.	WA	Australia
Acacia	0	681	1,472	5,188	96	79	37	3,342	10,895
Callitris	0	1,366	0	544	65	1	18	0.1	1,993
Casuarina	1	466	33	175	260	6	54	90	1,086
Eucalypt	129	15,665	19,410	35,382	4,341	2,537	7,240	16,378	101,081
Mangrove	0	8	392	493	19	0	3	196	1,110
Melaleuca	0	67	1,019	5,946	25	24	23	89	7,193
Other native forest	0.2	1,017	704	2,168	58	59	379	315	4,701
Rainforest	0	614	251	1,854	0	686	36	0.2	3,442
Total native forest	130	19,882	23,280	51,750	4,866	3,393	7,790	20,409	131,501

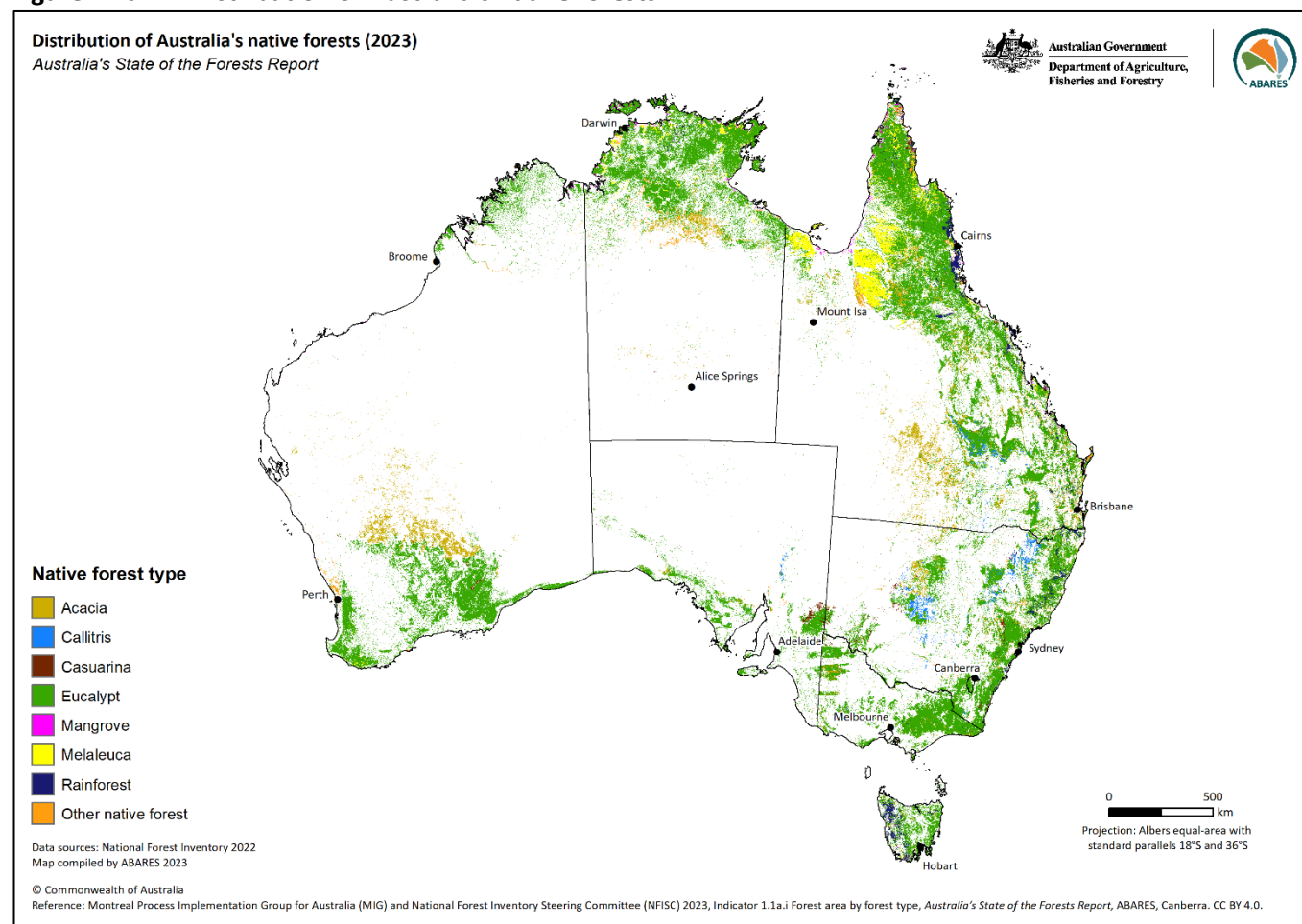
Totals may not tally due to rounding.

Other native forest comprises a range of minor forest types, including Agonis, Atalaya, Banksia, Hakea, Grevillea, Heterodendron, Leptospermum, Lophostemon and Syncarpia (each named after its dominant genus), as well as native forests where the type is unknown. Source: ABARES, National Forest Inventory.

[Click here for a Microsoft Excel workbook of the data for Table 1.1a.i-2.](#)

The geographic distribution of Australia's forests by forest type is shown in Figure 1.1a.i-2. Eucalypt forests dominate in all jurisdictions, and are most dominant in the Australian Capital Territory (99% of its native forest area) and least dominant in Queensland (68%). The largest areas of Eucalypt, Acacia, Melaleuca, Rainforest and Mangrove forest types occur in Queensland, and the largest areas of Callitris and Casuarina forest are in New South Wales. Rainforest does not occur in South Australia or the Australian Capital Territory at this scale of analysis.

Figure 1.1a.i-2: Distribution of Australia's native forests



Source: ABARES, National Forest Inventory.

[Click here for high-definition copy of Figure 1.1a.i-2.](#)

Native forest area by crown cover, height and form

Australia's native forests (98% of Australia's total forest area) are classified into nine structural classes based on three crown cover classes and three stand height classes (Table 1.1a.i-3a and Table 1.1a.i-3b).

The three native forest crown cover classes are:

- Woodland forest (93 million hectares, 71% of Australia's total forest area)
- Open forest (34 million hectares, 26% of Australia's total forest area)
- Closed forest (2.6 million hectares, 2% of Australia's total forest area).

Eucalypt forest types are the largest components of both Woodland and Open forests, while Rainforest is the largest component of Closed forest. Woodland forest is also the largest component of forest in all jurisdictions except Victoria and the Australian Capital Territory where Open forests dominate. Table 1.1a.i-3a and Table 1.1a.i-3b provide more data on the three crown cover classes.

The three stand height classes are Low, Medium and Tall. Separate area figures for height classes are less accurate than for crown cover, but are provided in Figure 1.1a.i-4 in [Supporting information for Indicator 1.1a.i.](#)

Eucalypt mallee forest also is separated as a distinct subtype within the Eucalypt forest type (see Table 1.1a.i-6 in [Supporting information for Indicator 1.1a.i.](#)).

The distribution of Australia's native forest types and structural classes varies across the continent (Figure 1.1a.i-3), depending on climate, soil type and fire history, and is related to soil moisture regimes and water availability, as well as land management practices.

- Woodland forests dominate drier areas, often inland.
- Open forests dominate higher rainfall regions located in the south-eastern, south-western and northern parts of the country.
- Closed forests are found in western Tasmania, north-eastern Queensland, north-eastern New South Wales, and coastal Northern Territory where rainfall is high.

Table 1.1a.i-3a: Australia's native forest area, by forest type and eucalypt crown cover class

Forest type	Area ('000 hectares)				
	Woodland forest	Open forest	Closed forest	Forest of unknown crown cover	Total
Acacia	9,546	1,274	76	0	10,895
Callitris	1,356	636	1	0	1,993
Casuarina	987	91	8	0	1,086
Eucalypt	74,966	25,993	122	0	101,081
Eucalypt low	17,338	1,420	22	0	18,780
Eucalypt medium	55,208	20,168	27	0	75,403
Eucalypt tall	2,419	4,405	74	0	6,898
Mangrove	280	359	353	118	1,110
Melaleuca	3,463	3,722	8	0	7,193
Rainforest	353	1,298	1,791	0	3,442
Other native forest	2,003	476	192	2,029	4,701
Total native forest	92,955	33,848	2,551	2,147	131,501
Area as proportion of total native forest area (%)	71	26	2	2	100

Totals may not tally due to rounding.

Source: ABARES, National Forest Inventory.

[Click here for a Microsoft Excel workbook of the data for Table 1.1a.i-3a.](#)

Table 1.1a.i-3b: Area of native forest, by crown cover class and jurisdiction

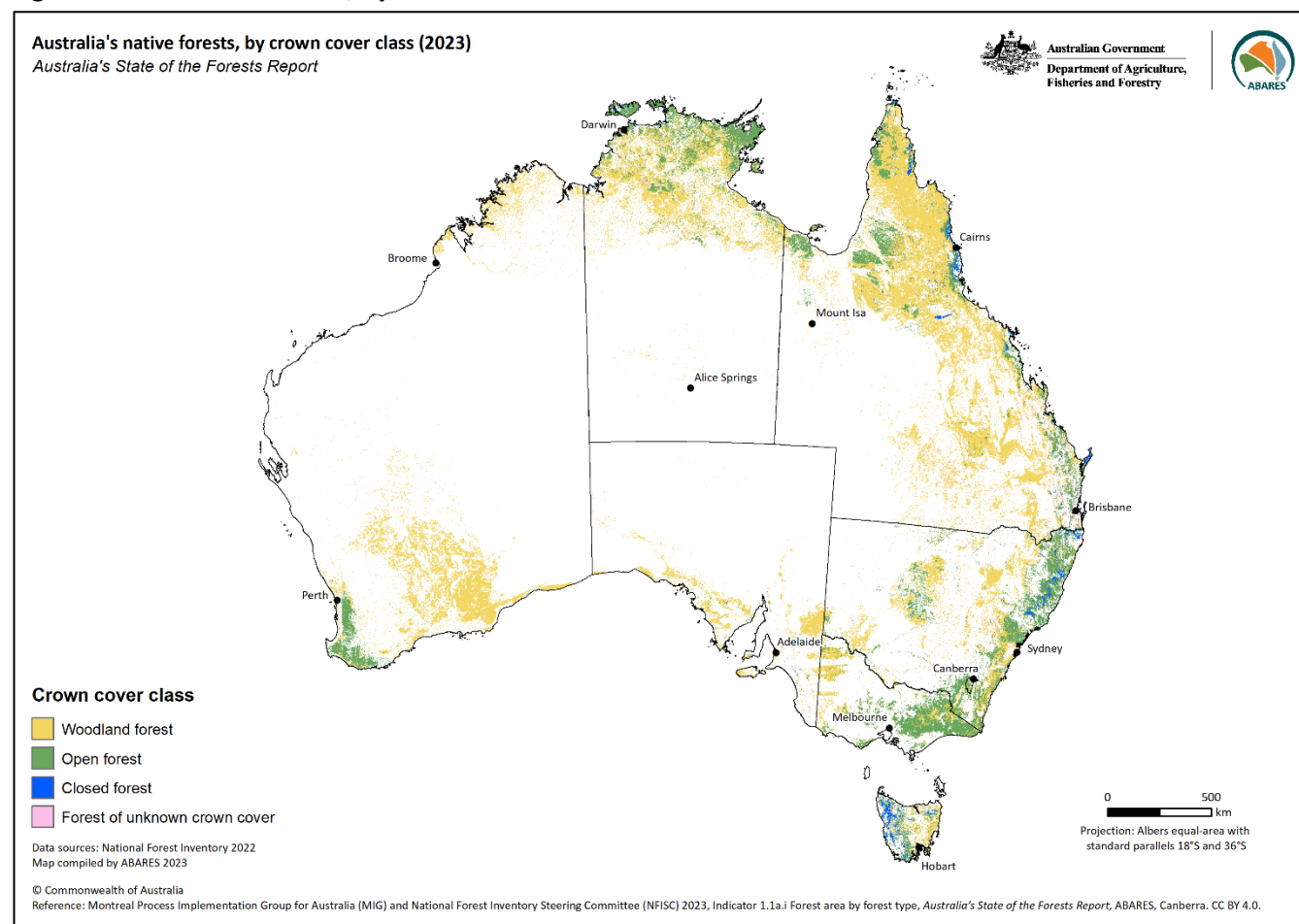
Jurisdiction	Area ('000 hectares) and proportion (%) of cover class									
	Woodland forest		Open forest		Closed forest		Unknown		Total native forest	
	Area	%	Area	%	Area	%	Area	%	Area	%
ACT	38	0.04	92	0.3	0	0	0.1	0.01	130	0.1
NSW	9,813	11	8,982	27	514	20	573	27	19,882	15
NT	15,304	16	7,420	22	399	16	158	7	23,280	18
Qld	40,973	44	8,531	25	1,014	40	1,233	57	51,750	39
SA	4,565	5	257	1	0	0	43	2	4,866	4
Tas.	1,479	2	1,305	4	609	24	0	0	3,393	3
Vic.	2,889	3	4,836	14	2	0	64	3	7,790	6
WA	17,894	19	2,425	7	14	1	76	4	20,409	16
Australia	92,956	100	33,848	100	2,551	100	2,147	100	131,501	100

Totals may not tally due to rounding.

Source: ABARES, National Forest Inventory.

[Click here for a Microsoft Excel workbook of the data for Table 1.1a.i-3b.](#)

Figure 1.1a.i-3: Native forest, by crown cover class



Source: ABARES, National Forest Inventory.

[Click here for high-definition copy of Figure 1.1a.i-3.](#)

Area of Commercial plantations and Other forest

Australia has 1.82 million hectares of Commercial plantations (1.4% of Australia's total forest area). This comprises (Table 1.1a.i-4):

- 1.06 million hectares of softwood plantations (58% of Commercial plantation area)
- 0.74 million hectares of hardwood plantations (41% of Commercial plantation area)
- 0.02 million hectares of unknown or mixed species commercial plantations (1% of Commercial plantation area).

Table 1.1a.i-4: Area of commercial plantation, by type and jurisdiction

Jurisdiction	Commercial plantation area ('000 hectares) and proportion (%) of plantation type							
	Softwood		Hardwood		Unknown or mixed species		Total	
	Area	%	Area	%	Area	%	Area	%
Australian Capital Territory	9	1	0.03	0	0	0	10	1
New South Wales	311	29	57	8	0.3	1	368	20
Northern Territory	2	0	45	6	0	0	47	3
Queensland	193	18	18	2	3	14	214	12
South Australia	130	12	46	6	0.1	0	176	10
Tasmania	81	8	203	27	4	18	288	16
Victoria	235	22	168	23	1	5	403	22
Western Australia	100	9	202	27	14	64	317	17
Australia	1,060	100	739	100	22	100	1,821	100

The area figure for Commercial plantations used in this update of *Australia's State of the Forest Report* is calculated from a rasterised (gridded) version of the National Plantation Inventory vector-format coverage used to produce the area data reported in [Australian plantation statistics and log availability report 2021](#). Conversion of the vector format to the 1-hectare raster format results in the area figure for Commercial plantations reported here (1.82 million hectares) being slightly higher than the area figure reported in [Australian plantation statistics and log availability report 2021](#) (1.77 million hectares).

Totals may not tally due to rounding.

Source: ABARES, National Forest Inventory, National Plantation Inventory.

[Click here for a Microsoft Excel workbook of the data for Table 1.1a.i-4.](#)

Commercial plantations are established in both temperate and tropical regions. Most commercial softwood plantations are in New South Wales (0.31 million hectares, 29% of Australia's total softwood plantation area), Victoria (0.24 million hectares, 22%) and Queensland (0.19 million hectares, 18%). Most commercial hardwood plantations are found in Tasmania and Western Australia (each with 0.20 million hectares and 27% of Australia's total hardwood plantation area) and Victoria (0.17 million hectares, 23%).

The Other forest category comprises 0.24 million hectares (0.2% of total forest area) (Table 1.1a.i-1). This category is dominated by plantations not reported as managed for commercial wood production, and so not listed as Commercial plantations in the National Plantation Inventory. It also contains environmental plantings, sandalwood plantations, and some smaller farm forestry and agroforestry plantations. South Australia has the largest area of Other forest (0.09 million hectares, 38% of the total Other forest area). All Other forest in the Northern Territory is sandalwood plantations.

The Commercial plantation category plus the planted proportion of the Other forest category comprise the 'Planted forests' category used by the Food and Agriculture Organization (FAO) of the United Nations for the five-yearly [Global Forest Resources Assessment](#).

Supporting information for Indicator 1.1a.i Forest area by forest type

Native forest crown cover and stand height classes

Australia's native forests are classified into nine structural classes (Figure 1.1a.i-4). The classification is based on:

- three crown cover classes:
 - Woodland forest, crown cover 20-50%
 - Open forest, crown cover >50-80%
 - Closed forest, crown cover >80-100%
- three stand height classes:
 - Low, height >2-10 metres
 - Medium, height >10-30 metres
 - Tall, height >30 metres.

These structural classes and their area proportions in native forest are shown in Figure 1.1a.i-4 (figures exclude the areas of Mangrove forest and Other native forest for which the height and/or cover class are unknown). Nationally, medium woodland forest is the most common native forest structural class (62 million hectares, 48% of total native forest area), followed by low woodland forest (28 million hectares, 22%). At 0.11 million hectares, tall closed forest has the smallest area proportion (0.1%).

Figure 1.1a.i-4: Native forest structural classes and area proportions, 2021



Percentages are area proportions of each height class/crown cover class combination in Australia's total native forest area, excluding areas of Mangrove forest and Other native forest for which height and cover class are unknown. In accordance with the definition of forest used for the National Forest Inventory, the crown cover values relate to existing or potential crown cover, and the height values relate to mature or potentially mature stand height.

Source: Adapted from a diagram in Australian Land Information Group and Carnahan JA (1990). *Atlas of Australian Resources, Vegetation*. Australian Government Publishing Service, Canberra.

The area of the Eucalypt forest type by height and cover classes is shown in Table 1.1a.i-5. Native forest type and crown cover are reasonably well measured across Australia, but only limited forest height information is collected outside forests in which wood is harvested.

Table 1.1a.i-5: Area of Eucalypt forest, by structural class and jurisdiction

Forest structural class	Area ('000 hectares)								
	ACT	NSW	NT	Qld	SA	Tas.	Vic.	WA	Australia
Eucalypt low woodland	0	2,519	3,867	1,406	3,906	59	1,103	4,479	17,338
Eucalypt low open	0	148	657	36	218	61	199	102	1,420
Eucalypt low closed	0	0.01	1	10	0	6	0	5	22
Eucalypt medium woodland	8	5,670	9,134	28,045	200	1,070	1,427	9,655	55,208
Eucalypt medium open	1	5,138	5,747	3,549	17	209	3,597	1,912	20,169
Eucalypt medium closed	0	1	4	22	0	0	0	0.2	27
Eucalypt tall woodland	30	29	0	2,099	0	259	0	2	2,419
Eucalypt tall open	91	2,086	0	216	0	874	916	222	4,405
Eucalypt tall closed	0	74	0	0	0	0	0	0.02	74
Total Eucalypt forest	129	15,665	19,410	35,382	4,341	2,537	7,240	16,378	101,081

Totals may not tally due to rounding.

Source: ABARES, National Forest Inventory, National Plantation Inventory.

[Click here for a Microsoft Excel workbook of the data for Table 1.1a.i-5.](#)

Eucalypt mallee forest also is separated as a distinct subtype within the Eucalypt forest type. The majority of Eucalypt mallee forest (9.1 million hectares, 87%) is low woodland, and is found predominantly in South Australia and Western Australia (see Table 1.1a.i-6).

Table 1.1a.i-6: Area of Eucalypt mallee forest, by structural class and jurisdiction

Forest structural class	Area ('000 hectares)								
	ACT	NSW	NT	Qld	SA	Tas.	Vic.	WA	Australia
Eucalypt mallee low woodland	0	855	0.4	0	3,749	0	1,091	3,372	9,067
Eucalypt mallee low open	0	2	0	0	211	0	199	1	412
Eucalypt mallee low closed	0	0	0	0	0	0	0	0	0
Eucalypt mallee medium woodland	0	778	0	0.3	0	0	49	3	830
Eucalypt mallee medium open	0	81	0	0	0	0	0	0	81
Eucalypt mallee medium closed	0	0	0	0	0	0	0	0	0
Eucalypt mallee tall woodland	0	27	0	0	0	0	0	0	27
Eucalypt mallee tall open	0	0	0	0	0	0	0	0	0
Eucalypt mallee tall closed	0	0	0	0	0	0	0	0	0
Eucalypt mallee total	0	1,742	0	0	3,960	0	1,339	3,376	10,418
Eucalypt non-mallee total	129	13,922	19,410	35,381	381	2,537	5,901	13,001	90,663
Eucalypt total	129	15,665	19,410	35,382	4,341	2,537	7,240	16,378	101,081

Totals may not tally due to rounding.

Source: ABARES, National Forest Inventory.

[Click here for a Microsoft Excel workbook of the data for Table 1.1a.i-6.](#)

Mapping forest for the 2023 update of forest area for Australia's State of the Forests Report

A Multiple Lines of Evidence (MLE) process was used by ABARES to examine and combine forest cover data from multiple sources to produce the [Forests of Australia \(2023\)](#) spatial dataset. Appropriate independent datasets were intersected using analytical spatial (GIS) software, to identify areas where datasets agree on the allocation of land as forest or on the allocation of land as non-forest. For areas for which the datasets disagree, allocation as forest or non-forest is made through an assessment of the accuracy and/or currency of individual datasets, through using ancillary data from the National Vegetation Information System (NVIS), and through validation with recent high-resolution aerial and satellite imagery. Validation also involves input from and checking by the relevant state and territory agencies. The product is a forest/non-forest binary raster (grid) at 100 metre resolution (each cell or pixel thus being 1 hectare in area).

Input datasets for the MLE process included forest cover data sourced from relevant state or territory agencies, forest cover data from other national programs and datasets such as the *National Greenhouse Accounts* (NGA), which produces the *National Greenhouse Gas Inventory* (NGGI), and the forest cover dataset [Forests of Australia \(2018\)](#) developed for reporting in [Australia's State of the Forests Report 2018](#) (Table 1.1a.i-7). The datasets all have different data dates, and the data date of the combined *Forests of Australia (2023)* dataset is taken as 2021. The publication date for this update is 2023.

Table 1.1a.i-7: Key MLE input datasets

Dataset	Description
Forests of Australia (2018)	<i>Forests of Australia (2018)</i> is the forest extent dataset that was used in <i>Australia's State of the Forests Report 2018</i> . It is a continental dataset of forest extent by national forest categories and types, and was developed by a Multiple Lines of Evidence process from multiple forest, vegetation and land cover spatial data inputs, including contributions from relevant Australian, state and territory government agencies and external sources.
State-wide Land and Tree Study (SLATS) Woody Extent (2018) - Queensland. Also known as Queensland Foliage Projective Cover (FPC) (2018).	The Queensland government SLATS method calculates Foliage Projective Cover (FPC) values from Sentinel-2 satellite images (and before 2018 used Landsat satellite Thematic Mapper™ and Enhanced Thematic Mapper Plus (ETM+) images). ABARES used an empirically derived relationship between FPC and crown-cover values (Scarath et al. 2008) to delineate the landscape into forest and non-forest areas (an FPC of 11% is approximately equivalent to a crown cover of 20%). The Sentinel-2 dataset is produced at 10 m × 10 m resolution, and is supported by on-ground validation. The dataset covers the whole of Queensland, and was developed to support land-clearance legislation and monitoring of change.
National Greenhouse Gas Inventory (2016 – 2020)	<p>The National Greenhouse Gas Inventory (NGGI) dataset is produced from Landsat satellite Thematic Mapper™, Enhanced Thematic Mapper Plus (ETM+) and Operational Land Image images for the Australian Government Department of the Climate Change, Energy, the Environment and Water (DCCEEW), and identifies woody vegetation of height or potential height greater than 2 metres, crown cover greater than 20%, and with a minimum patch size of 0.2 hectares. The dataset is compiled using time-series data since 1972, and is produced at a 25 m × 25 m resolution.</p> <p>The NGGI dataset used was developed by combining five annual layers (2016-2020, inclusive) from the <i>National forest and sparse woody vegetation data (Version 5.0)</i> (DISER 2021) spatial dataset produced using the algorithms for land-use change allocation developed for the <i>National Inventory Reports</i> (DISER 2020). The original 25 m resolution, three-class (forest, sparse woody and non-forest) dataset was resampled to a binary (forest and non-forest) 100 m raster by classifying as forest the 100 m pixels that had more than half their area as forest; the sparse woody and non-forest classes were combined into a non-forest class.</p>
NSW H_Woody_Fuzzy_2_Class	This dataset was developed to support New South Wales Natural Resources Commission's (NRC) Monitoring, Evaluation and Reporting Program and is based on the NGGI dataset produced by DCCEEW from Landsat data.

	NRC applied Fuzzy Logic and Probability modelling to the NGGI dataset to derive annual layers distinguishing between forest and non-forest at 25 m raster resolution. Each of five annual layers, 2015-2019, was resampled to a 100 m raster by classifying as forest the 100 m pixels that had more than half their area as forest as determined from 25 m pixels. The five annual layers were combined and every pixel in the combination that had been classified as forest in any year during 2015-2019 period was allocated as forest (and the balance non-forest). This approach was taken to prevent areas where the crown cover had reduced below 20%, through events such as fire, harvesting, drought or disease, from being incorrectly classified as non-forest.
National Plantation Inventory 2020 spatial dataset	National Plantation Inventory (NPI) data as at 2020 were used to identify the area of Commercial plantations (Legg et al. 2021). The associated spatial vector dataset was converted to a raster format before being integrated with the Multiple Lines of Evidence forest cover raster dataset.
Qld 2016–17, 2017-18, and 2019 Land Clearing datasets	These annual datasets are produced by the Queensland government for the purposes of tracking vegetation clearing in the state, and were used by ABARES to identify and classify as non-forest cleared areas that would otherwise have been incorrectly mapped as forest in <i>Forests of Australia (2023)</i> .
NSW 2017-18, 2018-19 and 2019-20 Woody vegetation clearing datasets	These annual datasets are produced by the New South Wales government for the purposes of tracking vegetation clearing in the state, and were used by ABARES to identify and classify as non-forest cleared areas that would otherwise have been incorrectly mapped as forest in <i>Forests of Australia (2023)</i> .
Tasmania Forest Communities with NVIS Groups 2020 dataset	This statewide forest cover dataset was provided by the Tasmanian government for use in SOFR 2023. The vector (shapefile) dataset distinguishes between forest and non-forest polygons, with the forest polygons further attributed with relevant forest communities, including the dominant tree species. The dataset also includes attributes of vegetation community codes, source data and a National Vegetation Information System attribute that describes high-level forest structure.
Victorian Land Cover (2015-19)	The Victorian Department of Environment, Land, Water and Planning recommended allocating as forest the following cover types from the Victorian Land Cover (2015-19) dataset: <ul style="list-style-type: none"> - Treed native vegetation - Conifer plantation - Hardwood plantation - Mangrove vegetation - Perennial wetland
Global Mangrove Watch (2018)	The Global Mangrove Watch dataset is based on ALOS PALSAR and Landsat imagery, and provides geospatial information about mangrove extent and changes. Geoscience Australia is a collaborator of the GMW project through the Digital Earth Australia project (Bunting et al. 2018; Thomas et al. 2017).
Land Use Mapping Project (LUMP) of the Northern Territory (2016 – 2022)	The LUMP dataset (DEPWS 2020) maps land use in the Northern Territory using the national classification scheme developed by the Australian Collaborative Land Use and Management Program (ACLUMP). The dataset was used to identify and map sandalwood plantations in <i>Forests of Australia (2023)</i> .
National Vegetation Information System (NVIS) 6.0 (2020)	The NVIS dataset contains detailed vegetation descriptions in 6 hierarchal classes, Level 1-6, based on structural and floristic information including dominant genus, growth form, height and cover. Level 6 (VI) Sub-Association (sub-stratum) growth form, height and cover information was used to identify mapped areas that fulfilled the definition of forest (growth form = tree, potential height \geq 2 m and potential crown cover = 20%).
Catchment Scale Land Use Mapping (CLUM) 2020 land-use mask	The CLUM dataset (ABARES 2020) was used as land-use mask to exclude from the Multiple Lines of Evidence forest cover dataset land uses deemed to be not suitable to carry forests, for example urban residential, industrial, mining, horticulture and intensive agriculture.
Google Earth Pro, Bing Maps and World Imagery by ESRI	The most recent high-resolution imagery from Google Earth Pro, Bing Maps and World Imagery by ESRI were used for validation of forest and non-forest allocation in areas where confidence in other datasets was low.

Attribution of the Forests of Australia (2023) dataset

Each forest pixel (cell) in the [Forests of Australia \(2023\)](#) dataset was given a number of attributes, including for forest type, tenure, height and canopy cover (Table 1.1a.i-8).

Table 1.1a.i-8: Data sources for attribution of forest areas

Parameter	Data sources (ordered by priority)	Notes
Forest type	<ul style="list-style-type: none"> • NPI 2020, then • Land Use Mapping Project of the Northern Territory (LUMP), 2016-2022 • Tasmania Forest Communities with NVIS Groups 2020, then • NVIS 6.0, then • <i>Forests of Australia (2018)</i> 	<p>A hierarchical approach was used to derive and allocate National Forest Inventory (NFI) forest types to the NFI 2021 forest cover dataset in the following order:</p> <ol style="list-style-type: none"> 1. the NPI 2021 spatial dataset was used to allocate types to Commercial plantations 2. the NT LUMP 2016-2022 dataset was used to allocate sandalwood plantations in the Northern Territory to 'Other forest' 3. native forest types were then allocated: <ul style="list-style-type: none"> – Tasmania, from <i>Tasmania Forest Communities with NVIS Groups 2020</i> – ACT, from <i>Forests of Australia (2018)</i> – for all other states and territories, from Major Vegetation Subgroup (MVS), Major Vegetation Group (MVG), Level V and Level VI categories of the NVIS 6.0 dataset. 4. where forest types could not be allocated from the above sources, forest types used in <i>Forests of Australia (2018)</i> were allocated 5. any remaining native forest areas not allocated a forest type were allocated as "Other native forest". Planted forest areas not allocated a type were allocated as "Other forest".
Forest tenure	<ul style="list-style-type: none"> • Jurisdictional land tenure datasets from relevant land titles registries and spatial data agencies, then • National land tenure data from PSMA Australia Limited (2019), then • <i>Tenure of Australia's Forests (2018)</i>, as used for SOFR 2018. 	<p>The process to allocate tenure categories to the NFI 2021 dataset used a combination of national tenure information from PSMA, and data from all jurisdictions. Data sources used for each jurisdiction were prioritised based on the assessed accuracy of each dataset.</p>
Forest height and cover	<ul style="list-style-type: none"> • NVIS 6.0, then • Tasmania Forest Communities with NVIS Groups 2020, then • <i>Forests of Australia (2018)</i>. 	

NFI, National Forest Inventory; NPI, National Plantation Inventory; NVIS, National Vegetation Information System; PSMA, PSMA Australia Ltd (now trading as Geoscape Australia).

Differences between the forest area reported in SOFR 2018 and the 2023 forest area update

This section outlines methodological reasons why the forest areas reported in this 2023 update of the forest area for *Australia's State of the Forests Report* (SOFR) differ from the forest areas reported in [Australia's State of the Forests Report 2018](#). The areas reported in this 2023 update of forest area are drawn from the [Forests of Australia \(2023\)](#) dataset, whereas the areas reported in *Australia's State of the Forests Report 2018* were drawn from the *Forests of Australia (2018)* dataset. Regular methodological updates mean that differences in reported

areas between successive SOFRs do not necessarily reflect actual, on-ground change in forest area. Measurement of the actual, on-ground change in forest area over time uses a different approach (see [Indicator 1.1a.iv – Forest area change over time](#)).

Continual improvement in measuring the extent of Australia's forests, and in the reporting of forest area, has occurred since national figures were first reported in 1974 (Forwood 1975). Australia's reported forest area has fluctuated between 105 million hectares and 164 million hectares since that date, but these historic fluctuations in reported areas did not represent actual changes in on-ground forest cover. Instead, they were generally due to a combination of:

- changes in the area basis reported (from only commercial forests to all forests)
- changes prior to 1998 in the definition of forest
- variability in state and territory data
- correction of mapping errors
- the progressive incorporation of a variety of remotely sensed datasets, and
- recent validation with high-resolution aerial and satellite imagery.

Australia's total forest area of 133.6 million hectares calculated as at 2021 from the *Forests of Australia (2023)* dataset, and reported in this 2023 update of forest area, differs by only 0.4% from the total forest area as at 2016 calculated from the [Forests of Australia \(2018\)](#) dataset and reported in SOFR 2018. The small difference, and the larger differences in the detailed mapping that underpins it, mostly reflect the incorporation of new and updated data provided by states and territories, delivered as a result of technological advances. A greater coverage of recent, high-resolution imagery for validation also facilitated the reclassification of some areas from forest to non-forest, and other areas from non-forest to forest.

Differences in forest area

Australia's total forest area calculated from the *Forests of Australia (2023)* dataset and reported in this 2023 update of forest area is 133.6 million hectares. This is 476 thousand hectares (0.4%) less than the forest area calculated from the *Forests of Australia (2018)* dataset and reported in SOFR 2018 (Table 1.1a.i-9). This net decrease is the sum of

- 3.58 million hectares now identified as forest that was identified as non-forest in the *Forests of Australia (2018)* dataset, and
- 4.06 million hectares that was identified as forest in the *Forests of Australia (2018)* dataset but that is now identified as non-forest in the *Forests of Australia (2023)* dataset.

Most of these differences do not reflect actual, on-ground changes of forest area, but instead reflect improved data accuracy and improved coverage of the high-resolution aerial and satellite imagery used for validation.

The area identified as forest in the *Forests of Australia (2023)* dataset is smaller than the area identified as forest in the *Forests of Australia (2018)* dataset in the Northern Territory (402 thousand hectares, 1.7% of the jurisdiction's forest area) and Western Australia (215 thousand hectares, 1.0%), and is larger than the area identified as forest in the *Forests of Australia (2018)* dataset in Queensland (146 thousand hectares, 0.3%) and South Australia (71 thousand hectares, 1.4%).

Table 1.1a.i-9: Forest area differences between the *Forests of Australia (2018)* dataset reported in SOFR 2018 and the *Forests of Australia (2023)* dataset reported in this 2023 update of forest area

Jurisdiction	Area ('000 hectares) and proportion (%) of <i>Forests of Australia (2023)</i> area						
					Non-forest in <i>Forests of Australia (2018)</i> but forest in <i>Forests of Australia (2023)</i>	Forest in <i>Forests of Australia (2018)</i> but non-forest in <i>Forests of Australia (2023)</i>	Forest in both <i>Forests of Australia (2018)</i> and <i>Forests of Australia (2023)</i>
	<i>Forests of Australia (2018)</i> ¹	<i>Forests of Australia (2023)</i> ²	Difference				
	Area	Area	Area	(%)	Area	Area	Area
Australian Capital Territory	142	143	1	0.4	1	0	142
New South Wales	20,368	20,284	-83	-0.4	324	407	19,960
Northern Territory	23,735	23,333	-402	-1.7	396	798	22,937
Queensland	51,830	51,977	146	0.3	1,903	1,757	50,074
South Australia	5,060	5,131	71	1.4	119	47	5,012
Tasmania	3,699	3,707	9	0.2	150	142	3,557
Victoria	8,222	8,224	2	0.0	148	147	8,075
Western Australia	20,981	20,766	-215	-1.0	544	759	20,222
Australia	134,037	133,565	-476	-0.4	3,585	4,057	129,980

Totals may not tally due to rounding.

¹Data from the *Forests of Australia (2018)* dataset were reported in *Australia's State of the Forests Report 2018*.

²Data from the *Forests of Australia (2023)* dataset are reported in this 2023 update of forest cover for *Australia's State of the Forests Report*.

Source: ABARES, National Forest Inventory, National Plantation Inventory.

[Click here for a Microsoft Excel workbook of the data for Table 1.1a-9.](#)

Nationally, the area identified consistently as forest, that is, in both the *Forests of Australia (2018)* dataset and the *Forests of Australia (2023)* dataset, was 130 million hectares (97% of the total forest area in either dataset). Furthermore, in all jurisdictions, at least 96% of the area identified as forest in the *Forests of Australia (2023)* dataset has also been identified as forest in the *Forests of Australia (2018)* dataset. These results give a high level of confidence in the areas classified as forest by the Multiple Lines of Evidence (MLE) process, and demonstrate the improved consistency that the MLE methodology has brought to the mapping of Australia's forest extent.

Datasets driving increased accuracy of forest area determination

The largest area identified as forest in the [Forests of Australia \(2023\)](#) dataset that was identified as non-forest in the [Forests of Australia \(2018\)](#) dataset is in Queensland (1.9 million hectares). The largest area identified as non-forest in the *Forests of Australia (2023)* dataset that was identified as forest in the *Forests of Australia (2018)* dataset is also in Queensland (1.8 million hectares). These changes result from the Queensland Statewide Landcover and Trees Study (SLATS) process using Sentinel 2 satellite data at 10 m resolution instead of Landsat satellite data at 30 m resolution to derive Queensland's Foliage Projective Cover (FPC) dataset, a key input into the Multiple Lines of Evidence (MLE) process; and from the use of 1 m resolution imagery from Earth-1 to restrict the SLATS coverage to areas with tree cover. Improved coverage of high-resolution imagery for validation (Google EarthPro, Bing Maps and ESRI World Imagery) and the new NVIS 6.0 dataset also enabled better classification in Queensland.

Classification changes, also driven by new data, exist in other jurisdictions, notably Western Australia and the Northern Territory. In both these jurisdictions, the new Global Mangrove Watch (2018) dataset identified mangrove forest not previously identified. Other validation by these jurisdictions enabled identification of non-

forest areas incorrectly identified as forest in the *Forests of Australia (2018)* dataset. The Northern Territory Department of Environment, Parks and Water Security provided an unpublished dataset with boundaries of treeless plains, which were used to reclassify as non-forest areas of shrublands and low open woodlands that were previously classified as forest (Figure 1.1a.i-5) (Emberg et al. 2023).

Figure 1.1a.i-5: Stunted *Eucalyptus tetrodonta* vegetation on Groote Island (Northern Territory) reclassified from forest to non-forest based on new information.

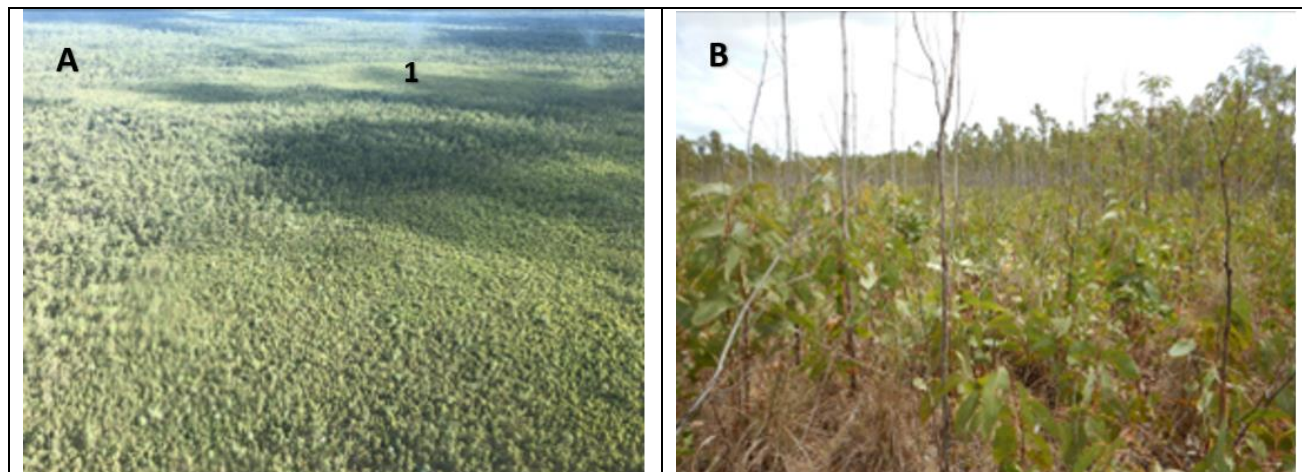


Image B shows the stunted *Eucalyptus tetrodonta* in area 1 of image A. Images provided by Northern Territory Department of Environment, Parks and Water Security

Significant revisions of the NVIS 5.1 dataset occurred between 2016 and 2019, with production of NVIS 6.0. This included reattribution of Major and Sub-Major Vegetation Groups in many areas across multiple states, and updates to the spatial boundaries of some NVIS polygons, which with improved coverage of high-resolution imagery for validation supported reclassification of many areas.

For the *Forests of Australia (2018)* dataset, the 2015 annual spatial layer of the National Greenhouse Gas Inventory (NGGI) dataset was used as an input into the MLE process. For the *Forests of Australia (2023)* dataset, five annual NGGI layers (2016 to 2020 inclusive) were combined to form a single input. This allowed retention of disturbed forest areas where canopy cover had temporarily reduced below 20%, and enabled identification of forest areas previously incorrectly identified as non-forest.

Woody vegetation clearing data for 2017-20 from the Statewide Landcover and Trees Study (SLATS) programs in Queensland and New South Wales was separated into areas of forest cleared by activities associated with a land-use change (e.g. urban development, pasture or mining), which were re-reclassified as non-forest, and areas where canopy cover loss was temporary (e.g. forest harvesting or thinning), which were retained as forest.

It was more difficult to identify areas classified as non-forest in the *Forests of Australia (2018)* dataset but that are now classified in the *Forests of Australia (2023)* dataset as forest due to regrowth or forest expansion. This is because transitions from non-forest to forest are generally gradual, whereas transitions from forest to non-forest are generally abrupt.

Reallocation of forest to non-forest due to new data and improved imagery

The examples provided in Figures 1.1a.i-6 and 1.1a.i-7 show areas classified as forest in the *Forests of Australia (2018)* dataset but reallocated as non-forest in the *Forests of Australia (2023)* dataset due to new data and improved coverage of high-resolution imagery for validation. They do not relate to actual on-ground change in forest cover.

Reallocation as non-forest of areas incorrectly classified as forest in the [Forests of Australia \(2018\)](#) dataset occurred for naturally treeless landscapes (heathlands, shrublands and grasslands) including: Grevillea heathlands on Cape York (Figure 1.1a.i-6); Acacia shrublands in central Queensland (Figure 1.1a.i-7); treeless plains of the Northern Territory (Figure 1.1a.i-5 above); and hummock grasslands on sandstone peninsulas in the King Leopold Ranges in Western Australia.

Figure 1.1a.i-6: Example of an area classified as forest in the *Forests of Australia (2018)* dataset but as non-forest in the *Forests of Australia (2023)* dataset due to better floristics information and high-resolution imagery. Cape York, northern Queensland. Individual green and pink squares on images B and C have an area of 1 hectare (100 m x 100 m).



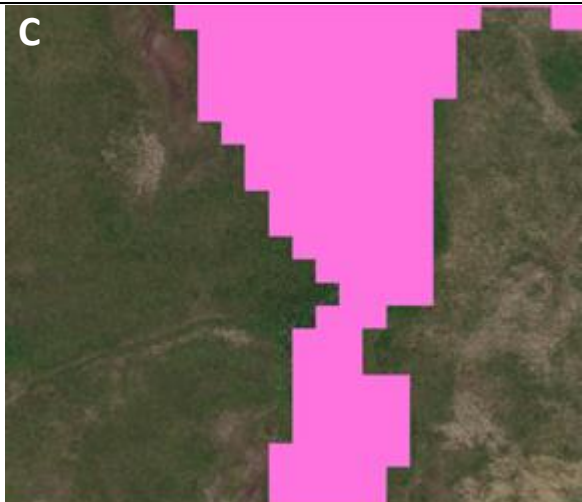


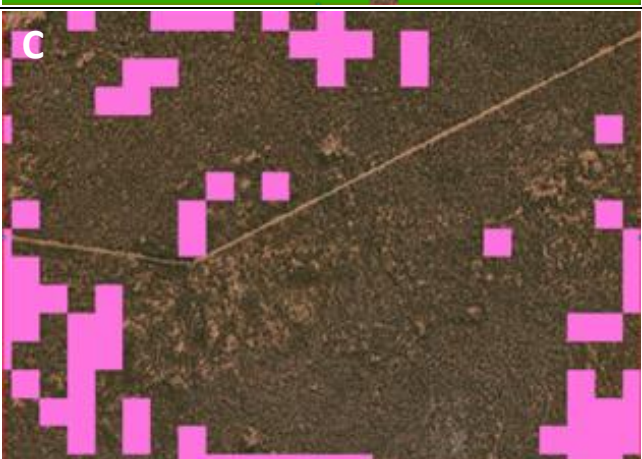
<p>A</p> 	<p>A High-resolution Google EarthPro imagery (2017).</p> <p>The updated NVIS 6.0 Major Vegetation Subgroups (MVS) for this area are ‘Heathlands’ on the left and right areas of the image and ‘Other forests and woodlands’ along the centre of the image and along the river.</p>
<p>B</p> 	<p>B Green area was classified as forest in the <i>Forests of Australia (2018)</i> dataset.</p> <p>Large areas of heathland (dominated by <i>Grevillea glauca</i>, <i>Melaleuca viridiflora</i> and <i>G. pteridifolia</i>) were incorrectly classified as forest in the <i>Forests of Australia (2018)</i> dataset.</p>
<p>C</p> 	<p>C Pink area now classified as forest in the <i>Forests of Australia (2023)</i> dataset. Background is 2021 imagery from ESRI World Imagery.</p> <p>The updated NVIS MVS for the non-coloured areas is ‘Heathlands’ and upper stratum tree height code is ‘6’ indicating a height range of 2-10 m, and cover code is ‘bi’ indicating tree crown cover range of 0–0.25%. The tree crown cover is consistent with allocation of the area as non-forest, validated by imagery.</p> <p>The updated NVIS 6.0 MVS for the pink areas is ‘Other forests and woodland’.</p>

Figure 1.1a.i-7: Example of an area classified as forest in the *Forests of Australia (2018)* dataset but as non-forest in the *Forests of Australia (2023)* dataset due to better floristics information. Jundah, central Queensland. Individual mid-green and pale-green squares on images **B** and **C** have an area of 1 hectare (100 m x 100 m).

	<p>A High-resolution Google EarthPro imagery (2020).</p> <p>The updated NVIS Major Vegetation Subgroups (MVS) for this area are ‘Acacia shrublands’, a non-forest vegetation type. Upper stratum has <i>Eucalyptus populnea</i> and <i>Grevillea striata</i> as emergents.</p>
	<p>B Green area classified as forest in the <i>Forests of Australia (2018)</i> dataset.</p> <p>Most of the area is described in the updated NVIS 6.0 MVS as ‘Acacia shrublands’.</p>
	<p>C Only pink squares are now classified as forest in <i>Forests of Australia (2023)</i> dataset. Background is 2021 imagery from ESRI World Imagery.</p> <p>The upper stratum tree height code for the non-coloured areas is ‘6’ indicating a height range of 2–10 m. However, the cover code is ‘bi’ indicating a crown cover range of 0–0.25% or non-forest.</p>

Reallocation of non-forest to forest due to new data and improved imagery

The examples provided in Figures 1.1a.i-8, 1.1a.i-9 and 1.1a.i-10 show areas classified as non-forest in the [Forests of Australia \(2018\)](#) dataset but reallocated as forest in the [Forests of Australia \(2023\)](#) dataset due to new data and improved coverage of high-resolution imagery for validation. They do not relate to actual on-ground change in forest cover.

The examples are from different ecosystems including woodland, rainforest and mangrove forests.

Figure 1.1a.i-8: Example of an area classified as non-forest in the *Forests of Australia (2018)* dataset but as forest in the *Forests of Australia (2023)* dataset due to new datasets and high-resolution imagery. South of Croydon, northern Queensland. Individual green and pink squares on images **B and **C** have an area of 1 hectare (100 m x 100 m).**



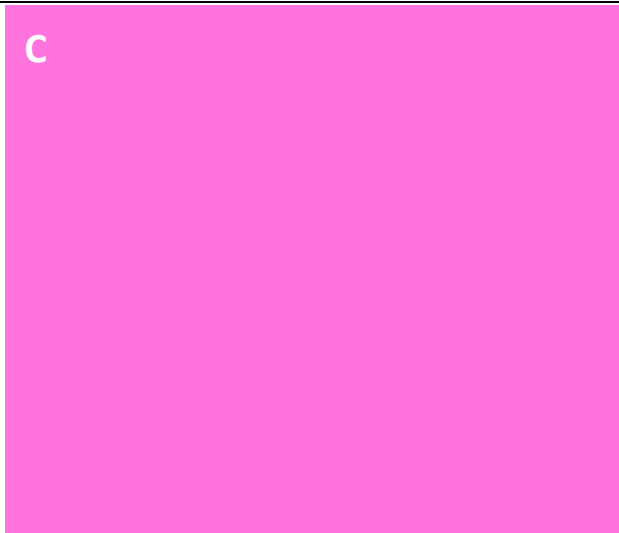
<p>A</p> 	<p>A High-resolution Google EarthPro imagery (2020).</p> <p>The updated NVIS Major Vegetation Subgroup (MVS) for this area is ‘Melaleuca open forests and woodlands’. The upper stratum tree height code is ‘7’ indicating a height range of 10–30 m, and cover code is ‘i’ indicating a tree crown cover range of 20–50%. The crown cover is consistent with allocation of the area as forest, validated by imagery.</p>
<p>B</p> 	<p>B Green area classified as forest in the <i>Forests of Australia (2018)</i> dataset. Background is 2021 imagery from ESRI World Imagery.</p> <p>Areas of ‘Melaleuca open forests and woodlands’ are incorrectly classified as non-forest in the <i>Forests of Australia (2018)</i> dataset.</p>
<p>C</p> 	<p>C All the area, pink, classified as forest in the <i>Forests of Australia (2023)</i> dataset.</p> <p>The updated NVIS Major Vegetation Subgroup (MVS) for the pink areas is Melaleuca open forests and woodlands’ and the upper stratum tree height code is ‘7’ indicating a height range of 10–30 m, and cover code is ‘i’ indicating a tree crown cover range of 20–50%. The crown cover is consistent with allocation of the area as forest.</p>

Figure 1.1a.i-9: Example of an area classified as non-forest in the *Forests of Australia (2018)* dataset but as forest in the *Forests of Australia (2023)* dataset due to new datasets and high-resolution imagery. North of Corinna, western Tasmania. Individual green and pink squares on images B and C have an area of 1 hectare (100 m x 100 m).



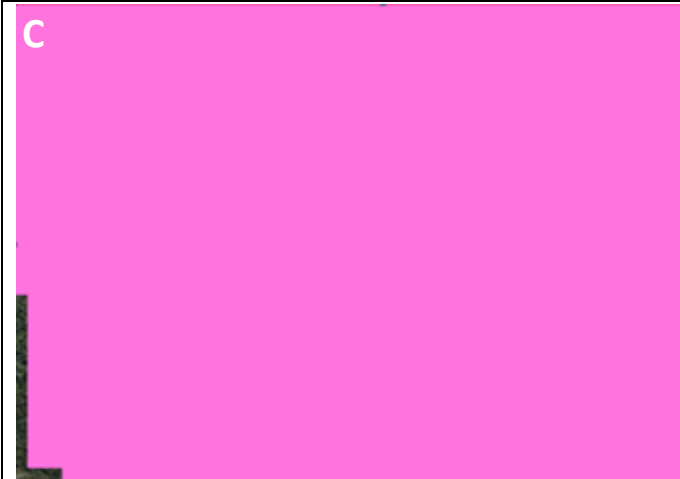



<p>A</p> 	<p>A) High-resolution Google EarthPro imagery (2022).</p> <p>The updated NVIS Major Vegetation Subgroups (MVSs) for this area include 'Cool temperate rainforest' and 'Eucalypt tall open forests'. The upper strata tree height codes are '7' and '8' indicating a height range of 10–30 m and greater than 30 m, and cover codes are 'd' and 'c' indicating a crown cover ranges of 50–70% and greater than 70%.</p>
<p>B</p> 	<p>B) Green squares classified as forest in the <i>Forests of Australia (2018)</i> dataset. Background is 2021 imagery from ESRI World Imagery.</p> <p>Areas of 'Cool rainforest' and 'Eucalypt tall open forests' incorrectly classified as non-forest in the <i>Forests of Australia (2018)</i> dataset.</p>
<p>C</p> 	<p>C) All the area, pink, classified as forest in the <i>Forests of Australia (2023)</i> dataset.</p> <p>Areas of 'Cool rainforest' and 'Eucalypt tall open forests' correctly classified as forest in the <i>Forests of Australia (2023)</i> dataset.</p>

Figure 1.1a.i-10: Example of an area classified as non-forest in the *Forests of Australia (2018)* dataset but as forest in the *Forests of Australia (2023)* dataset due to better new datasets and high-resolution imagery. Derby, Western Australia. Individual green and pink squares on images **B** and **C** have an area of 1 hectare (100 m x 100 m).

	<p>A) High-resolution Google EarthPro imagery (2018).</p> <p>NVIS Major Vegetation Subgroup (MVS) attributes areas labelled 1 as 'Unknown'. However, these areas are mapped as mangrove forest by the Global Mangrove Watch (2018) dataset and this allocation is supported by the high-resolution imagery.</p>
	<p>B) Green squares, areas classified as forest in the <i>Forests of Australia (2018)</i> dataset. Background is 2021 imagery from ESRI World Imagery.</p> <p>Area 1 in image A) is mangrove forest incorrectly classified as non-forest in the <i>Forests of Australia (2018)</i> dataset.</p>
	<p>C) Pink squares, areas classified as forest in the <i>Forests of Australia (2023)</i> dataset. Background is 2021 imagery from ESRI World Imagery.</p> <p>Mangrove forest previously classified as non-forest in the <i>Forests of Australia (2018)</i> dataset is correctly classified as forest in the <i>Forests of Australia (2023)</i> dataset.</p>

References

- ABARES (2020). *Catchment Scale Land Use of Australia – Update December 2020*. Australian Bureau of Agriculture and Resource Economics and Sciences, Canberra CC By 4.0. doi.org/10.25814/aqjw-rq15
- Australian Land Information Group and Carnahan JA (1990). *Atlas of Australian Resources, Vegetation*. Australian Government Publishing Service, Canberra.
- Bunting P, Rosenqvist A, Lucas RM, Rebelo L-M, Hilarides L, Thomas N, Hardy A, Itoh T, Shimada M, Finlayson CM (2018). The Global Mangrove Watch—A New 2010 Global Baseline of Mangrove Extent, *Remote Sensing*, 10(10), 1669. doi.org/10.3390/rs10101669
- Department of Environment, Parks and Water Security (DEPWS) (2020). [Land Use Mapping Project of the Northern Territory, 2016 - 2022 \(LUMP\) - Dataset - NTG Open Data Portal](#). Northern Territory government, Darwin, CC By 4.0.
- Department of Industry, Science, Energy and Resources (DISER) (2020). *National Inventory Report 2020*. Commonwealth of Australia, CCBY 4.0 dcceew.gov.au/climate-change/publications/national-inventory-report-2020
- Department of Industry, Science, Energy and Resources (DISER) (2021). *National forest and sparse woody vegetation data*. Version 5.0. Commonwealth of Australia, Canberra CC By 4.0 data.gov.au/data/dataset/national-forest-and-sparse-woody-vegetation-data-version-5-2020-release
- Emberg J, Petursson J, May R (2023). *Land Resources of Groote Eylandt* (in prep).
- Forwood (1975). Report on the forestry and wood-based industries development conference 1974. Australian Forestry Council, Canberra.
- Legg P, Frakes I, Gavran M (2021). [Australian plantation statistics and log availability report 2021](#). ABARES research report. doi.org/10.25814/xj7c-p829
- Scarth P, Armston J, Danaher T (2008). On the relationship between crown cover, foliage projective cover and leaf area index. *Proceedings of the 14th Australian Remote Sensing and Photogrammetry Conference, 29 September – 3 October 2008, Darwin*.
- Thomas N, Lucas R, Bunting P, Hardy A, Rosenqvist A, Simard M (2017). Distribution and drivers of global mangrove forest change, 1996–2010. *PLoS ONE* 12(6): e0179302. doi.org/10.1371/journal.pone.0179302

More information

Learn more about the [Criterion 1 of Australia's State of the Forest Report](#).

Web agriculture.gov.au/abares/forestsaustralia/sofr/

Download a [Microsoft Excel workbook of the data presented in Indicator 1.1a.i](#).

Email Info.ABARES@aff.gov.au

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.

© Commonwealth of Australia 2023

Unless otherwise noted, copyright (and any other intellectual property rights) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

All material in this publication is licensed under a [Creative Commons Attribution 4.0 International Licence](#) except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Citation and cataloguing data

This publication (and any material sourced from it) should be attributed as Montreal Process Implementation Group for Australia (MIG) and National Forest Inventory Steering Committee (NFISC) 2023, Indicator 1.1a.i Forest area by forest type, *Australia's State of the Forests Report*. Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, December. CC BY 4.0.

The Australian Government acting through the Department of Agriculture, Fisheries and Forestry, represented by the Australian Bureau of Agricultural and Resource Economics and Sciences, has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Agriculture, Fisheries and Forestry, ABARES, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.