



Australian Government



Tasmanian
Government

**Further assessment of
matters under the *Regional
Forest Agreements Act 2002*
(Cth) relating to the 2017
variation of the Tasmanian
Regional Forest Agreement**

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Introduction

The process to develop the Tasmanian Regional Forest Agreement began in January 1996 with the signing of the Scoping Agreement for a Tasmanian Regional Forest Agreement between the Commonwealth of Australia and the State of Tasmania (scoping agreement) (Commonwealth of Australia and State of Tasmania 1996). Under the scoping agreement, both governments made a commitment to jointly undertake regional assessments of the following matters: biodiversity, old growth, wilderness and wild rivers, endangered species, National Estate values, World Heritage values, Indigenous heritage values, social values, economic values and industry development opportunities of forested areas and ecologically sustainable management.

These matters were subsequently incorporated into paragraph (a) of the definition of 'Regional Forest Agreement' or 'RFA' in section 4 of the *Regional Forest Agreements Act 2002* (Cth). The full definition of an RFA is as follows:

RFA or Regional Forest Agreement means an agreement that is in force between the Commonwealth and a State in respect of a region or regions, being an agreement that satisfies all the following conditions:

- a) the agreement was entered into having regard to assessments of the following matters that are relevant to the region or regions:
 - i. environmental values, including old growth, wilderness, endangered species, national estate values and world heritage values;*
 - ii. indigenous heritage values;*
 - iii. economic values of forested areas and forest industries;*
 - iv. social values (including community needs);*
 - v. principles of ecologically sustainable management.**
- b) the agreement provides for a comprehensive, adequate and representative reserve system;*
- c) the agreement provides for the ecologically sustainable management and use of forested areas in the region or regions;*
- d) the agreement is expressed to be for the purpose of providing long-term stability of forests and forest industries;*
- e) the agreement is expressed to be a Regional Forest Agreement.*

With the Tasmanian Regional Forest Agreement due to expire in November 2017, the Australian and Tasmanian governments committed to extend the agreement for 20 years from its current expiry date.

The parties are committed that the RFA, as varied, will continue to provide for a comprehensive, adequate and representative reserve system, and for the ecologically sustainable management and use of forested areas in the region. The parties are also committed to ensuring that the extended RFA will be expressed to be for the purposes of providing long-term stability of forests and forest industries and will be referred to as a Regional Forest Agreement.

As noted above, assessments of those matters which are listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* were initially undertaken prior to entering into the RFA through the Comprehensive Regional Assessment process that preceded the signing of the Tasmanian Regional Forest Agreement in November 1997. Paragraph C of the Recitals in the Tasmanian Regional Forest Agreement specifically refers to the agreement being entered into having regard to 'studies and projects carried out in relation to all of the following matters relevant to the Tasmania Region' and it lists exactly the matters referred to in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth).

The purpose of this report is to provide an update on the matters listed in para (a) of the definition of the RFA in order to support the decision by the parties to enter into the proposed variation and extension of the RFA. This assessment considers the likely applicability of the findings of the 1997 assessments to the proposed extension to the term of the RFA, the current status of the values based on additional information derived from various sources published since the governments entered into the agreement, and the likely impact on those values of the proposed extension of the Tasmanian Regional Forest Agreement. This document summarises the above consideration by reference to each of the listed matters.

For the purposes of this report, 'ecologically sustainable management' in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth) is taken to be synonymous with Ecologically Sustainable Forest Management as used in the Tasmanian Regional Forest Agreement. Tasmania, and Australia, use the internationally-agreed Montréal Process Criteria and Indicators for reporting on sustainable forest management. The Montréal Process Criteria and Indicators were agreed to be the framework for reporting on sustainability (refer to clause 91 of the current Tasmanian Regional Forest Agreement) in the Tasmanian Regional Forest Agreement and the state uses the system to produce the statutory *State of the Forests Tasmania Report* series. The framework for Ecologically Sustainable Forest Management covers all of the matters listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth), and therefore provides the performance criteria for the assessment in this report.

All of the evaluation processes and reviews described in this report were commissioned through statutory or other governmental process. The outcomes and findings of all of the processes have been considered through the formal, independent five-yearly reviews of the Tasmanian Regional Forest Agreement undertaken jointly by the Australian and Tasmanian governments.

The Australian and Tasmanian governments have duly taken account of the outcomes of these reviews and assessment processes, by providing formal responses to each of the five-yearly reviews and by agreeing to implement further measures consistent with the adaptive management and continual improvement commitments in the Tasmanian Regional Forest Agreement, and sustainable management principles.

This report shows that the Australian and Tasmanian governments have, through a comprehensive and diverse range of processes, had ongoing regard to the listed matters in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth) relevant to the region.

The report also provides an assessment of the state of the values using the latest available information from the *State of the Forests Tasmania Report* series and *Australia's State of the Forests Report* series and other sources. It further provides comment on the future status of the values within the context of:

- a continuing Tasmanian Regional Forest Agreement, noting policy commitments of both governments
- the most recent joint government response to the latest independent five-yearly review of the Tasmanian Regional Forest Agreement
- Tasmania's Forest Management System.

Further detail on how Tasmania's Forest Management System adapts to new information and decisions of government can be found in *Tasmania's Forest Management System: An Overview (2017)* (Department of State Growth 2017).

Background

The Parties have committed to:

- extending the term of each Regional Forest Agreement by 20 years
- establishing a 'rolling' life for each Regional Forest Agreement by including a provision to extend its term for a further five years based upon successful completion and implementation of each independent five-yearly review of the Regional Forest Agreement ¹.

The Australian and Tasmanian governments are therefore working on a variation to the Tasmanian Regional Forest Agreement in order to extend its term for 20 years from its current expiry date.

In varying the Tasmanian Regional Forest Agreement, the Australian and Tasmanian governments seek to maintain the objectives and framework of the agreement. The governments are also seeking to negotiate a range of other minor improvements to the Tasmanian Regional Forest Agreement framework to address some of the issues raised by various consultative reviews, consistent with continual improvement.

These improvements include:

- more streamlined review and reporting arrangements
- better communication between the parties
- updated dispute resolution mechanisms
- updated references to superseded legislation and policies.

The purpose of this report is to provide an update on the matters referred to in para (a) of the definition of 'RFA' in section 4 of the *Regional Forest Agreements Act 2002* (Cth) based on information derived from the 1997 Comprehensive Regional Assessment and various sources published since the governments entered the Tasmanian Regional Forest Agreement.

¹ The term 'Parties' in the Tasmanian Regional Forest Agreement and in this report means the State of Tasmania and the Commonwealth of Australia.

Method

Interpretation

In 1997, an independent Expert Advisory Group assembled as part of the Tasmanian Comprehensive Regional Assessment defined Ecologically Sustainable Forest Management for the Tasmanian Regional Forest Agreement. They stated that Ecologically Sustainable Forest Management is based on seven principles and five management system elements (Tasmanian Public Land Use Commission 1997a). These principals and elements can be directly mapped to the criteria established in the Montréal Process (Table 1) (Montréal Process Working Group 2015). The Montréal Process criteria have provided the framework for reporting on sustainability indicators, pursuant to clause 91 of the current Tasmanian Regional Forest Agreement, since 2001.

Table 1 – Comparison of Montréal Process Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests with the principles and elements of Ecologically Sustainable Forest Management

Montréal Process Criteria for Sustainable Forest Management (current since 2001)	1997 Principles and elements of Ecologically Sustainable Forest Management
Criterion 1. Conservation of biological diversity	Principle 2. Protect and maintain biodiversity
Criterion 2. Maintenance of productive capacity of forest ecosystems	Principle 3. Maintain the productive capacity and sustainability of forest ecosystems
Criterion 3. Maintenance of ecosystem health and vitality	Principle 4. Maintain forest ecosystem health and vitality
Criterion 4. Conservation and maintenance of soil and water resources	Principle 5. Protect soil and water resources
Criterion 5. Maintenance of forest contribution to global carbon cycles	Principle 6. Maintain forests' contribution to global carbon cycles
Criterion 6. Maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies	Principle 1. Maintain and enhance long-term socio-economic benefits Principle 7. Maintain natural and cultural heritage values
Criterion 7. Legal, institutional and economic framework for forest conservation and sustainable management	Elements of a management system: 1. Commitment and policy framework 2. Planning 3. Implementation 4. Monitoring and compliance 5. Review and improvement

Table 2 maps the matters listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth) to the agreed set of sustainability indicators used in Tasmania for reporting of Ecologically Sustainable Forest Management under the Montréal Process.

Table 1 and Table 2 illustrate that the principles and elements of Ecologically Sustainable Forest Management used in the Tasmanian Regional Forest Agreement encompass all of the matters specifically listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth). It further follows that Tasmania's five-yearly reports on the sustainability indicators² provide a comprehensive form of periodic reporting against the matters listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth). Hence, the *State of the Forests Tasmania Report* series is a key source of information for the assessment of the matters listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth). Additional sources are drawn on to provide further information, detail and context for some *Regional Forest Agreements Act 2002* values.

² The reports on the sustainability indicators have been produced as the statutory *State of the Forests Tasmania Report* series (required under the *Forest Practices Act 1985* (Tas)) since 1999. Accordingly, in this assessment report references to *State of the Forests Tasmania Report* series include both the sustainability indicators reports and the *State of the Forests Tasmania Report* series booklets (Forest Practices Board 2002; Australian and Tasmanian Governments 2007; Forest Practices Authority 2012a).

Table 2 – Relationship between the matters listed in paragraph (a) of the definition of ‘RFA’ in the *Regional Forest Agreements Act 2002 (Cth)* and the Tasmanian sustainability indicators under the *Montréal Process Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests*

Montréal Process Indicator	Relevant matter in para (a) of the definition of ‘RFA’ in the <i>Regional Forest Agreements Act 2002 (Cth)</i> (best match(es) shown as shaded boxes)				
	4(a)i environmental values, (including old growth, wilderness, endangered species, national estate values and world heritage values)	4(a)ii indigenous heritage values	4(a)iii economic values of forested areas and forest industries	4(a)iv social values (including community needs)	4(a)v principles of ecologically sustainable management
1.1 Ecosystem diversity					
1.1a Area of forest by forest type and tenure					
1.1b Area of forest by growth stage					
1.1c Area of forest in protected area categories					
1.1d Fragmentation of forest cover					
1.1e Area of old growth by forest type by reservation status					
1.2 Species diversity					
1.2a Forest-dwelling species for which ecological information is available					

Montréal Process Indicator	Relevant matter in para (a) of the definition of 'RFA' in the <i>Regional Forest Agreements Act 2002</i> (Cth) (best match(es) shown as shaded boxes)				
	4(a)i environmental values, (including old growth, wilderness, endangered species, national estate values and world heritage values)	4(a)ii indigenous heritage values	4(a)iii economic values of forested areas and forest industries	4(a)iv social values (including community needs)	4(a)v principles of ecologically sustainable management
1.2b The status of forest-dwelling species at risk of not maintaining viable breeding populations, as determined by legislation or scientific assessment					
1.2c Representative species from a range of habitats monitored at scales relevant to regional forest management					
1.3 Genetic diversity					
1.3a Forest associated species at risk from isolation and the loss of genetic variation, and conservation efforts for those species					
1.3b Native forest and plantations of indigenous species which have genetic resource conservation mechanisms in place					
2 Maintenance of productive capacity of forest ecosystems					
2.1a Native forest available for wood production, area harvested and growing stock of merchantable and non-merchantable tree species					
2.1b Age class and growing stock of plantations					

Montréal Process Indicator	Relevant matter in para (a) of the definition of 'RFA' in the <i>Regional Forest Agreements Act 2002 (Cth)</i> (best match(es) shown as shaded boxes)				
	4(a)i environmental values, (including old growth, wilderness, endangered species, national estate values and world heritage values)	4(a)ii indigenous heritage values	4(a)iii economic values of forested areas and forest industries	4(a)iv social values (including community needs)	4(a)v principles of ecologically sustainable management
2.1c Annual removal of wood products compared to the volume determined to be sustainable for native forests and future yields for plantations					
2.1d Annual removal of non-wood products compared to the level determined to be sustainable					
2.1e The area of native forest harvested and the proportion of that effectively regenerated and the area of plantation clearfell harvested and the proportion of that effectively re-established					
3 Maintenance of ecosystem health and vitality					
3.1a Scale and impact of agents and processes affecting forest health and vitality					
3.1b Area of forest burnt by planned and unplanned fire					
4 Conservation and maintenance of soil and water resources					
4.1a Area of forest land managed primarily for protective function					

Montréal Process Indicator	Relevant matter in para (a) of the definition of 'RFA' in the <i>Regional Forest Agreements Act 2002 (Cth)</i> (best match(es) shown as shaded boxes)				
	4(a)i environmental values, (including old growth, wilderness, endangered species, national estate values and world heritage values)	4(a)ii indigenous heritage values	4(a)iii economic values of forested areas and forest industries	4(a)iv social values (including community needs)	4(a)v principles of ecologically sustainable management
4.1b Management of the risks of soil erosion and the risks to soil physical properties, water quantity and water quality in forests					
5 Maintenance of forests' contribution to global carbon cycles					
5.1a Total forest ecosystem biomass and carbon pool					
6.1 Production and consumption					
6.1a Value and volume of wood and wood products					
6.1b Values, quantities and use of non-wood forest products					
6.1c Value of forest based services					
6.1d Production and consumption and import/export of wood, wood products and non-wood products					
6.1e Degree of recycling of forest products					
6.2 Investment in the forest sector					

Montréal Process Indicator	Relevant matter in para (a) of the definition of 'RFA' in the <i>Regional Forest Agreements Act 2002 (Cth)</i> (best match(es) shown as shaded boxes)				
	4(a)i environmental values, (including old growth, wilderness, endangered species, national estate values and world heritage values)	4(a)ii indigenous heritage values	4(a)iii economic values of forested areas and forest industries	4(a)iv social values (including community needs)	4(a)v principles of ecologically sustainable management
6.2a Investment and expenditure in forest management					
6.2b Investment in extension and use of new and improved technologies					
6.3 Recreation and tourism					
6.3a Area of forest available for general recreation/tourism					
6.3b Range and use of recreational/tourism activities available					
6.4 Cultural, social and spiritual needs and values					
6.4a Area of forest to which Indigenous people have use rights that protect their special values and are recognized through formal and informal management regimes					
6.4b Registered places of non-indigenous cultural values in forests that are formally managed to protect those values					

Montréal Process Indicator	Relevant matter in para (a) of the definition of 'RFA' in the <i>Regional Forest Agreements Act 2002</i> (Cth) (best match(es) shown as shaded boxes)				
	4(a)i environmental values, (including old growth, wilderness, endangered species, national estate values and world heritage values)	4(a)ii indigenous heritage values	4(a)iii economic values of forested areas and forest industries	4(a)iv social values (including community needs)	4(a)v principles of ecologically sustainable management
6.4c The extent to which indigenous values are protected, maintained and enhanced through indigenous participation in forest management					
6.4d The importance of forests to people					
6.5 Employment and community needs					
6.5a Direct and indirect employment in the forest sector					
6.5b Wage rates and injury rates within the forest sector					
6.5c Resilience of forest dependent communities to changing social and economic conditions					
6.5d Resilience of forest dependent indigenous communities to changing social and economic conditions					
7 Legal, institutional and economic framework for forest conservation and sustainable management					
7.1a Extent to which the legal and policy framework supports the conservation and sustainable management of forests					

Montréal Process Indicator	Relevant matter in para (a) of the definition of 'RFA' in the <i>Regional Forest Agreements Act 2002 (Cth)</i> (best match(es) shown as shaded boxes)				
	4(a)i environmental values, (including old growth, wilderness, endangered species, national estate values and world heritage values)	4(a)ii indigenous heritage values	4(a)iii economic values of forested areas and forest industries	4(a)iv social values (including community needs)	4(a)v principles of ecologically sustainable management
7.1b Extent to which the institutional framework supports the conservation and sustainable management of forests					
7.1c Extent to which the economic framework supports the conservation and sustainable management of forests					
7.1d Capacity to measure and monitor changes in the conservation and sustainable management of forests					
7.1e Capacity to conduct and apply research and development aimed at improving forest management and delivery of forest goods and services					

Assessments through time

Assessments of the matters listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth) were initially undertaken through the 1997 Comprehensive Regional Assessment process that preceded the signing of the Tasmanian Regional Forest Agreement in November 1997. Paragraph C of the Recitals in the Tasmanian Regional Forest Agreement specifically refers to the agreement being entered into having regard to 'studies and projects carried out in relation to all of the following matters relevant to the Tasmania Region' and it lists exactly the matters referred to in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth).

The Comprehensive Regional Assessment was conducted by Australian and Tasmanian government agencies to assess the full range of values in Tasmania's forest estate, including environmental, heritage, social and economic values (Tasmania-Commonwealth Joint Steering Committee 1997). This assessment formed the basis for negotiation of the Regional Forest Agreement. Key objectives that were agreed included:

- defining and conserving forest areas needed to form a comprehensive, adequate and representative reserve system
- defining forest areas available for sustainable commercial use
- accrediting codes of forest practice and other management arrangements for forests
- setting out arrangements for reporting on the agreement's performance every five years.

Under the Tasmanian Regional Forest Agreement, the Australian and Tasmanian governments agreed to undertake further review and reporting on a range of matters, both as specific commitments and as part of a process of continual improvement and review. Since the commencement of the Tasmanian Regional Forest Agreement, there has been consideration of other relevant matters under other statutory and non-statutory processes and a great deal of information has been generated.

For the purposes of this report, 'ecologically sustainable management' in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth) is taken to be synonymous with 'Ecologically Sustainable Forest Management'. This term is used in the Tasmanian Regional Forest Agreement and it closely aligns with the internationally-agreed Montréal Process criteria and indicators for reporting on sustainable forest management. Australia has accepted the criteria developed by the Montréal Process Working Group and adapted the indicators to better suit its unique forests. The Montréal Process criteria and indicators form the basis for the agreed reporting on sustainability under the Tasmanian Regional Forest Agreement (refer to clause 91 of the current Tasmanian Regional Forest Agreement) and under Tasmania's statutory *State of the Forests Tasmania Report* series which is a key report considered by the independent reviews of the Tasmanian Regional Forest Agreement every five years.

The framework for Ecologically Sustainable Forest Management covers all of the matters listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth) and these have been reviewed and considered, to varying degrees, through both targeted and broader assessment processes in Tasmania (Table 3). The outcomes from these processes are well documented and are publicly available.

The Australian and Tasmanian governments have, through a comprehensive and diverse range of processes, formally had ongoing regard to the listed matters relevant to the region in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth).

Some of these processes led the governments to agree to changes to the Tasmanian Regional Forest Agreement. For example, there have been two variations to the Tasmanian Regional Forest Agreement in 2001 and 2007, as well as the Supplementary Tasmanian Regional Forest Agreement in 2005. Should the Tasmanian Regional Forest Agreement be extended, the Australian and Tasmanian governments will seek to terminate the Supplementary Tasmanian Regional Forest Agreement to remove the ambiguity associated with the existence of multiple Tasmanian Regional Forest Agreement documents. Commitments in the Supplementary Regional Forest Agreement have largely been completed. It is expected that any relevant ongoing commitments will be incorporated in the draft variation to the Tasmanian Regional Forest Agreement.

As shown in Table 3, several processes have assessed all of the five environmental values specifically listed under para (a)(i) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth) (old growth, wilderness, endangered species, national estate and world heritage); while others consider various environmental values separately. Other processes have assessed additional environmental values not specifically listed in the *Regional Forest Agreements Act 2002* (Cth), such as soils, streams, geomorphology, biodiversity and carbon.

All of the evaluation processes and reviews described in this report were commissioned through statutory or other governmental processes. Where applicable, additional information has also been captured from reporting from forest certification requirements. The outcomes and findings of all of the processes have contributed to the formal, independent five-yearly reviews of the Tasmanian Regional Forest Agreement undertaken jointly by the Australian and Tasmanian governments.

The Australian and Tasmanian governments have duly taken account of the outcomes of these assessment processes, as evidenced by their formal joint government responses to the independent five-yearly reviews of the Tasmanian Regional Forest Agreement and their agreement to implement further measures consistent with the adaptive management and continual improvement commitments in the Regional Forest Agreement and sustainable management principles. Further detail on how the Tasmanian Forest Management System adapts to new information and decisions of government can be found in *Tasmania's Forest Management System: An Overview (2017)* (Department of State Growth 2017).

The following chapters detail the state of the values listed in the *Regional Forest Agreements Act 2002* (Cth) using the most recent *State of the Forests Tasmania Report 2012*, and other sources, such as Tasmanian-specific information from the *Australia State of the Environment Report* and *Australia's State of the Forests Report*. The report then goes on to comment on the likely future status of the values within the context of a continuing Tasmanian Regional Forest Agreement, noting policy commitments of both governments, the most recent joint government response to the latest independent five-yearly review, and Tasmania's Forest Management System.

Table 3 – Relevance of various evaluation processes to the matters listed in s 4(a)(i) to (v) of the Regional Forest Agreements Act 2002 (Cth)

Evaluation process One-off (O) or periodic (P)		Primary relevance to matters listed in the <i>Regional Forest Agreements Act 2002 (Cth)</i>				
		Environmental values	Indigenous values	Economic values	Social values	Principles of Ecologically Sustainable Forest Management
1. Comprehensive Regional Assessment 1997	O	(All ++)				
2. Regional Forest Agreement annual reviews 1998–2001	P	(All ++)				
3. Regional Forest Agreement five-yearly review 2002, 2007, 2012	O	(All ++)				
4. Tasmanian Forests Intergovernmental Agreement 2011	O	(All ++)				
5. Tasmanian Forest Agreement – wood schedules 2012	O					
6. Reviews of wood supply 2002, 2007, 2014	P					
7. Special Species Timber 2010, 2015	O					
8. Management and utilisation of forest residues 2015	O					
9. Socio-economic study of forestry industry change 2014	O					
10. Forestry Tasmania transition 2014	O					
11. Review of Tasmania's private plantation estate 2013	O					
12. Monitoring and Reporting System for Tasmania's National Parks and Reserves 2013	P	(All ++)				
13. Monitoring of private forest management 2015	P	(OG, ES ++)				

Evaluation process One-off (O) or periodic (P)		Primary relevance to matters listed in the <i>Regional Forest Agreements Act 2002</i> (Cth)				
		Environmental values	Indigenous values	Economic values	Social values	Principles of Ecologically Sustainable Forest Management
14. Tasmanian Wilderness World Heritage Area – nomination report 2013	P	(All ++)				
15. State of the Forests Tasmania Reports 2012, 2007, 2002	P					
16. Processes under the Forest Practices Act (includes Forest Practices Plans, FPA Annual Reporting, State of the Forest Reporting)	P	(All ++)				
17. Biodiversity provisions of Forest Practices Code 2009	O	(ES ++)				
18. Global assessment of the forest practices system 2007	O	(ES ++)				

Note: Environmental values are shown as OG (old growth), ES (endangered species), All (all values specifically listed under para (a)(i) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth)) and ++ (other values such as soils and water).

Environmental values

The purpose of this chapter is to report on the environmental values that are specifically listed in para (a)(i) of the definition of 'RFA' in the *Regional Forest Agreement Act 2002* (Cth): old growth, wilderness, endangered species, national estate values and world heritage values. Biodiversity values and wetland values have also been assessed as part of the general 'environmental values' of the Tasmanian Regional Forest Agreement region.

The chapter includes an explanation of the meaning of each of the environmental values, the context in which these values have been defined, the status of the values as measured at the time the Tasmanian Regional Forest Agreement was implemented, and changes in values or related matters since 1997. This information is drawn from the original documentation produced as part of the Comprehensive Regional Assessment process, subsequent reports (including the *State of the Forests Tasmania Report* series, the *State of the Environment Report* series, and the statutory independent five-yearly reviews of the Tasmanian Regional Forest Agreement required under the Tasmanian Regional Forest Agreement) and other relevant data.

Overview of the environmental values addressed in the first and second five-yearly reviews of the Tasmanian Regional Forest Agreement

The first independent five-yearly review of the Tasmanian Regional Forest Agreement (Resource Planning and Development Commission 2002a) found that the components of the expanded reserve system on public land had all been implemented and that the program to identify and protect forest communities on private land was underway. The review also found that the threatened species lists had been upgraded, and recovery plans for threatened species had been developed and were being implemented. It also concluded that mechanisms for protecting threatened species had been improved, including the revision and incorporation of revised prescriptions into the Forest Practices Code.

The first independent five-yearly review recommended 30 adjustments or additions to the commitments made in the 1997 agreement. Those recommendations formed the basis for the 2005 *Supplementary Tasmanian Regional Forest Agreement* that added new areas to the system of formal and informal nature conservation reserves.

By the time the second independent five-yearly review of the Tasmanian Regional Forest Agreement (Ramsay 2008) was undertaken, the area of formal and informal reserves on public and private land had increased by a further 320 000 hectares following the 2005 *Supplementary Tasmanian Regional Forest Agreement*. The native forest estate had been maintained above the agreed minimum level of 95 per cent of the 1996 area. Five new single threatened species and four new multiple species recovery plans had been developed and implementation of eight had commenced. Threatened species lists had been further reviewed and additional revisions incorporated into the Forest Practices Code. However, the review found that preparation and publication of documentation had not been completed for many threatened species due to the availability of resources. The review accordingly made seven recommendations relating to

threatened species and communities, dealing with priorities for completion of listing statements or advice, completion of recovery plans and related matters.

The second five-yearly review also found that commitments to the establishment of the reserve system were largely met during the review period, that reservation by covenanting of private forest was extended as far as program funds allowed, a small-scale market-based mechanism (the Forest Conservation Revolving Fund) had been established to reserve additional forests on private land, and that the agreement commitments had largely been met for the forest practices system, threatened species and communities, forest research and other matters.

During the second five-yearly review period 10 single species recovery plans and five multiple species recovery plans for forest-dependent species were prepared, with the Commonwealth adopting nine recovery plans for species endemic to Tasmania. Tasmania had also contributed to six multijurisdictional national species recovery plans, including a revision of the Swift Parrot Recovery Plan. A recovery plan was also prepared for the *Eucalyptus ovata* - *Callitris oblonga* forest community, the only Tasmanian forest type currently listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); that plan was adopted by the Commonwealth as meeting the requirements of the EPBC Act.

Old growth values

Old growth forest is defined in the *National Forest Policy Statement* as ecologically mature forest where the effects of disturbances are now negligible (Commonwealth of Australia 1992a). The long-term protection of old growth forest is important because of its aesthetic, cultural and nature conservation values and the absence of disturbance.

Along with other environmental values, old growth forests were one of the criteria for designing a comprehensive, adequate and representative reserve system under the Tasmanian Regional Forest Agreement.

The current old growth value is reported based on the indicator developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (Table 4) and adopted by Australia for the *State of the Forest Report* series reporting. Indicators grouped under these criteria allow the presentation of data in a consistent and repeatable format.

Table 4 – Indicators used in Tasmanian forest reporting relating to old growth values developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests

Criterion 1: Conservation of biological diversity
1.1 Ecosystem diversity
Indicator 1.1e – Area of old growth by forest type by reservation status

Tasmanian Comprehensive Regional Assessment

During the Tasmanian Comprehensive Regional Assessment (which informed the establishment of the Tasmanian Regional Forest Agreement) old growth was mapped by classifying forests according to the proportion of senescent crowns in each stand and their history of disturbance by fire, harvesting and grazing (Figure 1, Figure 2, Figure 3, Figure 4 and Figure 5) (Tasmanian Public Land Use Commission 1997b).

The Joint Australian and New Zealand Environment and Conservation Council and Ministerial Council on Forestry, Fisheries and Aquaculture National Forest Policy Statement Implementation Sub-Committee (JANIS) criteria (Commonwealth of Australia 1997) used for old growth forest were:

- Where old growth forest is rare or depleted (generally less than 10 per cent of the extant distribution) within a forest ecosystem, all viable examples should be protected, wherever possible.
- For other forest ecosystems, 60 per cent of the old growth forest identified at the time of assessment would be protected, where appropriate, increasing levels of protection to achieve the following objectives: the representation of old growth forest across the geographic range of the forest ecosystem; the protection of high quality habitat for species identified under the biodiversity criterion; appropriate reserve design; protection of the

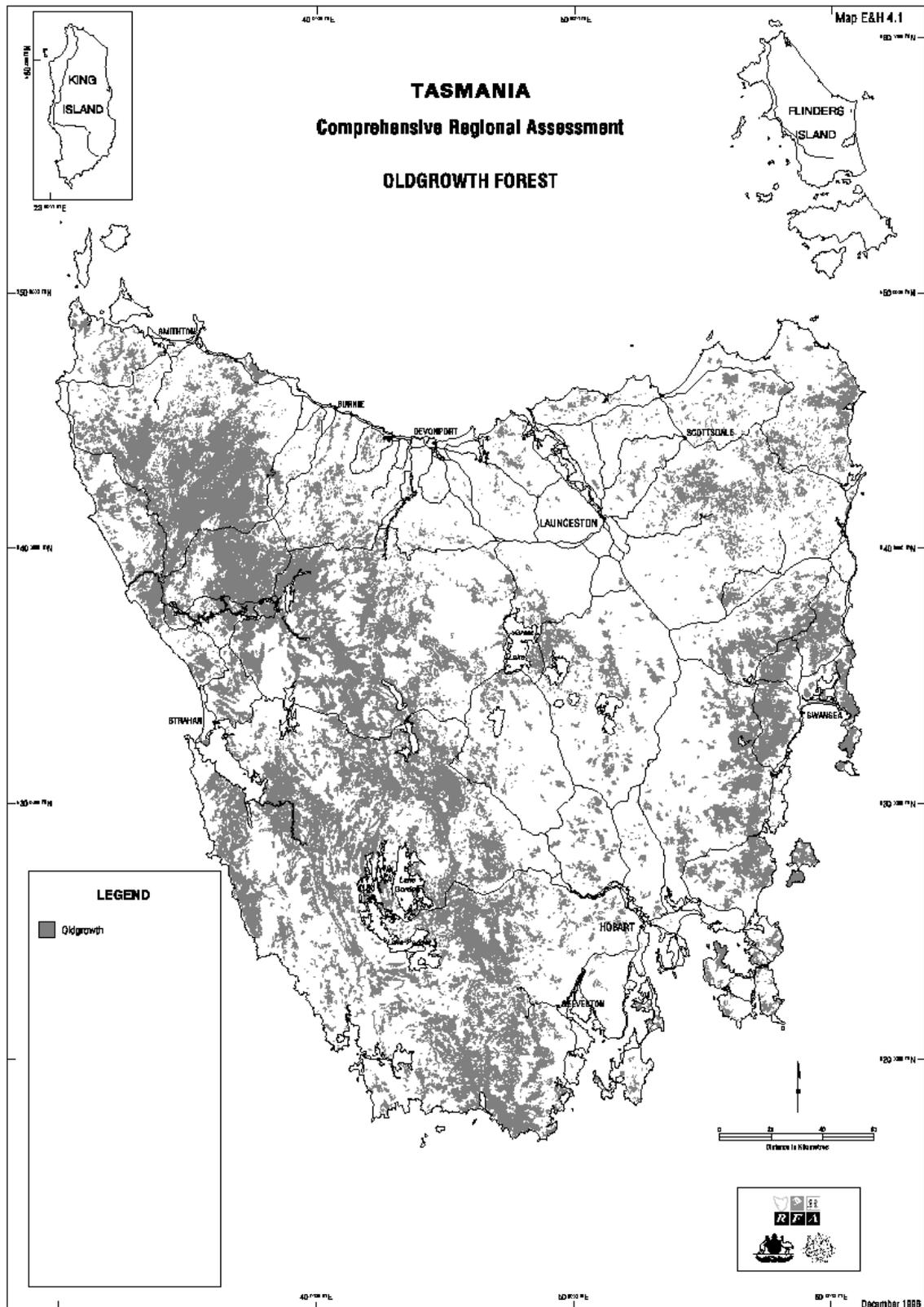
largest and least fragmented areas of old growth; specific community needs for recreation and tourism.

Assessment and identification of old growth eucalypt and non-eucalypt forest was undertaken through a variety of methods including analysing aerial photos, field assessment, assessing timber harvesting history and others. The preliminary results identified 1 278 000 hectares of old growth; this estimate was revised to 1 146 000 before the agreement was finalised.

The Tasmanian Comprehensive Regional Assessment concluded that there were 43 forest communities containing elements of old growth, of which 14 met or exceeded JANIS criteria. Eleven forest communities contained elements of old growth forest that were rare or depleted (and the remainder did not meet the criteria).

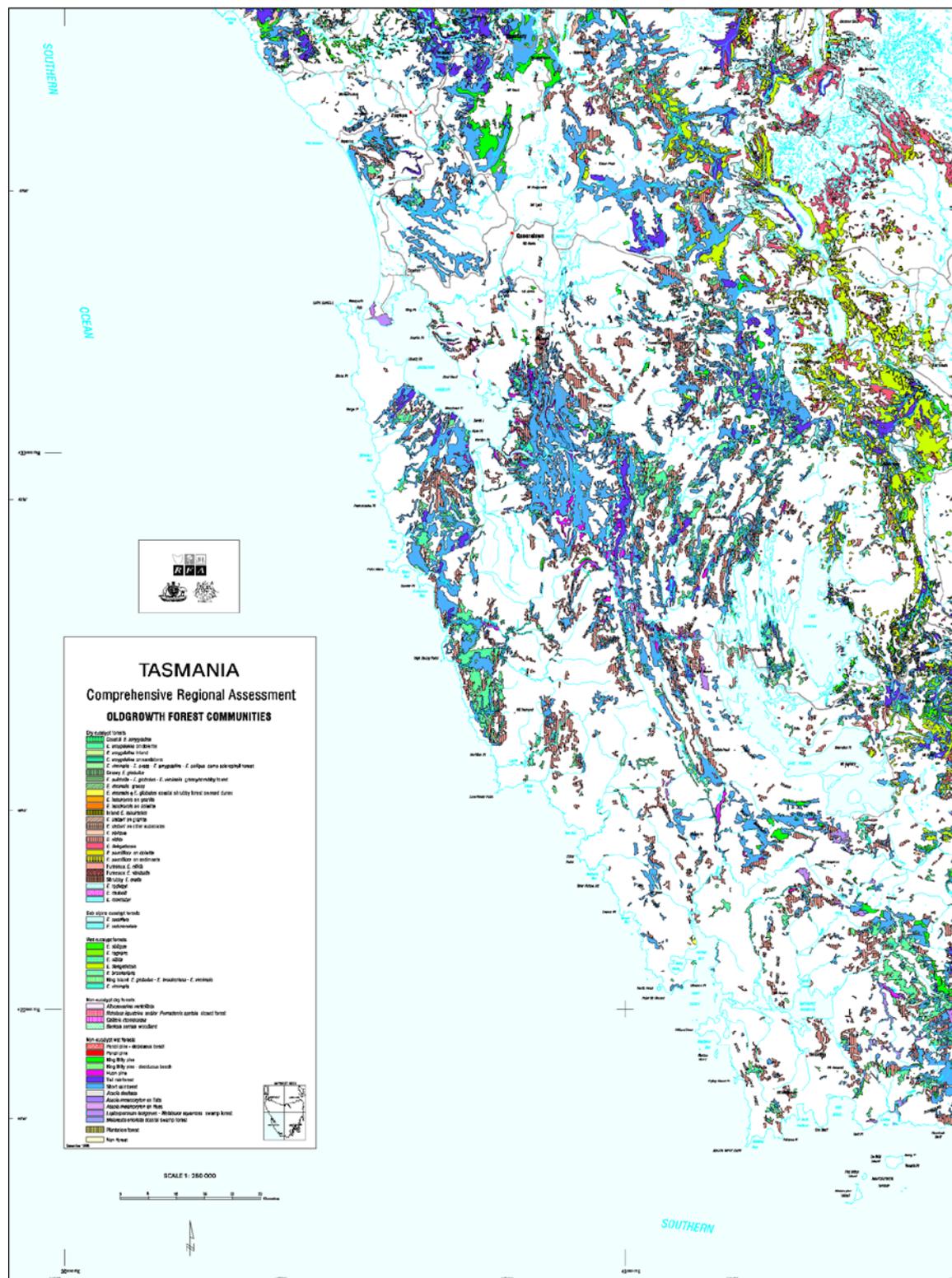
The total reservation shortfall for protecting old growth values was calculated as 149 710 hectares, of which it was considered public land could provide 127 820 hectares, with a 21 890 hectare shortfall still needed from private land. In 2005, the *Tasmanian Community Forest Agreement* (which was enacted through the *Supplementary Tasmanian Regional Forest Agreement*) established programmes to significantly reduce this shortfall (Department of Agriculture and Water Resources 2016a).

Figure 1 – Old growth forest identified in Tasmania as part of the Tasmanian Comprehensive Regional Assessment



Source: Tasmanian Public Land Use Commission (1997b)

Figure 5 – Old growth forest communities identified in south-west Tasmania as part of the Tasmanian Comprehensive Regional Assessment



Source: Tasmanian Public Land Use Commission (1997b)

First independent five-yearly review of the Tasmanian Regional Forest Agreement

The Tasmanian Regional Forest Agreement provided for an indicative area of 153 620 hectares of old growth in new reserves (Resource Planning and Development Commission 2002a).

A total of \$1.6 million of Tasmanian Regional Forest Agreement funds was allocated under clause 101(ii) of the Tasmanian Regional Forest Agreement by the Commonwealth to the Forests and Forest Industry Council, to facilitate the transition from old growth to regrowth and plantation resources, facilitating strategic research into new processing technologies and market opportunities. The Forests and Forest Industry Council was active in assisting this transition from old growth to regrowth and plantation resources.

Tasmanian Community Forest Agreement 2005

The *Tasmanian Community Forest Agreement*, enacted through the *Supplementary Tasmanian Regional Forest Agreement*, required the 'protection of old growth forest in Tasmania' be increased to more than one million hectares with an additional 120 000 hectares of old growth reservation on public land and the expected voluntary addition of at least 25 000 hectares of old growth forest on private land through the Forest Conservation Fund (Department of Agriculture 2016a; Commonwealth of Australia and the State of Tasmania 2005).

State of the Forests Report Tasmania 2012

A summary of the indicators relating to old growth values in the *State of the Forests Tasmania Report 2012* (Forest Practices Authority 2012a), which covers the period from July 2006 to June 2011, are provided below.

Indicator 1.1.e – Area of old growth by forest type by reservation status

In 2010, there were 1 221 000 hectares of old growth forest in Tasmania, of which 91 per cent was on public land and nine per cent was on private land. Of Tasmania's old growth forests on public and private land, 982 000 hectares (80.4 per cent) were protected in reserves in 2011, an increase of 300 000 hectares since 1996. The *State of the Forests Tasmania Report 2012* includes data showing the change in reservation status since 1996 of old growth by forests type (Forest Practices Authority 2012a).

Of the 42 old growth forest communities, 32 have at least 60 per cent of their 1996 extent of old growth reserved. With only a few exceptions, wet eucalypt, sub-alpine eucalypt and rainforest communities have high levels of old growth reservation. Four forest communities, all of which are dry eucalypt, have less than 30 per cent of their extent of old growth in reserves. Most of the remaining old growth for all four of these communities is on private land. Progress is being made in protecting old growth on private land. By 2011, 15 000 hectares had been reserved.

Third independent five-yearly review of the Tasmanian Regional Forest Agreement

No issues related to old growth forest management were raised in submissions during the third five-yearly review of the Tasmanian Regional Forest Agreement.

The Independent Reviewer's Report to the Australian and Tasmanian Governments on the third five-yearly review of the Tasmanian Regional Forest Agreement 2015 (Kile 2015) noted that subsequent to the review period, old growth forest harvesting has been significantly reduced as a consequence of further reservation, areas protected by management prescription, and through requirements for certification. The reservation levels of old growth in formal and informal reserves on public land are shown in Table 14 of *Implementation of the Tasmanian Regional Forest Agreement 2007–2012* (Australian Government and Tasmanian Government 2015). This table is reproduced below.

Table 14 – Reservation levels of old growth forest in formal and informal reserves on public land from 1996 to 2011

Forest community	Old growth									
	1996 area (ha)	1996 reservation (ha)	RFA proposed reservation (ha)	RFA proposed reservation (per cent)	TCFA proposed reservation (ha) ¹	TCFA proposed reservation (per cent)	TCFA proposed reservation on public land ² (ha)	TCFA proposed reservation on public land (per cent)	2011 reservation (ha) ³	2011 reservation (per cent) ⁴
Coastal <i>E. amygdalina</i> dry sclerophyll forest	40 090	12 610	24 300	60	26 590	66	26 400	66	26 110	65
<i>E. amygdalina</i> forest on dolerite	30 490	5 790	15 390	50	18 960	62	18 740	61	18 750	61
Inland <i>E. amygdalina</i> forest	2 860	140	170	6	870	30	550	19	520	18
<i>E. amygdalina</i> forest on sandstone	6 600	700	2 160	33	4 680	71	4 680	71	4 250	64
<i>Allocasuarina verticillata</i> forest	970	440	510	53	540	56	520	54	520	54
<i>E. brookeriana</i> wet forest	690	40	60	8	230	33	230	33	230	33
<i>Banksia serrata</i> woodland	160	120	120	75	120	75	120	75	120	73
<i>E. coccifera</i> dry forest	32 630	25 690	27 930	86	29 610	91	29 600	91	28 670	88
<i>Callitris rhomboidea</i> forest	600	230	330	54	340	57	330	55	340	57
Dry <i>E. delegatensis</i> forest	79 820	40 100	48 180	60	54 100	68	54 000	68	53 570	67

Forest community	Old growth									
	1996 area (ha)	1996 reservation (ha)	RFA proposed reservation (ha)	RFA proposed reservation (per cent)	TCFA proposed reservation (ha) ¹	TCFA proposed reservation (per cent)	TCFA proposed reservation on public land ² (ha)	TCFA proposed reservation on public land (per cent)	2011 reservation (ha) ³	2011 reservation (per cent) ⁴
<i>E. viminalis</i> / <i>E. ovata</i> / <i>E. amygdalina</i> / <i>E. obliqua</i> damp sclerophyll forest	2 500	670	1 780	71	1 760	70	1 710	69	650	66
Tall <i>E. delegatensis</i> forest	104 420	50 880	57 980	56	63 500	61	63 430	61	64 300	62
King Billy Pine with deciduous beech forest	370	340	340	92	370	100	370	100	360	97
<i>E. viminalis</i> and/or <i>E. globulus</i> coastal shrubby forest	870	130	130	15	170	20	170	19	120	14
Grassy <i>E. globulus</i> forest	4 910	2 720	4 000	81	4 110	84	4 030	82	3 980	81
Huon pine forest	7 610	6 650	7 280	96	7 360	97	7 350	97	7 330	96
<i>Leptospermum</i> sp. / <i>Melaleuca squarrosa</i> swamp forest	9 960	7 620	8 320	84	10 580	91	10 580	106	8 970	90
Callidendrous and thamnic rainforest on fertile sites	159 640	79 280	93 870	59	131 110	82	131 000	82	130 410	82
Thamnic rainforest on less fertile sites	335 900	223 290	265 420	79	308 420	92	308 400	92	306 160	91
<i>Melaleuca ericifolia</i> forest	310	30	30	10	200	65	200	65	200	64

Forest community	Old growth									
	1996 area (ha)	1996 reservation (ha)	RFA proposed reservation (ha)	RFA proposed reservation (per cent)	TCFA proposed reservation (ha) ¹	TCFA proposed reservation (per cent)	TCFA proposed reservation on public land ² (ha)	TCFA proposed reservation on public land (per cent)	2011 reservation (ha) ³	2011 reservation (per cent) ⁴
Dry <i>E. nitida</i> forest	107 370	85 460	95 520	89	99 980	93	99 930	93	99 770	93
<i>Notelaea ligustrina</i> / <i>Pomaderris apetala</i> forest	270	190	190	72	220	81	220	81	220	81
Tall <i>E. nitida</i> forest	49 600	45 290	47 150	95	48 230	97	48 220	97	48 230	97
Dry <i>E. obliqua</i> forest	46 960	19 110	27 590	59	31 650	67	31 560	67	30 600	65
Tall <i>E. obliqua</i> forest	83 490	28 920	44 970	54	52 830	63	52 790	63	52 620	63
Shrubby <i>E. ovata</i> forest	470	110	150	32	180	38	160	35	160	34
<i>E. pulchella</i> / <i>E. globulus</i> / <i>E. viminalis</i> grassy shrubby dry sclerophyll forest	63 840	9 140	26 680	42	32 910	52	30 230	47	31 230	47
Pencil Pine with deciduous beech forest	170	170	170	100	170	100	170	100	170	97
<i>E. pauciflora</i> forest on Jurassic dolerite	1 870	910	1 280	68	1 110	59	1 110	59	1 220	65
Pencil pine forest	340	330	330	100	340	100	340	100	340	100
<i>E. pauciflora</i> forest on sediments	4 300	2 720	2 770	64	3 140	73	3 140	73	3 130	73

Forest community	Old growth									
	1996 area (ha)	1996 reservation (ha)	RFA proposed reservation (ha)	RFA proposed reservation (per cent)	TCFA proposed reservation (ha) ¹	TCFA proposed reservation (per cent)	TCFA proposed reservation on public land ² (ha)	TCFA proposed reservation on public land (per cent)	2011 reservation (ha) ³	2011 reservation (per cent) ⁴
<i>E. regnans</i> forest	13 290	4 900	6 320	48	7 480	56	7 480	56	7 580	57
<i>E. risdonii</i> forest	10	0	0	0	0	0	0	0	0	7
<i>E. rodwayi</i> forest	730	120	140	19	140	19	140	19	140	19
<i>E. sieberi</i> forest on granite	960	180	790	82	800	83	800	83	790	83
<i>E. sieberi</i> forest on other substrates	1 660	320	790	48	830	50	830	50	820	49
<i>E. subcrenulata</i> forest	7 420	6 500	6 560	88	6 640	89	6 640	89	6 670	90
<i>E. tenuiramis</i> forest on granite	2 900	1 280	2 670	92	2 730	94	2 730	94	2 730	94
<i>E. tenuiramis</i> forest on dolerite	5 490	2 190	4 470	81	4 850	88	4 850	88	4 850	88
Inland <i>E. tenuiramis</i> forest	7 980	820	1 540	19	2 870	36	2 130	27	2 110	26
<i>E. viminalis</i> grassy forest	8 500	530	760	9	1 010	12	920	11	880	10
Wet <i>E. viminalis</i> forest on basalt	140	60	100	71	100	71	100	71	90	66
King Billy pine forest	17 300	15 290	15 590	90	17 200	99	17 190	99	16 930	98

Forest community	Old growth									
	1996 area (ha)	1996 reservation (ha)	RFA proposed reservation (ha)	RFA proposed reservation (per cent)	TCFA proposed reservation (ha) ¹	TCFA proposed reservation (per cent)	TCFA proposed reservation on public land ² (ha)	TCFA proposed reservation on public land (per cent)	2011 reservation (ha) ³	2011 reservation (per cent) ⁴
TOTAL	1 246 430	682 020	835 640	67	977 480	78	972 560	78	966 860	78

1. Includes reserves on Commonwealth land, other public land and private comprehensive, adequate and representative reserves.

2. Includes formal and informal reserves on public land only.

3. Old growth forest extent is as at the first quarter of 2010 and reserves are as at 30 June 2011. Includes formal and informal reserves on public land only.

4. The 2011 reserved extent expressed as a percentage of the unrounded 1996 extent.

Source: Australian Government and Tasmanian Government (2015)

Kile (2015) made one recommendation that has implications for the future assessment of old growth values:

Recommendation 5 – The state builds on its existing monitoring framework to develop a long-term forest condition monitoring system across all forest tenures to assess changes in ecosystem health and vitality.

This recommendation was considered and agreed to by the Australian and Tasmanian governments in the *Joint Australian and Tasmanian Government Response to the Review of Implementation of the Tasmanian Regional Forest Agreement for the Period 2007–2012* (Commonwealth of Australia and State of Tasmania, 2016):

The Australian and Tasmanian governments recognise that a state-wide forest monitoring information system would be a valuable tool to assess and monitor changes in ecosystem health and vitality.

Through the Australian and Tasmanian State of the Forests Report series, the scale and impact on forest health is identified from a variety of processes and agents, both natural and human-induced.

Tasmania's public forest managers have a range of monitoring systems that cover different aspects of the forest estate. The information from these systems is used to inform adaptive management and continuous improvement approaches to the management of Tasmanian forests.

The Tasmanian Government agrees to consider implementing a state-wide forest monitoring information system. This would likely require greater integration of existing systems and the development of new tools to assist in the long-term monitoring of forest condition and biodiversity, including threatened species.

Tasmanian Wilderness World Heritage Area

The Tasmanian Wilderness World Heritage Area is characterised by large expanses of remote and difficult terrain distant from points of access that includes a great variety of interconnected habitats and landscapes. These expanses show little of the disturbance from post-settlement activities that is evident elsewhere in Tasmania.

Old growth values listed in the *Tasmanian Wilderness World Heritage Management Plan 2016* (Department of Primary Industries, Parks, Water and Environment 2016a) include:

- *Lomatia tasmanica*—Recent research has revealed that *Lomatia tasmanica* is one of the world's oldest known plant clones. Stands of genetically identical individuals are estimated to be at least 43 000 years old.
- *Eucalyptus regnans*—The Styx River Valley has the highest concentration (more than 30) of registered 'Giant Trees' (at least 85 metres tall or 280 cubic metres in volume) in Tasmania, with many trees over 90 metres tall and some close to 100 metres.

Wilderness values

Wilderness is significant to the Australian community because of its aesthetic, cultural and natural values. The 1992 *National Forest Policy Statement* (Commonwealth of Australia 1992a) defines wilderness as land that:

- together with its plant and animal communities, is in a state that has not been substantially modified by, and is remote from, the influences of European settlement or is capable of being restored to such a state
- is of sufficient size to make its maintenance in such a state feasible
- is capable of providing opportunities for solitude and self-reliant recreation.

The JANIS criteria used wilderness quality to identify high quality wilderness that could be protected in reserves (Commonwealth of Australia 1997). Along with other environmental values, high quality wilderness was a criterion for designing the comprehensive, adequate and representative reserve system under the Regional Forest Agreements.

Significant wilderness areas are found in the Tasmanian Wilderness World Heritage Area and, as the Tasmanian Regional Forest Agreement covers the whole of Tasmania, the Tasmanian Wilderness World Heritage Area makes an important contribution to environmental values under the Tasmanian Regional Forest Agreement.

The current wilderness values are reported based on the indicator developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (Table 5). Indicators grouped under these criteria allow the presentation of data in a consistent and repeatable format.

Table 5 – Indicator relating to wilderness values developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests

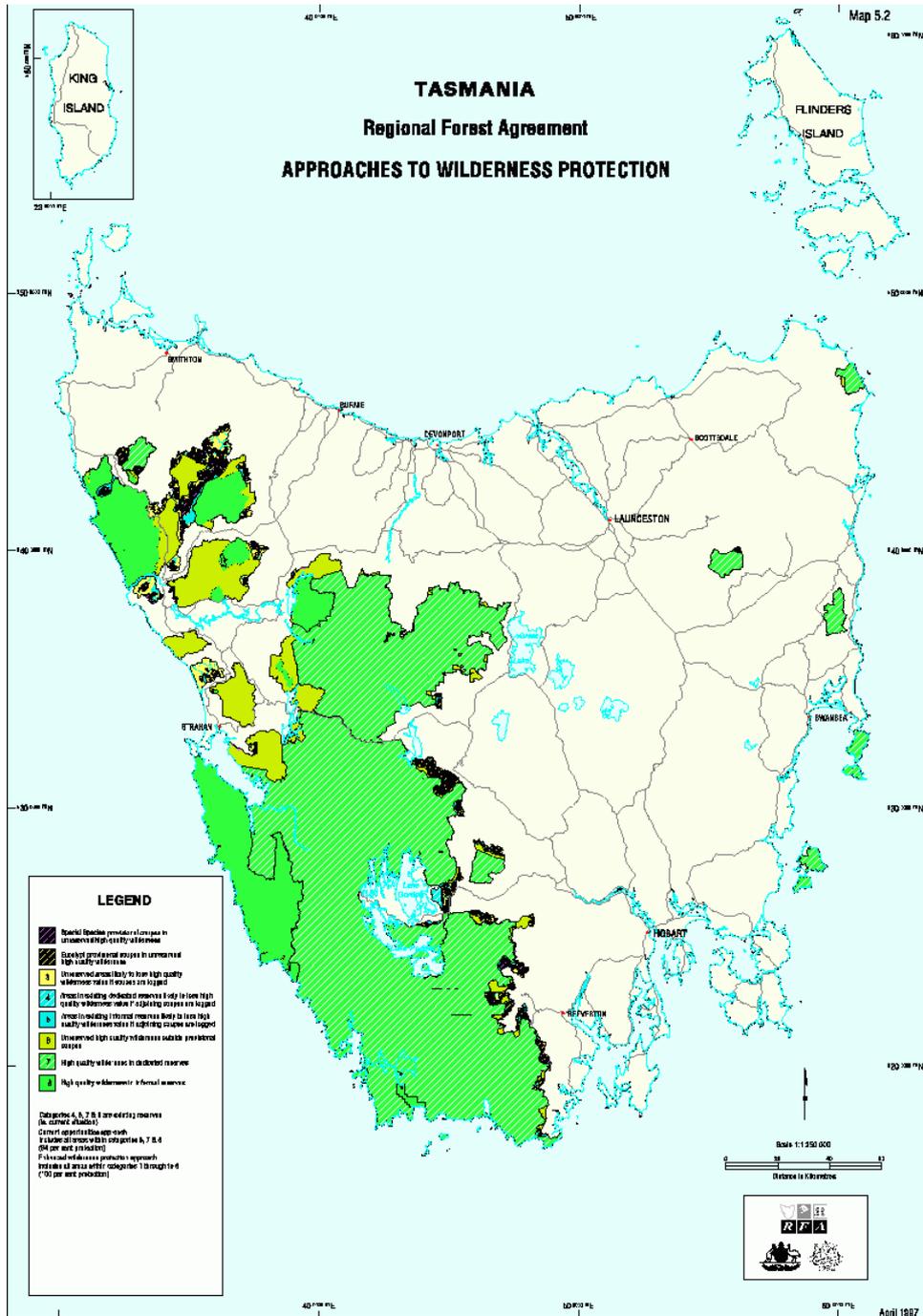
<i>Criterion 6: Conservation of biological diversity</i>
6 Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of society
Indicator 6.3a – Area of forest available for general recreation/tourism

The 1997 Comprehensive Regional Assessment

In the Tasmanian Comprehensive Regional Assessment, the National Wilderness Inventory (now known as the Australian Land Disturbance Database) was used to assess wilderness quality in Tasmania. Wilderness quality was assessed on the basis of remoteness from settlement, remoteness from access, apparent naturalness and biophysical naturalness on a continuum from pristine to urban (Tasmanian Public Land Use Commission 1996a). A map showing wilderness quality was produced and further assessed to define areas of high wilderness quality (Figure 6). The Joint Australian and New Zealand Environment and

Conservation Council and Ministerial Council on Forestry, Fisheries and Aquaculture National Forest Policy Statement Implementation Sub-Committee criteria for the protection of wilderness was that 90 per cent (or more if practicable) of the area of high quality wilderness that met minimum area requirements should be protected in reserves (Commonwealth of Australia 1997).

Figure 6 – Wilderness quality in 1997 determined through the Tasmanian Comprehensive Regional Assessment



Source: Tasmanian Public Land Use Commission (1997b)

Extensive areas of wilderness were identified in the western half of the state. Wilderness quality was noted to be diminished by activities such as forestry, mining and associated infrastructure development (including roading, powerlines and pipelines). The total area of high-quality wilderness reported was 1 943 570 hectares; 42 per cent (823 810 hectares) of which was forest. The Joint Australian and New Zealand Environment and Conservation Council and Ministerial Council on Forestry, Fisheries and Aquaculture National Forest Policy Statement Implementation Sub-Committee criterion recognises that, since forest and non-forest vegetation types form a mosaic, non-forest vegetation may be included in largely forested wilderness areas. At the time the Tasmanian Comprehensive Regional Assessment was conducted, 653 960 hectares (79.4 per cent) of forest in high-quality wilderness areas was in dedicated and informal reserves; the remainder was unreserved. One-fifth of 1 per cent (3180 hectares) of high-quality wilderness was on private land.

Sixteen areas of high-quality wilderness³ above the Joint Australian and New Zealand Environment and Conservation Council and Ministerial Council on Forestry, Fisheries and Aquaculture National Forest Policy Statement Implementation Sub-Committee criteria size threshold of 8000 hectares were identified through the Tasmanian Comprehensive Regional Assessment. Of those wilderness areas, 86 per cent was already contained within the existing reserve system, 69.3 per cent in dedicated reserves and 16.4 per cent in informal reserves. The shortfall in reaching 90 per cent reservation of high-quality wilderness (i.e. the Joint Australian and New Zealand Environment and Conservation Council and Ministerial Council on Forestry, Fisheries and Aquaculture National Forest Policy Statement Implementation Sub-Committee criterion) was 83 570 hectares.

First independent five-yearly review of the Tasmanian Regional Forest Agreement

The *Inquiry on the Progress with Implementation of the Tasmanian Regional Forest Agreement (1997) – Background Report* noted that the proportion of high quality wilderness in reserves reached 95 per cent by 2001, an increase of 9 per cent since 1996 (Resource Planning and Development Commission 2002b). This figure did not allow for the possibility of some reduction in wilderness values in some areas due to developments outside reserves.

State of the Forests Tasmania Report 2012

A summary of the indicators about wilderness values in the *State of the Forests Tasmania Report 2012* (Forest Practices Authority 2012a) (covering the period from July 2006 to June 2011) is provided below.

³ High-quality wilderness is wilderness quality 12 and above.

Indicator 6.3.a – Area of forest available for general recreation/tourism

The *State of the Forests Tasmania Report 2012* includes data showing the change in reservation levels since 1996 for high-quality wilderness areas (Forest Practices Authority 2012a). This is reported in the context of forest available for recreation and tourism. In 2011, 97 per cent of high quality wilderness areas were protected within the comprehensive, adequate and representative reserve system compared to 86 per cent of high-quality wilderness areas protected in 1996. The Tasmanian Wilderness World Heritage Area covers an area of 1.38 million hectares or 20 per cent of the land area of Tasmania and is one of only three temperate wilderness areas remaining in the southern hemisphere.

Third independent five-yearly review of the Tasmanian Regional Forest Agreement

No matters relating to wilderness values were raised during the consultation period for the third five-yearly review of the Tasmanian Regional Forest Agreement.

The independent reviewer's report made one recommendation that has implications for the future assessment of wilderness values:

Recommendation 5 – The State builds on its existing monitoring framework to develop a long-term forest condition monitoring system across all forest tenures to assess changes in ecosystem health and vitality.

This recommendation was considered and agreed to by the Australian and Tasmanian governments in the *Joint Australian and Tasmanian Government Response to the Review of Implementation of the Tasmanian Regional Forest Agreement for the Period 2007–2012* (Australian Government and Tasmanian Government 2016):

The Australian and Tasmanian governments recognise that a state-wide forest monitoring information system would be a valuable tool to assess and monitor changes in ecosystem health and vitality.

Through the Australian and Tasmanian State of the Forests Report series, the scale and impact on forest health is identified from a variety of processes and agents, both natural and human-induced.

Tasmania's public forest managers have a range of monitoring systems that cover different aspects of the forest estate. The information from these systems is used to inform adaptive management and continuous improvement approaches to the management of Tasmanian forests.

The Tasmanian Government agrees to consider implementing a state-wide forest monitoring information system. This would likely require greater integration of existing systems and the development of new tools to assist in the long-term monitoring of forest condition and biodiversity, including threatened species.

Wilderness values in the Tasmanian Wilderness World Heritage Area 2016

Note: World Heritage values are covered in a separate chapter.

Wilderness is defined in the *Tasmanian Wilderness World Heritage Area Management Plan 2016* (Department of Primary Industries, Parks, Water and Environment 2016a) as:

A wilderness area is an area that is of sufficient size, remoteness and naturalness to enable the long-term integrity of its natural systems, diversity and processes, the maintenance of cultural landscapes and the provision of a wilderness recreational experience.

The wilderness values of the Tasmanian Wilderness World Heritage Area are significant internationally, as only two other areas in the southern hemisphere (Fiordland in New Zealand and Patagonia in South America) contain significant areas of protected temperate wilderness. The Tasmanian Wilderness World Heritage Area contains the largest areas of wilderness in south-eastern Australia. The large extent of remote and largely undisturbed country forms the tangible component of wilderness value in the Tasmanian Wilderness World Heritage Area. These areas are fundamental to the integrity of the Tasmanian Wilderness World Heritage Area and many of the natural and aesthetic values that form part of its Outstanding Universal Value. The scale and remoteness of these areas is also important in the protection of the Aboriginal cultural values contained within them.

Under the *Tasmanian Wilderness World Heritage Area Management Plan 2016*, a key desired outcome is that wilderness is managed for the protection of its integrity, natural and cultural values and the quality of the recreational experience it provides. Management actions include:

- designate the majority of the Tasmanian Wilderness World Heritage Area as a Wilderness Zone and enforce zoning prescriptions that manage physical development and human use in a manner that protects wilderness and other values
- ensure that impacts on wilderness values are considered in any assessment of activities in the Tasmanian Wilderness World Heritage Area.

Other information

Collation of data in preparation for completing the *State of the Forests Tasmania Report 2017* has identified that an additional 300 hectares of high quality wilderness areas have been protected within the comprehensive, adequate and representative reserve system since 2011 (Forest Practices Authority, in prep.).

Endangered species values

According to the *National Forest Policy Statement* (1992a), endangered species are species of animals or plants that are at risk of extinction and whose survival is unlikely if the causal factors continue operating (Commonwealth of Australia 1992a). Included are species whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that the species are deemed to be in danger of extinction. Also included are species that are possibly already extinct but have definitely been seen in the wild in the past fifty years and have not been subject to recent thorough searching.

Under the Tasmanian Regional Forest Agreement, endangered species were included in the priority species list for protection. It is proposed that an extended Tasmanian Regional Forest Agreement will have new terminology: 'Listed Species and Communities'. This is defined as species and communities listed in accordance with Part 13 of the *Environment Protection and Biodiversity Conservation Act 1999*, including threatened species, ecological communities, migratory species and other listed categories, or fauna or flora that are a threatened species within the meaning of the *Threatened Species Protection Act 1995* (Tas) or the native vegetation communities listed under Schedule 3A of the *Nature Conservation Act 2002* (Tas). Listed species (or threatened species) in this assessment will encompass 'endangered species', which are specifically referred to as part of 'environmental values' in para (a)(j) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth). However, the concept of 'listed species' is broader than the meaning of endangered species as defined in the *National Forest Policy Statement* as it includes extinct, extinct in the wild, critically endangered, endangered, vulnerable and conservation dependent categories.

The 1997 Tasmanian Regional Forest Agreement addressed conservation of threatened species in three ways: providing a system of conservation reserves; maintaining a permanent native forest estate; and management of habitat in areas outside the reserve system.

For management of habitat in areas outside the reserve system, the agreement specified responsibilities for development and implementation of a Threatened Species Protection Strategy, recovery plans and threat abatement plans for threatened species and forest communities listed under Commonwealth or state legislation. 'Priority species', that is, those listed as endangered or threatened, were agreed to be protected in reserves or by applying management prescriptions for forestry practices. The agreement (clause 88) also specified areas for continuing research including research to underpin requirements for recovery plans and threat abatement plans. Recognising that new information might lead to changed priorities, the Tasmanian Regional Forest Agreement requires that continued consultation is undertaken on the priorities for listing threatened species, forest communities and threatening processes and for preparation of recovery plans and threat abatement plans.

Endangered (listed) species value are reported based on the indicator developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (Table 6). Indicators grouped under these criteria allow the presentation of data in a consistent and repeatable format.

Table 6 – Indicator relating to endangered (listed) species values developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests

Criterion 1: Conservation of biological diversity
1.2 Species diversity
Indicator 1.2.b – The status of forest-dwelling species at risk of not maintaining viable breeding populations, as determined by legislation or scientific assessment

The 1997 Comprehensive Regional Assessment

The Tasmanian Public Land Use Commission (1996) assessed endangered species as part of the Comprehensive Regional Assessment. This was based on a literature survey, which assessed impacts of disturbances, life history attributes and population parameters for 514 flora species and 182 fauna species. Modelling was used to determine the distribution of species.

When designing the reserve system that resulted from the Tasmanian Comprehensive Regional Assessment process, the JANIS criterion prioritised rare, vulnerable and endangered ecosystems and species.

As part of the Tasmanian Comprehensive Regional Assessment, experts classified fauna and flora into categories and made a number of recommendations for protection of species in Tasmania. These included:

- protecting locations of species with extremely restricted distributions or endangered species considered to be adversely affected by forestry operations
- combining protection of core habitats and management prescriptions for some species, and other species managed by prescription because of logistics
- including a process in the Tasmanian Regional Forest Agreement for the preparation and implementation of recovery plans for the 13 endangered species and 24 vulnerable species listed in Tasmania under the Commonwealth's *Endangered Species Protection Act 1992*.

The Tasmanian Comprehensive Regional Assessment mapped the distribution of 50 forest communities. 20 communities were considered rare, vulnerable or endangered using criteria from the proposed national forest reserve criteria (Tasmania–Commonwealth Joint Steering Committee 1997). Sixteen rare, vulnerable or endangered forest communities did not meet the JANIS criteria (for 15 communities there was insufficient area on public land). The total shortfall was 81 490 hectares.

As at 1997, Tasmania had a total of 41 migratory bird species, 16 of which were associated with forests. Two of these species associated with forests had nationally threatened status: the swift parrot, *Lathamus discolor*, and the orange-bellied parrot, *Neophema chrysogaster*. The other 14 species associated with forests were considered widespread and common.

Research reports were prepared for a number of species including the swift parrot and the giant freshwater lobster (*Astacopsis gouldi*). Findings from these reports included:

- A census of the swift parrot population conducted in the 1995 breeding season located 940 pairs compared to a total of 1320 pairs counted during a previous survey in 1987. It was concluded that the major threatening process in Tasmania was the loss of habitat within the restricted breeding distribution of the species.
- Threats to the freshwater lobster included fishing pressure and fragmentation of habitat. The population structure at two survey locations showed evidence of disturbance. Adult size classes were under-represented, especially for males.

The Tasmanian Regional Forest Agreement identified 170 species of flora and 59 species of fauna as priority species for protection. A list of the priority species listed in Attachment 2 of the Tasmanian Regional Forest Agreement and their current status under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) and the *Threatened Species Protection Act 1995* (Tas) is provided at Appendix A. Under the Tasmanian Regional Forest Agreement, they were protected through management of the comprehensive, adequate and representative reserve system or by applying relevant management prescriptions.

Threatened species listing

After the Tasmanian Regional Forest Agreement was signed, new Commonwealth legislation came into force that changed the definition and assessment of endangered species at the national level. The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) aims to provide for the protection of the environment, especially matters of national environmental significance. These matters include nationally threatened species and ecological communities.

In order to determine if a species is eligible for listing as threatened in one of the categories under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth), a rigorous scientific assessment of the species' threat status is undertaken. These assessments are undertaken by the Threatened Species Scientific Committee to determine if the item is eligible for listing against a set of criteria that is available on the Department of the Environment and Energy's website (Department of the Environment and Energy n.d.a).

In Tasmania, the *Threatened Species Protection Act 1995* provides protection for listed flora, fauna and threatened vegetation communities. There are two mechanisms that may prompt consideration of whether a species is to be added to, or omitted from, the schedules of threatened flora and fauna. Firstly the Scientific Advisory Committee may recommend to the Minister that an eligible taxon be added to the schedules, or that any taxon of flora or fauna that is no longer eligible be omitted from the schedules (s 13(4)). The second avenue that may trigger changes to the schedules of listed species is that any person may nominate the addition of an eligible taxon of fauna or flora, or the omission of an ineligible taxon of fauna and flora (s 16).

In the case of a public nomination, the Scientific Advisory Committee may only reject the nomination if the subject of the nomination is already listed, the nomination is vexatious, or the nomination is not in a prescribed form (s 17). If the nomination is not rejected, the Scientific Advisory Committee must make a preliminary recommendation that the nomination be

supported or rejected, and give public notification of that preliminary recommendation (s 18). After considering public comments, the Scientific Advisory Committee must then make a final recommendation to the Minister that the nomination be rejected or supported, and the Minister must decide whether or not a taxon of flora or fauna is to be added to, or omitted from, the schedules within 30 days of receiving the final recommendation (s 21(1)). The Secretary must give public notification and advise the Community Review Committee of the Minister's decision; and make the reasons for the decision available to the public (s 21(3)).

The process for amending the schedules of threatened species is then the same irrespective of whether the changes were recommended to the Minister directly by the Scientific Advisory Committee; or nominated by the public and subsequently recommended to the Minister by the Scientific Advisory Committee.

In considering recommendations for the listing of flora and fauna, the Minister must have regard only to matters of nature conservation (s 21(2)).

After considering a recommendation by the Scientific Advisory Committee, and giving public notification of a proposed order, the Minister may add an item to, amend an item in, or omit an item from the schedules of threatened species by Ministerial order (s 13(5)). Public notification means publication in the Gazette and in each newspaper circulating generally in Tasmania (s 3).

A person may appeal to the Resource Management and Planning Appeal Tribunal against the proposed order within 30 days of public notification.

If an appeal is upheld, the order is taken to be disallowed and ceases to have effect on the date that the Tribunal notified the public of that fact, but this does not affect the validity of the order before the disallowance (s 14(6(b))).

Threatened species management

Threatened species and communities are protected under the *Nature Conservation Act 2002* (Tas), *Threatened Species Protection Act 1995* (Tas) and provisions of the Forest Practices Code 2015. The *Nature Conservation Act 2002* (Tas) provides for the listing of threatened native vegetation communities in Tasmania. The *Threatened Species Protection Act 1995* (Tas) provides for the conservation management of scheduled threatened species of flora and fauna. The Forest Practices Code requires consideration of both Commonwealth and state listed threatened and migratory species.

Threatened species are protected within the forest practices system through the Forest Practices Code, which requires the management of threatened species to be in accordance with procedures for the management of threatened species under the forest practices system (Agreed Procedures) agreed between the Forest Practices Authority and Department of Primary Industries, Parks, Water and Environment. These Agreed Procedures provide equivalent or greater protection than that provided under the *Threatened Species Protection Act 1995* (Tas).

Under the Agreed Procedures, the Forest Practices Authority and Department of Primary Industries, Parks, Water and Environment have a system of exchanging information on the distribution of threatened species. This ensures species range boundaries are kept up-to-date, which in turn ensures that adequate consideration is given to the potential for threatened

species to be present in an operational area. The maintenance of range boundaries (and by extension the core and known ranges) is an essential component of a continuous improvement model.

Wetland vegetation is also a threatened native vegetation community listed under the *Nature Conservation Act 2002* (Tas) and is given legislative protection from clearance and conversion under the *Forest Practices Act 1985* (Tas).

State of the Forests Tasmania Report 2012

A summary of the indicator relating to endangered species values in the *State of the Forests Tasmania 2012 Report* (Forest Practices Authority 2012a), which covers the period from July 2006 to June 2011, is provided below.

Indicator 1.2.b – The status of forest-dwelling species at risk of not maintaining viable breeding populations, as determined by legislation or scientific assessment

In 2011, the percentage of forest flora considered rare, vulnerable or endangered was 26 per cent, and one per cent was presumed extinct. Of the 138 forest-dwelling vertebrates (13 fish, eight amphibians, 15 reptiles, 69 birds and 33 mammals) in Tasmania, 20 per cent were considered rare, vulnerable or endangered in 2011⁴.

The *State of the Forests Tasmania Report 2012* also provided further information on selected species, including the swift parrot. During the 2004–05 and 2005–06 breeding seasons nest site surveys found 134 swift parrot nests. Previous to this dedicated study only 40 nests had been recorded throughout Tasmania. Many of these nests formed breeding aggregations of up to 50 nests covering approximately 100 hectares. The information collected from known nest sites and from additional surveys targeting both nesting and foraging habitat has been integrated into the management of breeding habitat, and used to identify high potential nesting habitat.

⁴ The *State of the Forests Tasmania Report 2012* (Forest Practices Authority 2012a) includes a list of RFA Priority Species, and their status under the *Threatened Species Protection Act 1995* (Tas) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (as at December 2011).

Third independent five-yearly review of the Tasmanian Regional Forest Agreement 2012

A number of matters were raised in submissions to the review on the topic of threatened species. They are summarised as:

- revision of legislation and regulation
- increased monitoring with targets of threatened species
- increased funding for monitoring and research and greater research adaptation—translation of new results into management practices.

The Australian and Tasmanian governments signed a *Memorandum of Understanding – Species Information Partnership* in relation to the alignment of threatened species lists. The partnership lasted for three years from April 2010. At the time of the review, there were 681 species listed under the *Threatened Species Protection Act 1995* (Tas) and 211 under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

The threatened species Scientific Advisory Committee created under the *Threatened Species Protection Act 1995* (Tas) undertakes ongoing review of species listed under the *Threatened Species Protection Act 1995* (Tas). The threatened species Scientific Advisory Committee examines and endorses prescriptions in the Forest Practices Authority's Threatened Species Advisor that contains management prescriptions for key species.

The independent reviewer found that judging the overall success of threatened species management and the broader biodiversity outcomes under the Tasmanian Regional Forest Agreement is difficult given the limited monitoring of outcomes. Individual species monitoring will help to build a knowledge base that can be complemented by broader macro and more strategic studies and needs to be extended to test other tenants of the Tasmanian Regional Forest Agreement in relation to biodiversity conservation, i.e. a more systematic approach as well as a focus on threatened species.

The independent reviewer made two recommendations that have implications for the assessment of listed species values in the future:

Recommendation 5 – The State builds on its existing monitoring framework to develop a long-term forest condition monitoring system across all forest tenures to assess changes in ecosystem health and vitality.

Recommendation 6 – The Parties continue to improve the mechanisms in place to research, evaluate and communicate outcomes for the protection of threatened species and biodiversity across all forest tenures.

These recommendations were considered and agreed to by the Australian and Tasmanian governments in the *Joint Australian and Tasmanian government response to the recommendations in the Independent Reviewer's Report to the Australian and Tasmanian*

Governments on the third five-yearly review of the Tasmanian Regional Forest Agreement (November 2015) (Australian Government and Tasmanian Government 2016):

The Australian and Tasmanian governments recognise that a state-wide forest monitoring information system would be a valuable tool to assess and monitor changes in ecosystem health and vitality.

Through the Australian and Tasmanian State of the Forests Report series, the scale and impact on forest health is identified from a variety of processes and agents, both natural and human-induced.

Tasmania's public forest managers have a range of monitoring systems that cover different aspects of the forest estate. The information from these systems is used to inform adaptive management and continuous improvement approaches to the management of Tasmanian forests.

The Tasmanian Government agrees to consider implementing a state-wide forest monitoring information system. This would likely require greater integration of existing systems and the development of new tools to assist in the long-term monitoring of forest condition and biodiversity, including threatened species.

The Australian and Tasmanian governments recognise that improved research, evaluation and communication mechanisms can contribute to improved outcomes for threatened species and biodiversity, and agree to continue to improve these mechanisms as part of an adaptive management framework. Opportunities for outcomes focused monitoring and reporting will be considered as part of the extension process.

The Australian and Tasmanian governments are committed to protecting and improving the conservation of Tasmania's threatened species and will continue to work together in the development and implementation of conservation advices and recovery plans. In signing the Memorandum of Understanding for the implementation of a common assessment method for the listing of threatened species and ecological communities, the Parties have committed to improving cross-jurisdictional consistency in the assessment of threatened species status.

The Threatened Species Commissioner, appointed by the Commonwealth Government, is also working collaboratively with all levels of government, scientists, the non-profit sector, industry and the community to deliver better outcomes for threatened species across all tenures. The Commissioner is currently focused on achieving the targets set out in Australia's first Threatened Species Strategy.

The Tasmanian Government continues to prepare listing statements and note sheets for threatened species, and makes this information widely available through the Threatened Species Link—a website designed to provide advice on how to manage threatened species in Tasmania.

The status, extent and required conservation measures for threatened fauna species are regularly reviewed by the State, in accordance with the Agreed Procedures for the Management of Threatened Species under the Forest Practices System. These measures are made available through the Threatened Fauna Adviser—a decision-support system to

advise on the management of threatened fauna in wood production forests in Tasmania. An equivalent adaptive management tool is being developed by the Forest Practices Authority for threatened flora.

Listed species values in the Tasmanian Wilderness World Heritage Area

(Note: there is a separate chapter for World Heritage values.)

The Tasmanian Wilderness World Heritage Area provides important habitat for more than 130 species of flora and fauna that are listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* and Tasmanian *Threatened Species Protection Act 1995*. A third of Tasmania's threatened species occur in the Tasmanian Wilderness World Heritage Area, including the critically endangered orange-bellied parrot (*Neophema chrysogaster*), Pedder galaxias (*Galaxias pedderensis*), Kings holly (*Lomatia tasmanica*) and the Tasmanian pearlwort (*Sagina diemensis*), as well as the endangered Tasmanian devil (*Sarcophilus harrisi*) and drooping pine (*Pherosphaera hookeriana*).

Most rare and threatened species in the Tasmanian Wilderness World Heritage Area are naturally rare or they are threatened by processes outside the Tasmanian Wilderness World Heritage Area. Thus, the protected habitats in the Tasmanian Wilderness World Heritage Area are vital for the conservation of these species. A number of species are threatened by the spread of weeds, pests and disease into the Tasmanian Wilderness World Heritage Area as well as inappropriate fire regimes. The distribution and ecology of a number of rare and threatened species remain poorly known, particularly for invertebrates and non-vascular plant species.

A key outcome for threatened species in the Tasmanian Wilderness World Heritage Area is that threatened species and ecosystems remain at least stable or increase in population or extent. A management action (in the Tasmanian Wilderness World Heritage Area Management Plan) is to implement key actions in threatened species and community recovery plans and threat abatement plans.

Other information

In the period 30 June 2011 to 30 June 2016, the status of 13 Tasmanian taxa changed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (Table 7).

Table 7 – Summary of changes in listing status under the EPBC Act from 30 June 2011 to 30 June 2016 (not including ocean fauna or shore birds or Macquarie Island taxa)

Change	Flora	Fauna
Number of species with changed EPBC Act listing status	6	7
Number of species which have moved to a higher category of risk (including number of species now determined to be extinct)	0	1
Number of species which have moved to a lower category of risk* (including number of species rediscovered from extinct status)	1	0
Number of species added to the EPBC Act list (including number of species now determined to be extinct)	1	6
Number of species de-listed (including number of species previously listed as extinct)	4	0

For the same period there were 48 changes to the listings under the *Threatened Species Protection Act 1995* (Tas) (Table 8). The majority of these changes were due to taxonomic review of flora species, new knowledge coming from greater survey effort, and the identification of new threats (such as the predation impact of sugar gliders on the swift parrot).

Table 8 – Summary of changes in listing status under Threatened Species Protection Act 1995 (Tas) of Regional Forest Agreement Priority Species from 30 June 2011 to 30 June 2016

Change	Flora	Fauna
Number of species with changed <i>Threatened Species Protection Act 1995</i> listing status	45	3
Number of species which have moved to a higher category of risk (including number of species now determined to be extinct)	6(0)	2(0)
Number of species which have moved to a lower category of risk (including number of species rediscovered from extinct status)	2(0)	1(0)
Number of species added to the <i>Threatened Species Protection Act 1995</i> Act list (including number of species now determined to be extinct)	14(1)	0
Number of species de-listed (including number of species previously listed as extinct)	23(1)	0

The current *Environment Protection and Biodiversity Conservation Act 1999* listed species (including migratory species) and ecological communities for terrestrial Tasmania are provided at Table 66 (Appendix B) and Table 67 (Appendix B) respectively. This information is available from the Protected Matters Search tool available on the Department of the Environment and Energy's website (Department of the Environment and Energy 2013a).

National Estate values

National Estate values in the *Regional Forest Agreements Act 2002* (Cth) refer to the aesthetic, historic, scientific or social significance or other values of places that form part of the natural environment or cultural environment of Australia that make those places of significance or special value to current and future generations. The former Register of the National Estate has since been replaced by a graduated system under Commonwealth and state legislation. Values previously listed as part of the Register of the National Estate are now managed through a combination of the National and Commonwealth Heritage Lists, the Tasmanian Heritage Register and the Heritage Codes of local planning schemes.

The current Tasmanian Regional Forest Agreement defines 'National Estate values' as values attributed by the Australian Heritage Commission to the National Estate. The Register of the National Estate was originally established under the *Australian Heritage Commission Act 1975* (Cth), but this was repealed by the *Australian Heritage Council (Consequential and Transitional Provisions) Act 2003* (Cth). Section 4 of the *Australian Heritage Commission Act 1975* defined the 'national estate' as consisting of those places, being components of the natural environment or the cultural environment of Australia, that have aesthetic, historic, scientific or social significance or other special value for future generations as well as for the present community.

Following the repeal of the *Australian Heritage Commission Act 1975* (Cth), the Register of the National Estate was progressively phased out, with places no longer being added to, or removed from the Register since 2007. All Tasmanian places of state significance previously on the Register of the National Estate for historic cultural heritage values were assessed for listing under the Tasmanian Heritage Register, in accordance with the Council of Australian Government's agreement to rationalise Commonwealth–state heritage arrangements. Places not of state heritage significance may have been identified as being of local significance, and if so, are protected under the Heritage Code of local planning schemes. The archival Register of the National Estate List can be publically accessed on the Australian Heritage Database (Department of the Environment and Energy 2007a).

Places identified as being of state significance are protected under the *Historic Cultural Heritage Act 1995* (Tas). Heritage Tasmania manages the Tasmanian Heritage Register for the Tasmanian Heritage Council. The Tasmanian Heritage Council has legal powers to stop identified places being demolished or changed in a way that may lessen their heritage value.

In 2003 the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was amended to include 'national heritage places' as a matter of national environmental significance. These amendment came into effect on 1 January 2004 and included the formation of the National Heritage and Commonwealth Heritage Lists (Department of the Environment and Energy n.d.b, n.d.c).

The National Heritage List includes places that have outstanding heritage value to the nation for their natural, Indigenous and historic heritage values. The Commonwealth Heritage List includes places with significant heritage value that are controlled or owned by the Australian Government, including places that are connected to defence, communications, customs and other government activities. Heritage places of national significance on the Register of the

National Estate or on Commonwealth land were considered for inclusion on the National or Commonwealth Heritage Lists after the phase-out of the Register of the National Estate.

At the national level, the Australian Heritage Council was established in 2004 by the *Australian Heritage Council Act 2003*. The main role of the Australian Heritage Council is the assessment and nomination of nationally significant heritage places and the provision of advice and policy to support major national heritage programs.

The *Historic Cultural Heritage Act 1995* (Tas) required the establishment and maintenance of the Tasmanian Heritage Register for places of state heritage significance. The *Historic Cultural Heritage Act 1995* (Tas) requires that approval be sought for works on places listed on the Tasmanian Heritage Register. The Tasmanian Heritage Council is established under the *Historic Cultural Heritage Act 1995* (Tas) and provides that approvals function. Within the Tasmanian Department of Primary Industries, Parks, Water and Environment, Heritage Tasmania supports the Tasmanian Heritage Council, coordinates historic heritage strategy and facilitates development of the historic heritage sector.

Reporting of current heritage value is based on the indicator developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (Table 9), however this is only a subset of National Estate values. Indicators grouped under these criteria allow the presentation of data in a consistent and repeatable format.

Table 9 – Indicator relating to National Estate values under the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests

<i>Criterion 6: Maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies</i>
6.4 Cultural, social and spiritual needs and values
Indicator 6.4.b – Registered places of non-Indigenous cultural values in forests that are formally managed to protect these values

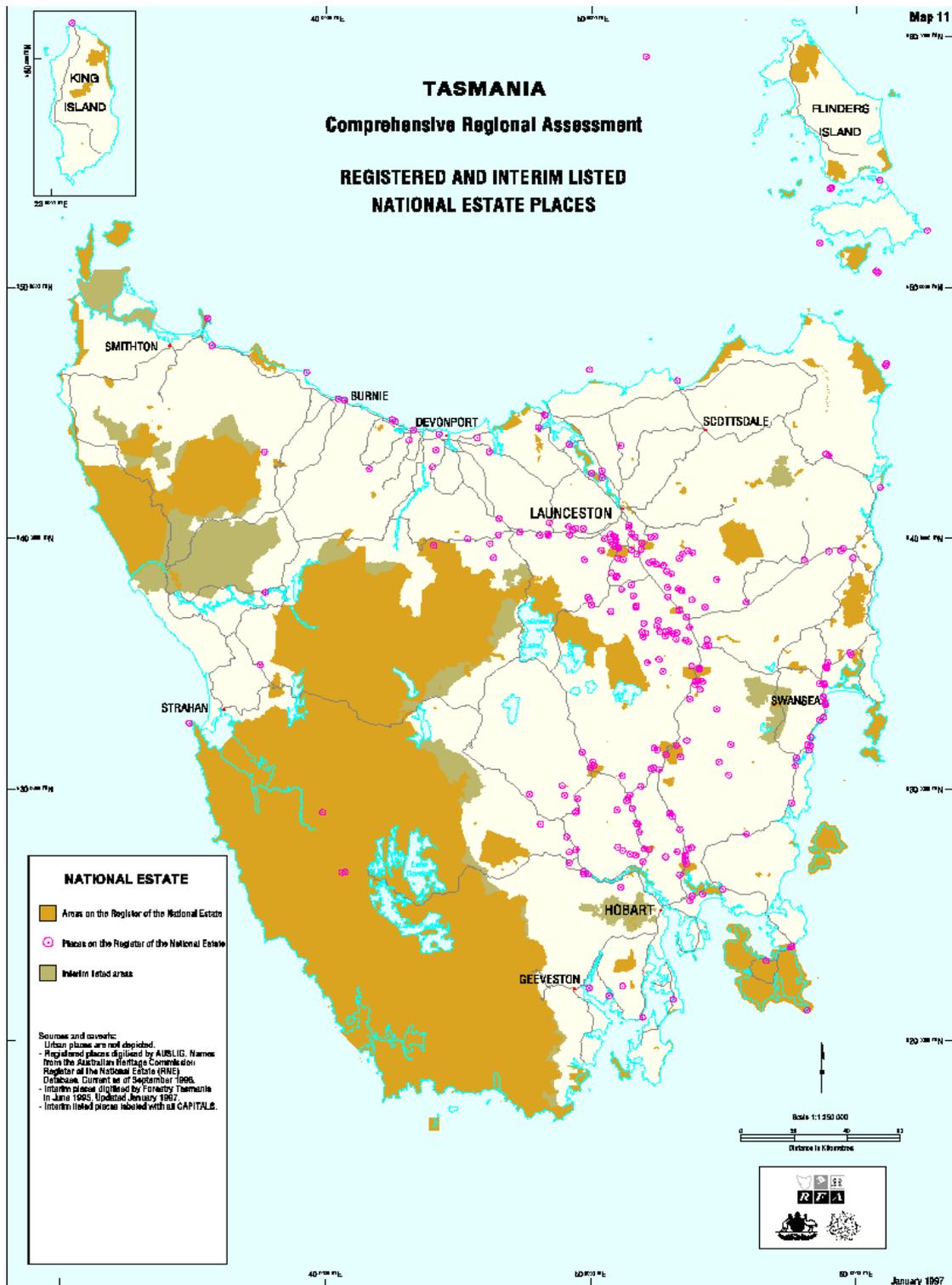
Tasmanian Comprehensive Regional Assessment

In 1997, the Tasmanian Comprehensive Regional Assessment defined National Estate values as the aesthetic, historic, scientific or social values attributed to places by the Australian Heritage Commission. As part of the Comprehensive Regional Assessment process, areas of potential National Estate value were identified and assessed in Tasmanian forests. Over 130 areas were identified by an expert panel as indicative National Estate places of historic, social or aesthetic cultural value (see Figure 7, Figure 8, Figure 9, Figure 10 and Figure 11 for maps of registered and interim National Estate places, nature values, geo-heritage values, natural history sites and cultural values that were identified as part of this process). A subset of these were subsequently delineated and listed on the Register of the National Estate by the Australian Heritage Commission. Many of the areas identified by the panel were already on the Register of the National Estate.

The main outcomes of the Comprehensive Regional Assessment included: identification of over 70 new indicative National Estate forest places of historic value, including mining places, timber industry sites and transport routes; identification of over 60 indicative National Estate forest places of particular importance to the Tasmanian community; and identification of many thousands of indicative National Estate forest places, many of them overlapping and having significance for one or more natural values.

In order to ensure National Estate values in forests were identified and managed on a long-term basis, the Australian and Tasmanian governments examined forest management practices through an independent assessment of ecologically sustainable forest management (Tasmanian Public Land Use Commission 1997a, 1996b). This assessment examined the legislative framework in Tasmania and determined whether suitable mechanisms existed for the conservation of National Estate values. Conservation principles and management regimes were also assessed to identify their inadequacies, and to inform the development of improved comprehensive and integrated conservation and management principles (guidelines) for National Estate values. The results of these two assessment processes contributed to the development of the Tasmanian Regional Forest Agreement.

Figure 7 – Registered and interim listed National Estate places identified in the Tasmanian Comprehensive Regional Assessment



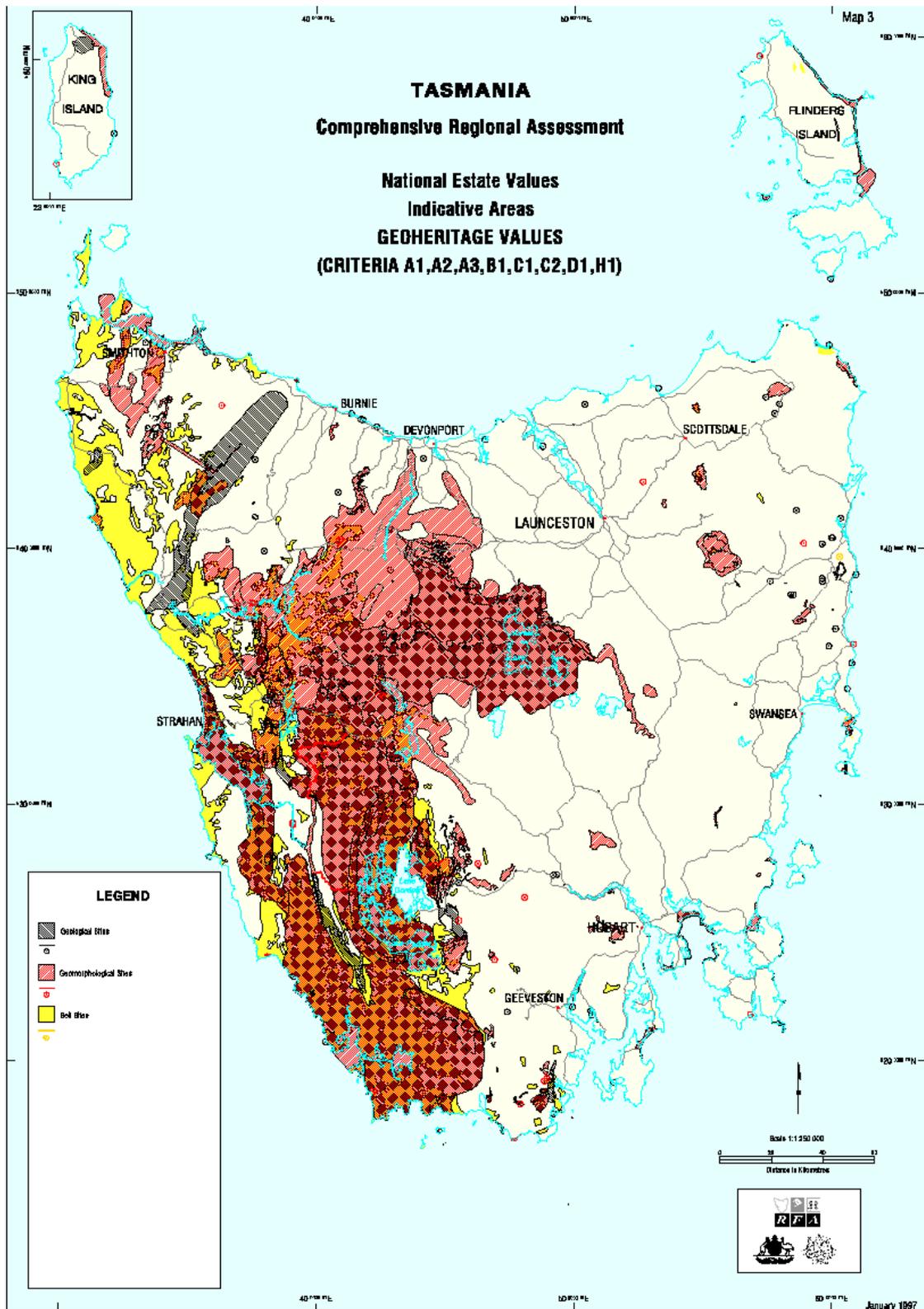
Source: Tasmanian Public Land Use Commission (1997b)

Figure 8 – Extensive natural values identified in the Tasmanian Comprehensive Regional Assessment



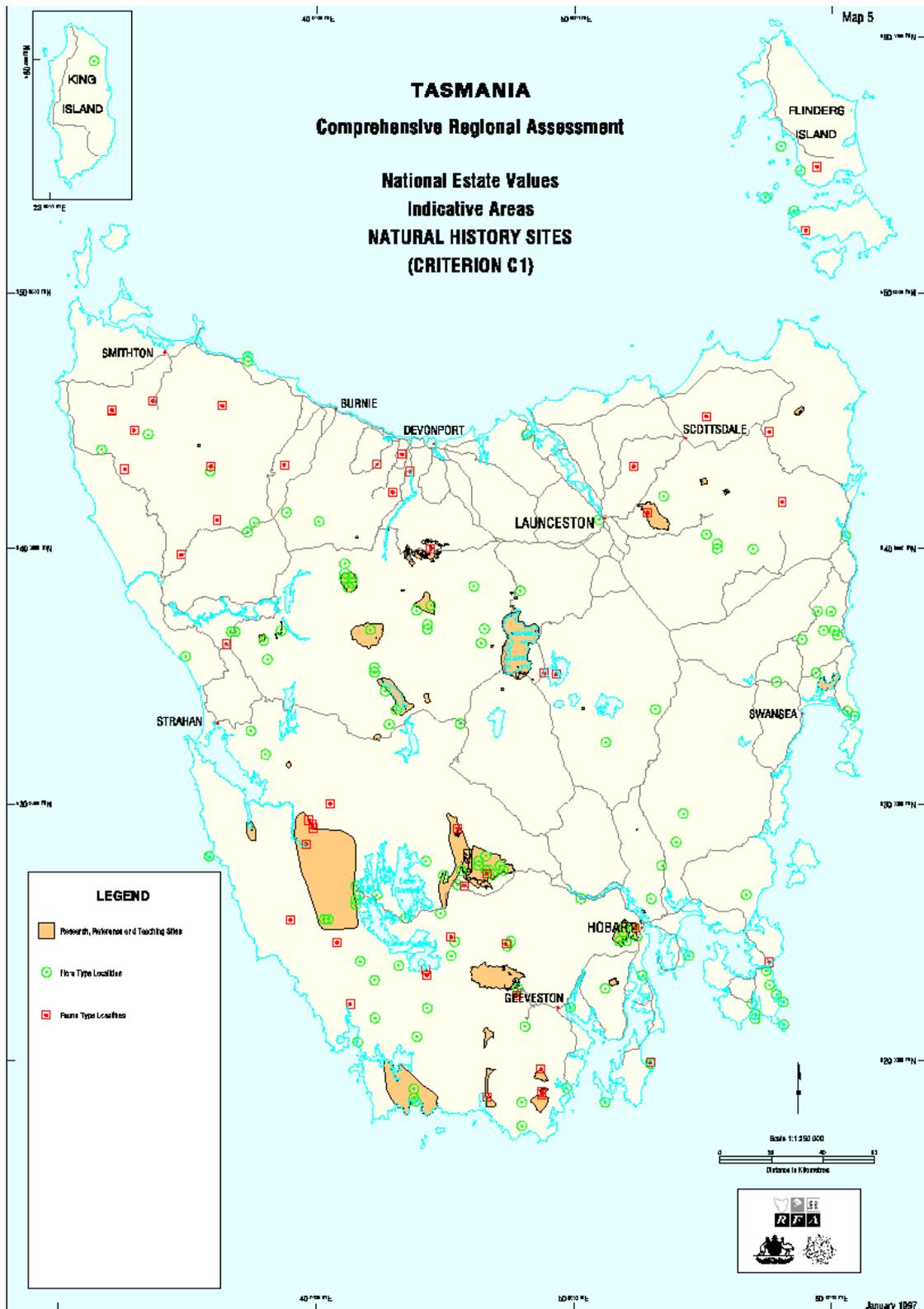
Source: Tasmanian Public Land Use Commission (1997b)

Figure 9 – Geo-heritage values identified in the Tasmanian Comprehensive Regional Assessment



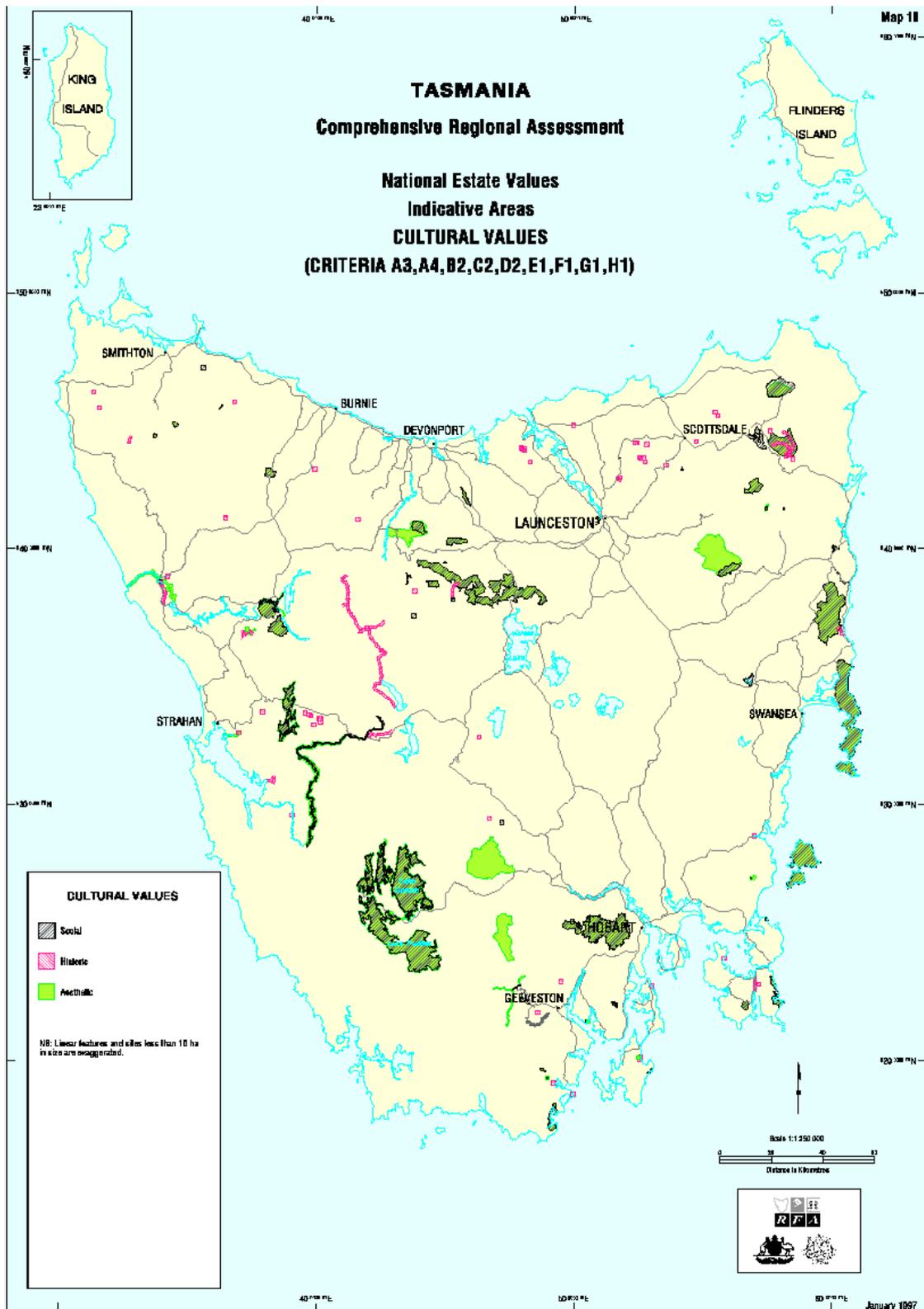
Source: Tasmanian Public Land Use Commission (1997b)

Figure 10 – Natural history sites identified in the Tasmanian Comprehensive Regional Assessment



Source: Tasmanian Public Land Use Commission (1997b)

Figure 11 – Cultural values identified in the Tasmanian Comprehensive Regional Assessment



Source: Tasmanian Public Land Use Commission (1997b)

Register of the National Estate frozen from 19 February 2007

The Register of the National Estate was a list of natural, Indigenous and historic heritage places throughout Australia. From 19 February 2007 the Register was frozen, meaning that no places can be added or removed.

A new national heritage system was established under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) on 1 January 2004. This introduced the National Heritage List, which was designed to recognise and protect places of outstanding heritage to the nation, and the Commonwealth Heritage List, which includes Commonwealth owned or leased places of significant heritage value. The establishment of this national system was in line with a 1997 agreement by the Council of Australian Governments, that each level of government should be responsible for protecting heritage at the appropriate level. The Australian Government's role in relation to heritage is to focus on protecting places of world and national heritage significance and on ensuring Commonwealth compliance with state heritage and planning laws. Each state and territory government, and local government, has a similar responsibility for its own heritage (Department of the Environment and Energy 2007b).

Assessment processes for the National and, Commonwealth Heritage Lists and the Tasmanian Heritage Register are used to identify and protect heritage values. The current places in Tasmania on the National Heritage List and the Commonwealth Heritage List are provided in Table 10 and Table 11 below.

Table 10 – Tasmanian National Heritage Listed places

Name	Class
Brickendon Estate	Historic
Cascades Female Factory	Historic
Cascades Female Factory Yard 4 North	Historic
Coal Mines Historic Site	Historic
Darlington Probation Station	Historic
Jordan River Levee	Indigenous
Macquarie Island	Natural
Port Arthur Historic Site	Historic
Recherche Bay (North East Peninsula) Area	Historic
Richmond Bridge	Historic
Tasmanian Wilderness	Natural
Western Tasmania Aboriginal Cultural Landscape	Indigenous
Woolmers Estate	Historic

Source: Department of the Environment and Energy (n.d.b)

Table 11 – Tasmanian Commonwealth Heritage Listed places

Name	Class
Anglesea Barracks	Historic
Australian Maritime College, Newnham Campus	Historic
Cape Sorell Lighthouse	Historic
Cape Wickham Lighthouse	Historic
Eddystone Lighthouse	Historic
Edward Braddon Commonwealth Law Courts	Historic
Gosse Island Lighthouse	Historic
Hobart Airport Air Traffic Control Tower	Historic
Hobart General Post Office	Historic
Launceston Airport Air Traffic Control Tower	Historic
Launceston General Post Office	Historic
Mersey Bluff Lighthouse	Historic
North Hobart Post Office	Historic
Paterson Barracks Commissariat Store	Historic
Pontville Small Arms Range Grassland Site	Historic
Queenstown Post Office	Historic
Swan Island Lighthouse	Historic
Table Cape Lighthouse	Historic
Tasman Island Lighthouse	Historic

Source: Department of the Environment and Energy n.d.c

National Heritage List assessment

Anyone can nominate a place with outstanding heritage values for inclusion on the National Heritage List. The Australian Heritage Council assesses the values of nominated places against set criteria and makes recommendations to the Minister for the Environment and Energy about listing. The final decision on listing is made by the Minister (Department of the Environment and Energy n.d.d).

There are two key tools used to assess National Heritage List nominations: criteria and thresholds.

National Heritage List criteria

Heritage criteria, thresholds, and statutory listings are devices for identifying and protecting places we wish to keep. They are the primary means by which the heritage values of such places are articulated, and for guiding the management of these places.

The National Heritage criteria against which the heritage values of a place are assessed are:

- a. the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history
- b. the place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history
- c. the place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history
- d. the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:
 - a class of Australia's natural or cultural places, or
 - a class of Australia's natural or cultural environments
- e. the place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group
- f. the place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period
- g. the place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- h. the place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history
- i. the place has outstanding heritage value to the nation because of the place's importance as part of Indigenous tradition.

Note: The cultural aspect of a criterion means the Indigenous cultural aspect, the non-Indigenous cultural aspect, or both.

Thresholds

As well as assessing a place against criteria for its heritage value, the Australian Heritage Council is also required to apply a 'significance threshold'. This test helps the Council to judge the level of significance of a place's heritage value by asking 'how important are these values?'

To reach the threshold for the National Heritage List, a place must have 'outstanding' heritage value to the nation. This means that it must be important to the Australian community as a whole.

To determine whether a place has 'outstanding' heritage values, it is compared to other, similar types of places. This allows the Council to determine if one place is 'more' or 'less' significant compared to other similar places, or if it is unique. The degree of significance can also relate to the geographic area, for instance, the extent of a place's significance locally, regionally, nationally or internationally.

Commonwealth Heritage List assessment

Anyone can nominate a place with significant heritage values for the Commonwealth Heritage List. Each year the Minister for the Environment and Energy invites nominations. The nominated places are assessed by the Australian Heritage Council against a set criteria and a recommendation made to the Minister. The final decision on listing is made by the Minister (Department of the Environment and Energy n.d.c).

When a place is nominated to be included on the Commonwealth Heritage List, the Australian Heritage Council assesses the heritage value of that place against nine criteria and significance thresholds.

Commonwealth Heritage List criteria

The Commonwealth Heritage criteria against which the heritage values of a place are tested include:

- a. the place has significant heritage value because of the place's importance in the course, or pattern, of Australia's natural or cultural history
- b. the place has significant heritage value because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history
- c. the place has significant heritage value because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history
- d. the place has significant heritage value because of the place's importance in demonstrating the principal characteristics of:
 - a class of Australia's natural or cultural places, or
 - a class of Australia's natural or cultural environments
- e. the place has significant heritage value because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group
- f. the place has significant heritage value because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period
- g. the place has significant heritage value because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons

- h. the place has significant heritage value because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history
- i. the place has significant heritage value because of the place's importance as part of Indigenous tradition.

Under the heritage system, the Commonwealth Heritage List and the National Heritage List have similar criteria. The key difference is the level or 'threshold' of significance required to be reached to meet the criteria. Heritage experts are able to 'test' a place for heritage value against these criteria.

Thresholds

As well as assessing a place against criteria for its heritage value, the Council applies a 'significance threshold' test. This test helps the Council to judge the level of significance of a place's heritage value by asking 'just how important are these values?'

To reach the threshold for the National Heritage List, a place must have 'outstanding' heritage value to the nation. To be entered on the Commonwealth List, a place must have 'significant' heritage value.

Tasmanian Heritage Register

The Tasmanian Heritage Register was created in 1997 following the proclamation of the *Historic Cultural Heritage Act 1995* (Tas). It is an inventory of those places that have been assessed against eight criteria outlined in the *Historic Cultural Heritage Act 1995* (Tas) and identified as being important to Tasmania, and Tasmanians, because of their connections to the state's history, culture and society (Department of Primary Industries, Parks, Water and Environment 2017a). There are currently over 5000 sites on the Tasmanian Heritage Register. The Tasmanian Heritage Council continues to progressively assess properties on public land for inclusion on the Tasmanian Heritage Register.

Any person may nominate a place for inclusion in the Register. Once a property is nominated it will be assessed against the criteria outlined in the *Historic Cultural Heritage Act 1995*. The Heritage Council will consider whether a place meets the requisite criteria, in line with its Assessing Historic Heritage Significance Guidelines (currently under review), and the Burra Charter (Department of Primary Industries, Parks, Water and Environment 2017b).

For a place to be entered in the Register, it must meet at least one of the following criteria set out in the *Historic Cultural Heritage Act 1995*:

- a. the place is important to the course or pattern of Tasmania's history
- b. the place possesses uncommon or rare aspects of Tasmania's history
- c. the place has the potential to yield information that will contribute to an understanding of Tasmania's history
- d. the place is important in demonstrating the principal characteristics of a class of place in Tasmania's history

- e. the place is important in demonstrating a high degree of creative or technical achievement
- f. the place has a strong or special association with a particular community or cultural group for social or spiritual reasons
- g. the place has a special association with the life or works of a person, or group of persons, of importance in Tasmania's history
- h. the place is important in exhibiting particular aesthetic characteristics (Department of Primary Industries, Parks, Water and Environment 2017b).

Each nomination received will be assessed against each of the eight criteria set out in the *Historic Cultural Heritage Act 1995*. This process includes reviewing historical information, texts, maps and photographs.

If the Heritage Council is of the view that the place does meet one or more of the criteria, it begins the two-staged registration process outlined in the *Historic Cultural Heritage Act 1995*:

1. The first stage, known as provisional registration, gives the owner, local government, and all members of the Tasmanian community an opportunity to provide information and feedback on whether they think the place should be permanently entered on the Register. The owners and local government are sent letters to seek feedback, and a public notice is placed in the local newspaper advising. There is a 30-day period for submissions and objections to be sent to the Heritage Council for or against the permanent entry.
2. In a second stage, the Heritage Council considers any submissions and objections received. If the Heritage Council decides that the place should be entered on the Heritage Register, the place is said to be permanently registered and another round of notifications is issued (Department of Primary Industries, Parks, Water and Environment 2017b).

Indicator 6.4.b – Registered places of non-Indigenous cultural values in forests that are formally managed to protect these values

This indicator reports on the extent of public land that is specifically dedicated to the management of historic heritage values. These areas are managed for the heritage values that may relate to historic mining, timber-extraction or agricultural sites, as well as historic tracks, tramways, huts, fences and the like.

Recognition of non-Indigenous cultural heritage in forests has increased over the period of the Tasmanian Regional Forest Agreement, with more sites included in international, national and state level heritage lists.

State listed places

As at 2002, historic sites of significance were protected by formal and informal reserves. In state forest, areas specifically zoned for the management of historic heritage were identified in Forestry Tasmania's Management Decision Classification System as Special Management Zones for Cultural Heritage. About 112 sites in state forest were specifically managed to protect non-Indigenous cultural heritage. These lay within special management zones covering

18 000 hectares. There were an additional 28 places designated as Historic Sites covering 16 064 hectares (of which 4320 hectares are forested) managed under the *National Parks and Wildlife Act 1970* (Tas).

To 2012, 1500 sites were identified and managed in wood production forests to protect non-Indigenous cultural heritage, of which about 700 were new since 2006. These are managed in Special Management Zones which, when combined with indigenous areas, exceeds 49 900 hectares.

Under the state *Nature Conservation Act 2002*, 29 places are designated Historic Sites covering a total area of 16 100 hectares, of which approximately 4320 hectares are forested (there are four designated Historic Sites in forested areas). Regulations governing the use of all reserved land under the *Nature Conservation Act 2002* prohibit unauthorised removal, damage, defacement or disturbance of any object of archaeological, historical or scientific interest. Historic heritage sites within formal reserves are managed in accordance with the *Tasmanian Reserve Management Code of Practice*. Individual sites are identified and may be further protected by prescriptions contained within relevant reserve management plans.

During the period 2011–16, Forestry Tasmania identified 77 new non-Aboriginal cultural heritage sites. Individual historic sites on public and private land that are subject to forest practices plans are assessed and managed in accordance with the *Forest Practices Code 2015* and the Forest Practices Authority's *Procedures for Managing Historic Cultural Heritage*. The *Forest Practices Code 2016* requires that all sites found in the preparation of a forest practices plan are recorded and protected.

Nationally listed places

Historic and natural places of national significance are listed on the National Heritage List. In general terms, actions likely to have a significant impact on the national heritage values of the places are regulated under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). In Tasmania there are six sites listed primarily for their historic values. Four of these sites are in forested areas or have forested components: the Recherche Bay (North East Peninsula) French exploration site, the Coal Mines (Tasman Peninsula) convict site, the Darlington Probation Site on Maria Island, and Port Arthur Historic Site (includes Garden Point and Point Puer). There has been no increase in the number of these sites in the reporting period 2011–16.

Third independent five-yearly review of the Tasmanian Regional Forest Agreement 2012

The implementation report prepared for the third five-yearly review stated that National Estate values have been addressed at the state level in both forest management plans and reserve management plans prepared or revised since the Tasmanian Regional Forest Agreement was signed in 1997, and are addressed in operational planning through the provisions of the Forest Practices Code 2015.

No matters regarding National or State Heritage lists were raised in submissions during the third five-yearly review of the Tasmanian Regional Forest Agreement.

The Australian and Tasmanian governments report that approximately 90 per cent of places on the Register of the National Estate for historic or cultural heritage are now included in the Tasmanian Heritage Register. Of the remainder, those that are of local significance are managed under the Heritage Code of local planning schemes.

Kile (2015) made one recommendation that has implications for the future assessment of national estate values:

Recommendation 10 – The Parties follow-up on their responses to the 2007 review to ensure that compatibility to the Regional Forest Agreement with Commonwealth heritage protection legislation is considered as part of the Tasmanian Regional Forest Agreement renewal/extension process.

The Australian and Tasmanian governments agreed to this recommendation and their response was as follows:

The Environment Protection and Biodiversity Conservation Act 1999 (Cth) was amended in 2003 to include 'national heritage places' as a matter of national environmental significance. This amendment came into effect on 1 January 2004.

The Parties agree to review the compatibility of the Tasmanian Regional Forest Agreement with current Commonwealth and State legislative frameworks.

National Estate values in the Tasmanian Wilderness World Heritage Area Management Plan 2016

(Note: There is a separate chapter for World Heritage values.)

The *Tasmanian Wilderness World Heritage Area Management Plan* contains a rich legacy of historic heritage places that reflect the area's use since European settlement, as well as other National Estate values. There are a number of historic heritage sites and areas in the Tasmanian Wilderness World Heritage Area that may have historic cultural landscape values, recognising that broader landscapes and the sites they contain may reflect their historic use.

There are currently 17 heritage places in the *Tasmanian Wilderness World Heritage Area Management Plan 2016* that are listed under the *Historic Cultural Heritage Act 1995* (Tas). The principles of the Australia ICOMOS Charter for Places of Cultural Significance inform the management of historic heritage values in the *Tasmanian Wilderness World Heritage Area Management Plan 2016*. This charter, known as the Burra Charter, provides an internationally accepted standard for the conservation of cultural property. Conservation planning mechanisms contained in the charter, and established interpretations of these mechanisms, are used to protect historic heritage resources from both cultural and natural impacts.

The *Tasmanian Wilderness World Heritage Area Management Plan 2016* also contains natural heritage and cultural heritage values. The World Heritage values sub-chapter and the Indigenous values chapter contains further information on these values.

Other information

Collation of data in preparation for completing the *State of the Forests Tasmania Report 2017* has identified that there have been no new Tasmanian sites added to the national list since the previous report in 2012 (Forest Practices Authority, in prep.). There are therefore a total of 13 listed places on the National Heritage List, including Macquarie Island, the Tasmanian Wilderness and Western Tasmania Aboriginal Cultural Landscape, as well as places listed for historic values. 20 places are listed on the Commonwealth Heritage List according to the Australian Heritage Database.

Similarly, there has been no change to the number of sites listed on the Tasmanian Heritage Register during that time. Since 2012, Forestry Tasmania has identified 77 new non-Aboriginal cultural heritage sites. Individual historic sites on public and private land that are subject to forest practices plans are assessed and managed in accordance with the *Forest Practices Code 2015*. The Forest Practices Code requires that all sites found in the preparation of a forest practices plan are recorded and protected.

World Heritage values

World Heritage values comprise cultural heritage or natural heritage as defined in the World Heritage Convention (i.e. the *Convention concerning the Protection of the World Cultural and Natural Heritage*) and are referred to in para (a) of the definition of a Regional Forest Agreement in section 4 of the *Regional Forest Agreements Act 2002* (Cth).

‘World Heritage Area’ is the designation for places that are of outstanding universal value to humanity. They are inscribed on the World Heritage List to be protected for future generations to appreciate and enjoy (United Nations Educational, Scientific and Cultural Organisation World Heritage Centre 2017a). To be included on the World Heritage list, sites must be of outstanding universal value and meet at least one out of ten selection criteria. These criteria are based on cultural heritage and natural heritage as those terms are defined in the Convention.

Cultural heritage includes:

- *monuments*—architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science
- *groups of buildings*—groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science
- *sites*—works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.

Natural Heritage includes:

- natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view
- geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation
- natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.

World Heritage values relate to environmental and Indigenous heritage values under the *Regional Forest Agreement Act 2002* (Cth), and many of the criteria and indicators developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests.

Assessments of the World Heritage values of sites and properties are sent to the World Heritage Committee when these sites are nominated for inclusion on the World Heritage List. Requests for boundary modifications to the World Heritage Committee also include assessments of the World Heritage values (United Nations Educational, Scientific and Cultural Organisation World Heritage Centre 2017b).

The Tasmanian Wilderness World Heritage Area was included in the World Heritage List because it met all four natural heritage criteria and three of the cultural heritage criteria (Department of the Environment and Energy n.d.e). The Tasmanian Wilderness World Heritage Area was added to the World Heritage List in 1982 and extended in 1989, June 2010, June 2012 and again in June 2013. It is one of the largest conservation reserves in Australia. As at 1997, the Tasmanian Wilderness World Heritage Area covered 1.38 million hectares, or about 20 per cent of the state. Its current area as at 2017 is 1.58 million hectares.

The *Tasmanian Wilderness World Heritage Area Management Plan 2016* (Department of Primary Industries, Parks, Water and Environment 2016a) summarises the World Heritage values as:

The listed cultural values of the Tasmanian Wilderness World Heritage Area belong to and are part of the cultural heritage of Tasmanian Aboriginal people. For Tasmanian Aboriginal people, the landscape, seascape and skyscape of the Tasmanian Wilderness World Heritage Area have deep spiritual meaning and significance. The Tasmanian Wilderness World Heritage Area's natural values include estuaries, wild rivers, lakes, dramatic and varied scenery, karst landscapes, rainforests, tall eucalypt forests, moorlands, glacial and periglacial features, patterned mires and alpine vegetation. The Tasmanian Wilderness World Heritage Area provides secure habitat for the conservation of biodiversity, including many threatened species, and its extent and integrity allow for ongoing ecological and biological processes. The landscape contains outstanding examples of major stages of the earth's geological history including significant ongoing geological processes. The natural values are enriched by the extraordinary cultural achievement of Aboriginal people's long occupation of Tasmania.

These World Heritage values can also incorporate other values, such as wilderness, old growth and wild rivers, which are all considered in separate chapters of this report (see the 'Biodiversity values' sub-chapter for information about wild rivers).

The *Regional Forest Agreement Act 2002* (Cth) exempts forestry operations conducted in accordance with Regional Forest Agreements from the Commonwealth assessment and approval requirements of the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth). However, this does not apply to operations within World Heritage or Ramsar wetland sites (section 42 of the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth)). The Tasmanian Wilderness World Heritage Area therefore continues to be managed separately from processes put in place by the Tasmanian Regional Forest Agreement. The Tasmanian Wilderness World Heritage Area is managed under an agreement between the Australian and Tasmanian governments that provides for joint management and financial arrangements, and that allows the Tasmanian Parks and Wildlife Service to manage the majority of the World Heritage Area under the auspices of a council of Commonwealth and state ministers and in close consultation with a community advisory committee.

Comprehensive Regional Assessment

The Tasmanian Wilderness World Heritage Area was listed in 1982 and extended in 1989 and was one of the largest conservation reserves in Australia. In 1997, the potential World Heritage values of Tasmania's entire forest estate were assessed by an expert panel as part of the development of the Tasmanian Regional Forest Agreement (World Heritage Expert Panel 1997).

The expert panel identified themes of World Heritage values and areas that may contain World Heritage values. None of these areas had specific boundaries and many of the locations were within existing reserves, including the existing Tasmanian Wilderness World Heritage Area. The potential World Heritage values of the areas identified were considered in the Regional Forest Agreement process. The 1997 Tasmanian Regional Forest Agreement process did not identify any additional areas for inclusion in the then-existing Tasmanian Wilderness World Heritage Area (which covered 1.38 million hectares, or about 20 per cent of Tasmania).

World Heritage List

World Heritage sites that are nominated for World Heritage listing are inscribed on the list only after they have been carefully assessed as representing the best examples of the world's cultural and natural heritage. Only the Australian Government can nominate Australian places for entry on the World Heritage List. The World Heritage Committee assesses nominated places against set criteria and makes the final decision as to the places that are included on the World Heritage List (Department of the Environment and Energy n.d.f).

To be included on the World Heritage list, sites must be of outstanding universal value and meet at least one out of ten of the set selection criteria. These criteria were developed by the World Heritage Committee and are based on cultural heritage and natural heritage as those terms are defined in the Convention. These criteria are further explained in the *Operational Guidelines for the Implementation of the World Heritage Convention* (United Nations Educational, Scientific and Cultural Organisation World Heritage Centre 2016) which, besides the text of the Convention, is the main working tool on World Heritage. The criteria are regularly revised by the World Heritage Committee to reflect the evolution of the World Heritage concept itself. The current criteria are listed below:

- to represent a masterpiece of human creative genius
- to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design
- to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared
- to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history
- to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change
- to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance (the Committee considers that this criterion should preferably be used in conjunction with other criteria)
- to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance

- to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features
- to be outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals
- to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

(Department of the Environment and Energy n.d.f; United Nations Educational, Scientific and Cultural Organisation World Heritage Centre 2016)

The protection, management, authenticity and integrity of properties are also important considerations (Department of the Environment and Energy n.d.f).

Independent five-yearly reviews of the Tasmanian Regional Forest Agreement 2012

The first five-yearly independent review of the implementation of the Tasmanian Regional Forest Agreement noted that the assessment of World Heritage values required by the agreement had been completed in 1999. The assessment found that further nominations of forested areas to the World Heritage list were not necessary to protect the World Heritage values identified in the 1997 expert panel report (Resource Planning and Development Commission 2002a, 2002b).

The second five-yearly independent review of the implementation of the Tasmanian Regional Forest Agreement noted that concerns had been raised about forestry operations adjacent to the Tasmanian Wilderness World Heritage Area (Ramsay 2008). The Tasmanian Wilderness World Heritage Area World Heritage Committee assessed these concerns for the Australian Government Department of the Environment and Heritage, and as a conclusion reported that the Australian Government was confident that the Tasmanian Wilderness World Heritage Area was well protected and managed, and that there was no threat to its integrity (Australian Government and Tasmanian Government 2007b).

The implementation report for the third five-yearly review noted that in 2010 the Australian Convict Sites was inscribed on the World Heritage List, including five sites in Tasmania, and that during the review period a minor boundary modification to the Tasmanian Wilderness World Heritage Area was approved by the World Heritage Committee (Kile 2015). The addition of 21 adjacent national parks and state reserves to the Tasmanian Wilderness World Heritage Area in 2010 increased the representation of tall eucalypt forests and cultural sites of significance to the Aboriginal community within the property. The boundary modification added 20 096 hectares to the Tasmanian Wilderness. A further extension occurred in 2013 (see 'Extensions' below).

State of the Forests Tasmania Report 2012

World Heritage values embrace a wide range of natural and cultural heritage, and are therefore addressed by many of the criteria and indicators that are the basis for the Australian and Tasmanian State of the Forests Report series reporting based on the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests. These criteria and indicators include those under Criterion 1: Conservation of biological diversity, Indicator 3.1.a dealing with agents and processes that affect forest health, and Indicators 6.4.a to 6.4.e, which across the various 'state of the forests' reports address Indigenous and non-Indigenous cultural heritage. The most recent assessments of these criteria and indicators are in the *State of the Forests Tasmania Report 2012* (Forest Practices Authority 2012a) and *Australia's State of the Forests Report* (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013). These indicators are explored in detail in other parts of this report.

Extensions

Some of the areas considered by the World Heritage Expert Panel to contain World Heritage values have subsequently been included in the Tasmanian Wilderness World Heritage Area as a result of the boundary extensions to the property in 2010 and 2012. The 2010 and 2012 extensions added a number of existing formal reserves into the property to increase the representation of tall eucalypt forests and cultural sites of significance to the Aboriginal community.

An agreement reached by a set of forestry and forest products industry, trade unions and environmental groups in 2012 included a recommendation that the Tasmanian and Australian governments nominate 123 650 hectares as a proposed minor extension to the Tasmanian Wilderness World Heritage Area (Commonwealth of Australia 2013). The conservation claims put forward as justification for the proposed extension and their compatibility with sustainable wood supply requirements were assessed by an 'Independent Verification Group' (Independent Verification Group 2012). An application was lodged with the World Heritage Committee in February 2013, that led to the extension of the Tasmanian Wilderness World Heritage Area of about 170 000 hectares.

In 2014, the Australian Government made a request to the World Heritage Committee for a minor boundary modification to reduce the size of the Tasmanian Wilderness World Heritage Area. The World Heritage Committee did not approve the Australian Government's request.

2015 Reactive Monitoring Mission to the Tasmanian Wilderness World Heritage Area

The report of the 2015 *Reactive Monitoring Mission to the Tasmanian Wilderness World Heritage Area* was published in March 2016 and concluded that the property continues to be in an overall good state of conservation (Jaeger and Sand 2016).

The report made 20 recommendations to address tangible and potential threats. These threats include climate change, changing fire regimes, and the incursions of invasive species are

recognised as major current threats to these values and the area's processes. In the 2016 State Party Report on the state of conservation of the Tasmanian Wilderness, the Australian and Tasmanian governments supported all 20 recommendations and committed to implement them (Commonwealth of Australia 2016a).

World Heritage values in the Tasmanian Wilderness World Heritage Area 2016

From the *Tasmanian Wilderness World Heritage Area Management Plan 2016* (Department of Primary Industries, Parks, Water and Environment 2016a):

The Tasmanian Wilderness World Heritage Area is one of the southern hemisphere's largest temperate wilderness areas. It covers almost a quarter of Tasmania and encompasses more than 1.58 million hectares. The listed cultural values of the Tasmanian Wilderness World Heritage Area belong to and are part of the cultural heritage of the Tasmanian Aboriginal people. For Tasmanian Aboriginal people, the landscape, seascape and skyscape of the Tasmanian Wilderness World Heritage Area have deep spiritual meaning and significance. The Tasmanian Wilderness World Heritage Area's natural values include estuaries, wild rivers, lakes, dramatic and varied scenery, karst landscapes, rainforests, tall eucalypt forests, moorlands, glacial and periglacial features, patterned mires and alpine vegetation. The Tasmanian Wilderness World Heritage Area provides secure habitat for the conservation of biodiversity, including many threatened species, and its extent and integrity allow for ongoing ecological and biological processes. The landscape contains outstanding examples of major stages of the earth's geological history including significant ongoing geological processes. The natural values are enriched by the extraordinary cultural achievement of Aboriginal people's long occupation of Tasmania.

The Tasmanian Wilderness World Heritage Area's natural values are facing potentially rapid change. Climate change, fire and the incursions of invasive species are recognised as major threats to these values and the area's processes.

Biodiversity values

Biodiversity is the name given to the variety of living things, the different plants, animals and organisms, the genetic information they contain and the ecosystems they form. Biodiversity values were fundamental in establishing a comprehensive, adequate and representative reserve system under the Tasmanian Regional Forest Agreement and were a focus of the original Comprehensive Regional Assessment in 1997. A comprehensive, adequate and representative reserve system contributes to Tasmanian Regional Forest Agreement objectives such as providing certainty for conservation of environment and heritage values.

As well as providing protection for environmental values, the comprehensive, adequate and representative reserve system also contributes to the National Reserve System and provides protection for Wild Rivers. The parties agreed in the 1997 Tasmanian Regional Forest Agreement that that the comprehensive adequate and representative reserve system provides adequate protection for Wild Rivers and meets all the requirements for the proposed National Reserve System, hence the comprehensive, adequate and representative reserve system is key to the protection and management of many environmental values besides flora and fauna. The National Reserve System is Australia's network of protected areas, conserving examples of our natural landscapes and native plants and animals for future generations. Based on a scientific framework, it is the nation's natural safety net against our biggest environmental challenges. The National Reserve System is made up of Commonwealth, state and territory reserves, Indigenous lands and protected areas run by non-profit conservation organisations, through to ecosystems protected by farmers on their private working properties (Department of the Environment and Energy n.d.g). CAPAD 2014 reports that the National Reserve System in Tasmania includes 1524 protected areas covering 44.09 per cent of Tasmania—over 3 015 707 hectares (Department of the Environment and Energy 2014). Comprehensive, adequate and representative formal reserves make up approximately 90 per cent of the National Reserve System in Tasmania.

Wild Rivers are defined in the 1997 Tasmanian Regional Forest Agreement as a river of natural origin, in which the biological, hydrological and geomorphological processes of river flow, and intimately linked parts of its catchment, have not been significantly altered by modern or colonial society. Wild Rivers may include permanent, seasonal or underground water courses. Ninety-six percent of the identified Tasmanian Wild Rivers are within Tasmania's comprehensive, adequate and representative reserve system and the Australian and Tasmanian governments have agreed that the comprehensive, adequate and representative reserve system 'provides adequate protection for wild rivers' (Commonwealth of Australia and State of Tasmania 1997). Within this reserve system, Wild Rivers are protected through a range of legislation, particularly the *Nature Conservation Act 2002* (Tas) and the *National Parks and Reserves Management Act 2002* (Cth). The remaining four percent of the Wild Rivers outside the reserves are on private, council and Hydro Electric Corporation land (Resource Planning and Development Commission 2003).

Indicators of biodiversity value can include number and diversity of plant and animal species, ecological communities and forest types. These indicators take into account the range of flora and fauna species and communities and the reserves established to protect biodiversity.

Indicators developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests relevant to biodiversity values are listed in Table 12. Indicators grouped under these criteria allow the presentation of data in a consistent and repeatable format.

Table 12 – Indicators used in Tasmanian forest reporting relating to biodiversity values developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests

Criterion 1: Conservation of biological diversity
1.1 Ecosystem diversity
Indicator 1.1.a – Area of forest by forest type and tenure
Indicator 1.1.b – Area of forest by growth stage
Indicator 1.1.c – Area of forest in protected area categories
Indicator 1.1.d – Fragmentation of forest cover
1.2 Species diversity
Indicator 1.2.a – Forest-dwelling species for which ecological information is available
Indicator 1.2.c – Representative species from a range of habitats monitored at scales relevant to regional forest management
1.3 Genetic diversity
Indicator 1.3.a Forest associated species at risk from isolation and the loss of genetic variation, and conservation efforts for those species

The 1997 Comprehensive Regional Assessment

The 1997 Tasmanian Comprehensive Regional Assessment (Tasmanian Public Land Use Commission 1997c) informed the establishment of the Tasmanian Regional Forest Agreement. The Comprehensive Regional Assessment used the nationally agreed JANIS biodiversity criteria (Commonwealth of Australia 1997) to plan a reserve network that sampled each forest ecosystem within a region and protected areas of high-quality habitat for biodiversity (Commonwealth of Australia 1997).

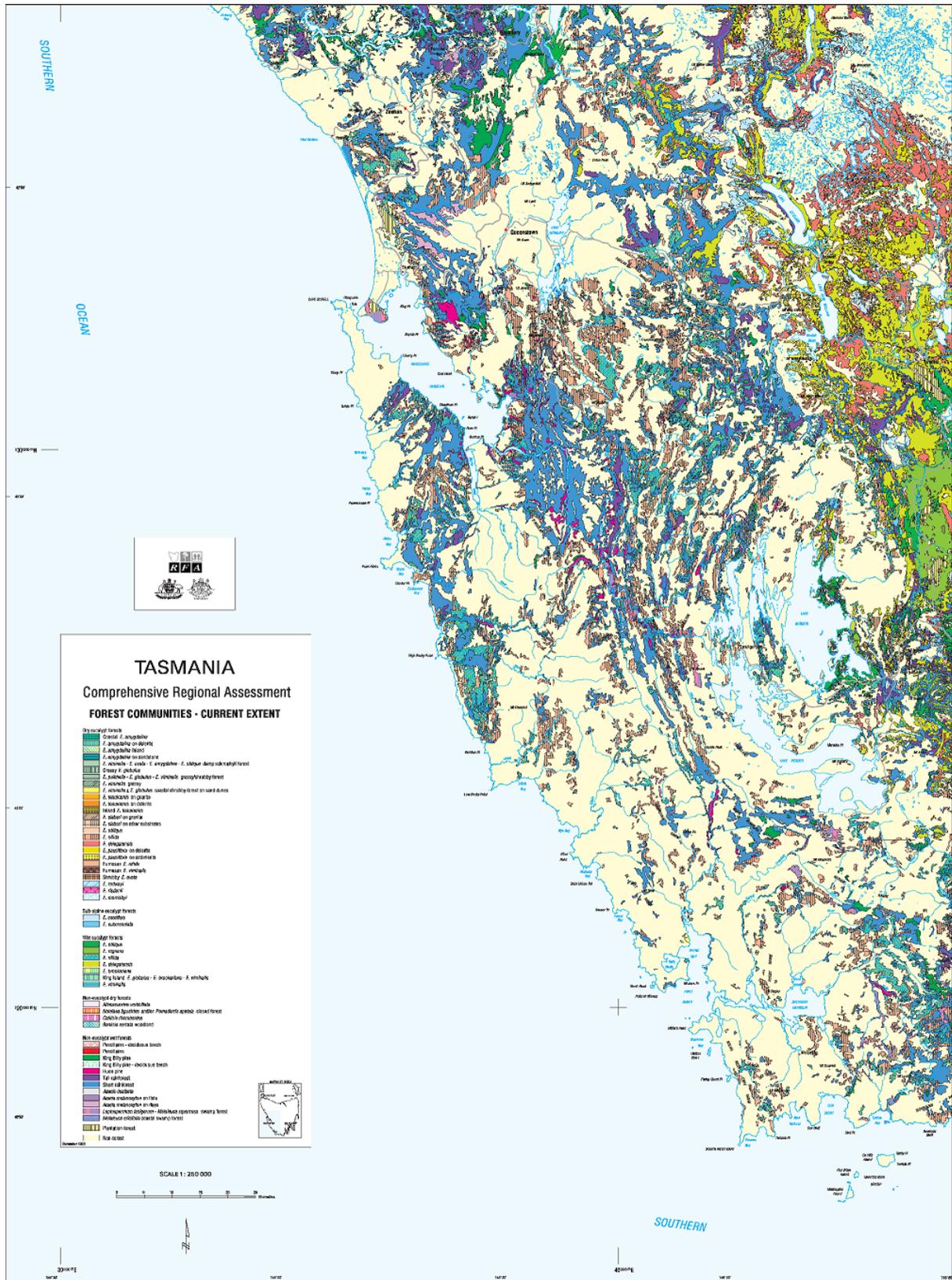
The JANIS biodiversity criteria that guided reserve planning were:

- 15 per cent of pre-European distribution of each forest ecosystem should be protected in the comprehensive, adequate and representative reserve system.
- Where forest ecosystems are recognised as vulnerable, at least 60 per cent of their remaining extent should be reserved.

- All remaining occurrences of rare and endangered forest ecosystems should be reserved or protected by other means as far as practicable.
- Reserved areas should be replicated across the geographic range to decrease the likelihood of events such as wildfire or disease will cause the forest ecosystem to decline.
- The reserve system should seek to maximise the area of high quality habitat for all known elements of biodiversity, with particular reference:
 - to the needs of rare, vulnerable or endangered species; special groups of organisations that have complex habitat requirements or migratory or mobile species
 - areas of high species diversity, natural refuge for flora and fauna and centres of endemism
 - species whose distributions and habitat requirements are not well correlated with any particular forest ecosystem.
- Reserves should be large enough to sustain the viability, quality and integrity of populations.
- Sample the full range of biological variation within each forest ecosystem.
- Remnants that contribute to sampling the full range of biodiversity.

Comprehensive Regional Assessment outputs included maps that showed the distribution of 50 forest communities and information on their reservation status as well as the preliminary estimated pre-1750 extent of forest communities in Tasmania. Maps of the forest communities that were identified in the Comprehensive Regional Assessment are provided at Figure 12, Figure 13, Figure 14 and Figure 15.

Figure 15 – Forest communities in south-west Tasmania identified as part of the Tasmanian Comprehensive Regional Assessment



Source: 1997 Tasmanian Comprehensive Regional Assessment

Shortfalls in the reservation of forest communities were identified. For example, it was determined that 278 000 hectares would need to be protected to meet the general JANIS criteria for forest communities and old growth and 32 of the 50 forest communities are reserved to a level below the JANIS reservation criteria.

The Tasmanian Regional Forest Agreement resulted in the addition of 396 000 hectares of public land to existing reserves—an increase of 17 per cent. This brought the total reserve system to 2.7 million hectares, representing 40 per cent of Tasmania's total land area.

First independent five-yearly review of the Tasmanian Regional Forest Agreement 2002

The Resource Development and Planning Commission (2002) noted that the Tasmanian Regional Forest Agreement provided for an indicative area of 396 000 hectares of new reserves. Forest communities and old growth forest were mostly reserved at, or in excess of, the levels agreed. Some communities were reserved at lower levels due to a variety of reasons, primarily where they principally occurred on private land. Some areas were proposed for reservation under the Tasmanian Regional Forest Agreement on the basis of the vegetation community they were believed to contain, which was subsequently found to be different and not requiring reservation.

The areas of forest communities and old growth as mapped in 1996 were subsequently revised as a result of improved mapping capability.

Tasmania maintained a very active program of research and development into the scientific understanding of forest ecosystem characteristics and functions. This included research into forest practices on biodiversity, and the establishment of the Warra Long Term Ecological Research site, which focuses on the ecology of *Eucalyptus obliqua* (stringybark) wet forest.

The main projects Tasmania conducted on the impacts of forest practices on biodiversity were:

- the effects of alternative silvicultural systems on biodiversity in *E. obliqua* wet forests
- modelling the impacts of fragmentation and habitat alteration on multiple species in north-east Tasmania
- the value to biodiversity conservation of retaining native forest in plantation-dominated landscapes
- the efficacy of wildlife habitat strips in the landscape conserving biodiversity.

State of the Forests Tasmania reports

This section provides a summary of the indicators relating to biodiversity values in the *State of the Forests Tasmania Reports* from 1996 to 2012, as well as some information in the draft 2017 report (Forest Practices Authority, in prep).

Indicator 1.1.a – Area of forest by forest type and tenure

The current forest extent (native forest and plantation) in Tasmania represents no change to the overall total compared to the 1996 extent and 1 per cent decrease compared to the 2011 extent. Tasmania had 3 388 000 hectares, or 50 per cent, of its land forested in 2011. This was a net increase of 1 per cent since 1996. Native forest makes up 91 per cent of this 2011 figure and plantations 9 per cent. In 2001 native forest made up 94 per cent and plantations 6 per cent.

The trend in total forest extent from 2011 to 2016 reflects losses in the extent of both native forest extent (reduced by 22 000) and plantations (reduced by 12 000 hectares).

Total native forest extent has decreased by 155 000 hectares (4.8 per cent) since 1996, and by 22 000 hectares (0.7 per cent) since 2011. On private freehold land, 1700 hectares of native forest was converted to plantation in the 2010 to 2015 period.

Under the Monitoring Vegetation Extent Project changes in the extent of forest communities were mapped by comparing satellite imagery from two points in time (2010 and 2015) over private land. All changes greater than 0.5 hectare were individually validated by trained operators using the best available high resolution imagery. The Monitoring Vegetation Extent Project results indicated a decrease in the mapped extent of native forest in the Regional Forest Agreement vegetation communities of 22 500 hectares. Following categorisation of changes detected, the information was applied to the 2011 Regional Forest Agreement vegetation maps to develop a revised forest extent map as at 2016.

Indicator 1.1.b – Area of forest by growth stage

The spread of age class across forest communities is a measure of ecosystem diversity. The definition of 'mature forests' as reported in this indicator is different to the concept of 'old growth' as defined under the Tasmanian Regional Forest Agreement (see Indicator 1.1e). The age of a natural forest can be difficult to define, because some of the trees may be older than others, understorey species may have colonised well after canopy trees, and precise tree ages are expensive to measure. For the purposes of broad-scale categorisation, the growth stage of trees is a reliable surrogate for age-class, particularly for eucalypt species.

The areas of forest communities mapped in 1996 were revised before the 2002 State of the Forests Tasmania Report as a result of improved Geographic Information System processing.

The *State of the Forests Tasmania Report 2002* (Forest Practices Board 2002) stated that of the forest for which growth-stage mapping was available 74 per cent was mature. In conservation reserve tenures 20 per cent of forest mapped was regrowth, and 32 per cent mature. State forests comprised 27 per cent of regrowth or regeneration forests, which was substantially higher than other tenures. In dry eucalypt forests of known growth stage 18 per cent was regeneration or regrowth, across all tenures, compared to 39 per cent for wet eucalypt forest. However dry eucalypt forests in Tasmania typically grow in mixed age classes, so forests mapped as mature usually contain a proportion of younger trees.

The *State of the Forests Tasmania Report 2007* (Australian Government and Tasmanian Government 2007a) summarised the forest age classes from the first quarter of 2005. Of the

forest for which growth-stage mapping was available 74 per cent was mature, which was the same figure at June 2001. Of forest mapped in conservation reserve tenures 20 per cent was regrowth and 35 per cent mature. State forests comprised 29 per cent of regrowth or regeneration forests, which was substantially higher than other tenures. In dry eucalypt forests of known growth stage 19 per cent was regeneration or regrowth across all tenures (a 1 per cent decrease from 2001), compared to 39 per cent for wet eucalypt forest (no change since 2001).

In 2011 most of the forest mapped for growth-stage was mature or over-mature (73 per cent). In conservation reserve tenures 20 per cent of forest mapped was regrowth, and 36 per cent mature. State forests comprised 32 per cent of regrowth or regeneration forests. In dry eucalypt forests of known growth stage 19 per cent was regeneration or regrowth across all tenures (1 per cent increase since 2001), compared to 41 per cent for wet eucalypt forest (2 per cent increase since 2001).

However, the *State of the Forests Tasmania Report 2007* states that areas of regeneration are generally only identifiable in state forest, where harvest records can be used to readily determine age class, while in operations on private or other tenure this data is not readily available.

Indicator 1.1.c – Area of forest in protected area categories

The Tasmanian Regional Forest Agreement established the comprehensive, adequate and representative reserve system, which includes formal, informal and private reserves. In 2011, the comprehensive, adequate and representative reserve system was 3 065 000 hectares, an increase of 55 per cent since 1996. These reserves included 49.2 per cent of Tasmania's native forests. Of these reserves, 77 per cent are formal reserves on public land, 17.5 per cent are informal reserves on public land and 5.5 per cent are private forest comprehensive, adequate and representative reserves.

By 2011, 37 of the 50 identified Tasmanian native forest communities had at least 15 per cent of their estimated pre-1750 extent reserved. These reserves included all sub-alpine eucalypt and most wet eucalypt and rainforest communities, such as the *Eucalyptus subcrenulata* forest.

As at February 2017 the comprehensive, adequate and representative reserve system comprises 3.412 million hectares of land, 50.1 per cent of the total land area of Tasmania, and approximately half of which contains forest. Public land reserves comprise 3.264 million hectares and private land reserves 151,000 hectares. The main changes in the area of comprehensive, adequate and representative reserves since 2011 are the result of:

- increased area of voluntary conservation of forest on private land through the finalisation of programs such as the Private Forest Reserves Program and the Forest Conservation Fund
- the inclusion in the informal reserves analysis of the Future Reserve Land (now called Future Potential Production Forest) proclaimed under the *Tasmanian Forests Agreement Act 2013* (Tas). This resulted in a net increase of 324 000 hectares, (in 2012–13) taking into account overlaps with pre-existing informal reserves (some of these were later formally gazetted).

The main trends evident from the data are:

- Implementation of the comprehensive, adequate and representative reservation framework agreed under the Tasmanian Regional Forest Agreement has resulted in an extended system of public and private terrestrial comprehensive, adequate and representative reserves. Within this framework, 1 778 000 hectares of forested land, or 58.2 per cent, of Tasmania's native forests, are now protected, up from the 1996 extent of 977 900 hectares. This represents an increase of 800 000 hectares above the 1996 area, and by 265 000 hectares since 2011.
- As well as the major changes in public land tenure, progress has been made in implementing protected areas on private freehold land.
- Most protected forests are on public land: 70 per cent of these are in formal reserves, of which 37 per cent is unavailable for mining and 33 per cent is subject to the *Mineral Resources Development Act 1995* (Tas). Informal reserves and private comprehensive, adequate and representative reserves account for the remaining 30 per cent of reserved native forests.
- A total of 47 native forest communities, including all subalpine eucalypt and non-eucalypt communities, now have more than 25 per cent of their current areas in reserves.

Indicator 1.1.d – Fragmentation of forest cover

In 2011 over 70 per cent of Tasmania had native vegetation cover and there was a high degree of connectivity across the landscape. There was a higher proportion of forest in larger patches in Tasmania (72 per cent) than occurs nationally.

In preparation for the *State of the Forests Tasmania Report 2017*, a connectivity analysis was undertaken for Tasmania's native vegetation cover. All patches of forest and woodland were allocated to patch sizes consistent with those used in Australia's State of the Forests Report 2002. The proportion of the total area of forest was calculated for all of the patches in each of the patch size classes for the years 2005, 2010 and 2015.

The analysis indicated that over 45 per cent of Tasmania's forests occur in patches larger than 50 000 hectares. A further 34 per cent of total forest area occurs in patches between 5000 hectares and 50 000 hectares. The remainder is distributed right across the range of remaining size classes below this. Approximately 7 per cent of Tasmania's total forest area occurs in patches less than 200 hectares in size (Forest Practices Authority, in prep.).

The analysis also found no substantial change in fragmentation since 2011. Over 70 per cent of Tasmania had native vegetation cover and there was a high degree of connectivity across the landscape. Over 47 per cent of Tasmania's forests occurred in patches larger than 50 000 hectares and over 72 per cent occurred in patches larger than 10 000 hectares (Forest Practices Authority, in prep.).

Indicator 1.2.a – Forest-dwelling species for which ecological information is available

There is partial or comprehensive information available for nearly all vascular plants and vertebrate fauna in Tasmania. In 2011 there were 1034 vascular plant taxa (including subspecies and varieties) that are considered to be forest dwelling and indigenous to Tasmania. This accounted for 54 per cent of the known native vascular plant taxa in Tasmania.

Currently, of the 1919 vascular plant taxa indigenous to Tasmania (including subspecies and varieties), 1158 (60 per cent) are known to be forest dwelling. This is an increase of 124 species from 2011 as listed in the *State of the Forests Tasmania Report 2012* (1034 species). This increase is due in part to changes in taxonomy (which resulted in 88 new taxa being added to the list), and also reassessment of forest dwelling status of flora species, based on updated information, which also saw 27 taxa removed from the list. Data quality has improved with the advent of the Natural Values Atlas and the Tasmanian Herbarium's annual census of vascular flora species in Tasmania, enabling accurate counts of taxa in the state for native vascular plant species.

Between 2011 and 2016, one new forest-dwelling vertebrate fauna species was identified: *Antechinus vandycki* (Tasman Peninsula dusky antechinus). No forest dwelling species is believed to have become extinct in this period.

The improvement in the percentage of native forest associated vascular plant species with adequate information to make management decisions has increased from 20 per cent (2011) to 27 per cent. This estimate is based on publications such as listing statements, note sheets, technical papers with management information included, scientific papers, and expert opinion. The improvement is largely due to the Natural Values Atlas which holds distribution information on all native vascular plant species in Tasmania and the species profiles in the Threatened Species Link. Improvement is also the result of increased efforts to produce or revise Listing Statements or Note Sheets for listed species. The information situation should continue to improve as data in the Natural Values Atlas and Threatened Species Link increases.

Indicator 1.2.c – Representative species from a range of habitats monitored at scales relevant to regional forest management

For fauna, the Department of Primary Industries, Parks, Water and Environment has continued to carry out long-term monitoring of brushtail possums, Tasmanian pademelons, Bennetts wallaby, Tasmanian devils, common wombats and eastern quolls. As was the case in 2011, all species were considered to have stable populations, except for the Tasmanian devil (due to the impacts of Devil Facial Tumour Disease) and eastern quoll, which displays significant population fluctuations over the long term.

Indicator 1.3.a – Forest associated species at risk from isolation and the loss of genetic variation, and conservation efforts for those species

In 2011 a total of 277 vertebrate species and vascular plants are potentially at risk of loss of genetic variation, ranging from high to moderate risk (128 species) to low risk (130 species) and unknown risk (19 species). Conservation efforts include recovery plans, habitat restoration and the 'Seed Safe' seed collecting program for the Tasmanian Seed Conservation Centre, in partnership with Kew Millennium Seed Bank.

Currently, a total of 392 vertebrate species and vascular plants are potentially at risk of loss of genetic variation, ranging from high to moderate risk (351 species) to low risk (38 species) and unknown risk (three species).

The significant increase in the number of species considered to be at risk is primarily as the result of modelling the potential impact of the plant disease myrtle rust (*Puccinia psidii sensu lato*), which was detected in Tasmania in February 2015.

Third independent five-yearly review of the Tasmanian Regional Forest Agreement 2012

The third independent five-yearly review included the *Independent Reviewer's Report to the Australian and Tasmanian Governments on the third five-yearly review of the Tasmanian Regional Forest Agreement 2015 (Independent Reviewer's Report)* (Kile 2015) and the *Joint Government Response tabled in 2016* (Australian Government and Tasmanian Government 2016).

Kile (2015) noted that the reservation levels of forest communities and old growth in formal and informal reserves on public land are shown in Table 13 and 14 of the report *Implementation of the Tasmanian Regional Forest Agreement 2007–2012* (Australian Government and Tasmanian Government 2015). The extent of changes to informal reserves on public land is shown in Table 7 of the report and the full comprehensive, adequate and representative reserve system is publicly available as an annually updated spatial layer on the Land Information System Tasmania (Department of Primary Industries, Parks, Water and Environment 2012).

Kile (2015) noted that the Biodiversity Review Panel (2009) undertook a significant and comprehensive review of the biodiversity provisions of the Tasmanian Forest Practices Code, and concluded: 'The panel's review has found that the Tasmanian forest practices system provides the basis for an effective framework for ensuring that forest practices are consistent with the delivery of sustainable management from the perspective of biodiversity conservation. It is a regulatory system, not a forest management system, but it takes an adaptive management approach to complement other components of the State's biodiversity conservation strategy.'

Kile (2015) further noted that there seemed to be a greater knowledge of biodiversity in production forests than in reserves and there was a need to build knowledge for both to determine the success or otherwise of the integrated land management approach of the Tasmanian Regional Forest Agreement. He also found that judging the overall success of

threatened species management and the broader biodiversity outcomes under the Tasmanian Regional Forest Agreement is difficult given the limited monitoring of outcomes.

Kile (2015) noted that in a broader sense the submissions received as part of the review indicated the need for better synthesis of information about the overall status of biodiversity conservation and the adoption of improved practices.

Kile (2015) subsequently made two recommendations that have implications for the assessment of biodiversity values in the future:

Recommendation 5 – The State builds on its existing monitoring framework to develop a long-term forest condition monitoring system across all forest tenures to assess changed in ecosystem health and vitality.

Recommendation 6 – The Parties continue to improve the mechanisms in place to research, evaluate and communicate outcomes for the protection of threatened species and biodiversity across all forest tenures

These recommendations were considered and agreed to by the Australian and Tasmanian governments in the *Joint Australian and Tasmanian Government Response to the Review of Implementation of the Tasmanian Regional Forest Agreement for the Period 2007–2012* (Australian Government and Tasmanian Government 2016):

Recommendation 5

The Australian and Tasmanian governments recognise that a state-wide forest monitoring information system would be a valuable tool to assess and monitor changes in ecosystem health and vitality.

Through the Australian and Tasmanian State of the Forests Report series, the scale and impact on forest health is identified from a variety of processes and agents, both natural and human-induced.

Tasmania's public forest managers have a range of monitoring systems that cover different aspects of the forest estate. The information from these systems is used to inform adaptive management and continuous improvement approaches to the management of Tasmanian forests.

The Tasmanian Government agrees to consider implementing a state-wide forest monitoring information system. This would likely require greater integration of existing systems and the development of new tools to assist in the long-term monitoring of forest condition and biodiversity, including threatened species.

Recommendation 6

The Australian and Tasmanian governments recognise that improved research, evaluation and communication mechanisms can contribute to improved outcomes for threatened species and biodiversity, and agree to continue to improve these mechanisms as part of an adaptive management framework. Opportunities for outcomes focused monitoring and reporting will be considered as part of the extension process.

The Australian and Tasmanian governments are committed to protecting and improving the conservation of Tasmania's threatened species and will continue to work together in the development and implementation of conservation advices and recovery plans. In signing the Memorandum of Understanding for the implementation of a common assessment method for the listing of threatened species and ecological communities, the Parties have committed to improving cross-jurisdictional consistency in the assessment of threatened species status.

The Threatened Species Commissioner, appointed by the Commonwealth Government, is also working collaboratively with all levels of government, scientists, the non-profit sector, industry and the community to deliver better outcomes for threatened species across all tenures. The Commissioner is currently focused on achieving the targets set out in Australia's first Threatened Species Strategy.

The Tasmanian Government continues to prepare listing statements and notesheets for threatened species, and makes this information widely available through the Threatened Species Link—a website designed to provide advice on how to manage threatened species in Tasmania.

The status, extent and required conservation measures for threatened fauna species are regularly reviewed by the State, in accordance with the Agreed Procedures for the Management of Threatened Species under the Forest Practices System. These measures are made available through the Threatened Fauna Adviser—a decision-support system to advise on the management of threatened fauna in wood production forests in Tasmania. An equivalent adaptive management tool is being developed by the Forest Practices Authority for threatened flora.

Wetland values

Wetlands are areas of land where water regularly covers the soil for all or part of the year. They include swamps, marshes, billabongs, lakes, lagoons, saltmarshes, mudflats, mangroves, coral reefs, bogs, fens, and peatlands. Wetlands are important to reduce the impacts of floods, absorb pollutants and improve water quality. They provide habitat for animals and plants and many contain a wide diversity of life, supporting plants and animals that are found nowhere else. As the Tasmanian Regional Forest Agreement region covers the entire landmass of Tasmania, wetlands make an important contribution to environmental values under the Tasmanian Regional Forest Agreement.

Wetland vegetation in Tasmania is a threatened native vegetation community listed under the *Nature Conservation Act 2002* (Tas), and is given legislative protection from clearance and conversion under the *Forest Practices Act 1985* (Tas).

The current wetland values are reported based on the indicator listed in Table 13 developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests. Indicators grouped under these criteria allow the presentation of data in a consistent and repeatable format.

There are no direct indicators for wetlands, but the indicators reported on reference and can impact wetland values, as they relate to soil and water management. The values in wetlands, in particular those wetlands of international significance in Tasmania have also been reported on.

Table 13 – Indicators used in Tasmanian forest reporting relating to wetland values developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests

Criterion 4: Conservation and maintenance of soil and water resources
4.1 Conservation and maintenance of soil and water resources
Indicator 4.1a – Area of forest land managed primarily for protective function
Indicator 4.1b – Management of the risks of soil erosion and the risks to soil physical properties, water quantity and water quality in forests

Ramsar wetlands of international importance in Tasmania

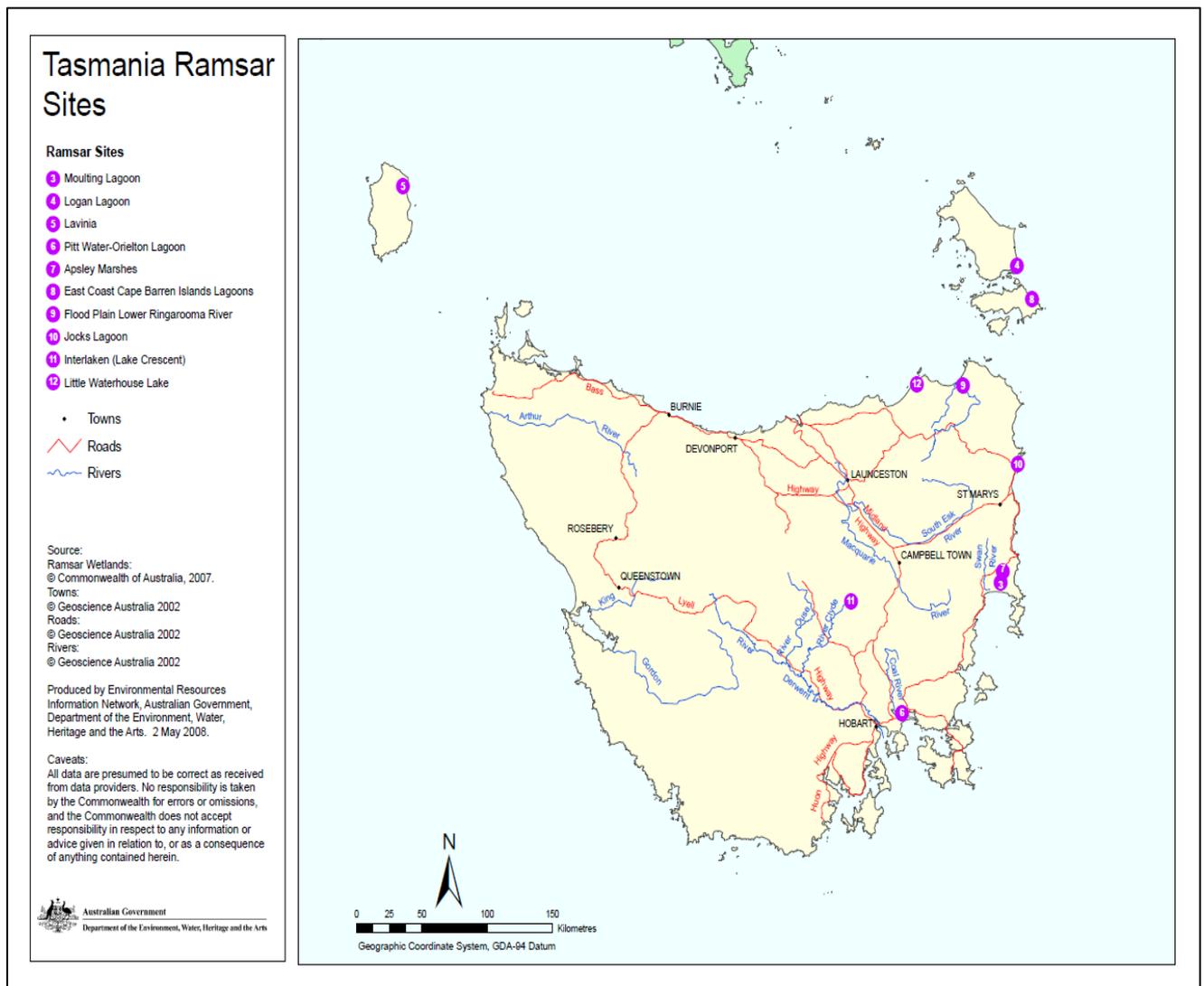
The Convention on Wetlands of International Importance (the Ramsar Convention) was signed in Ramsar, Iran on 2 February 1971. The Ramsar Convention aims to halt the worldwide loss of wetlands and to conserve, through wise use and management, those that remain. The Ramsar Convention encourages member countries to nominate sites containing representative, rare or unique wetlands, or sites that are important for conserving biological diversity, to the List of Wetlands of International Importance (Ramsar sites) (Department of the Environment and Energy 2013b).

The ecological character of Ramsar sites is one of the Matters of National Environmental Significance under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*. Within Regional Forest Agreement areas, forestry operations conducted in accordance with Regional Forest Agreements are exempt from the assessment and approval requirements of the *Environmental Protection and Biological Conservation Act 1999* (Cth), except where operations are within World Heritage or Ramsar sites (section 42 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)).

Forestry operations occur in the water catchments of Tasmanian Ramsar sites. The impacts of these operations on the water quality and quantity in the catchments, and therefore the Ramsar sites, are minimised by Tasmania's Forest Management System, in particular by controls required under the *Forest Practices Act 1985* (Tas) through the Forest Practices Code 2015. More details on how Tasmania's Forest Management System manages these impacts is provided in the '*State of the Forests Tasmania Report*' section of this chapter.

A brief description of each of the 10 listed Ramsar sites in Tasmania is provided below. Further information about these wetlands, including the values for which they are listed, is available on the Australian Wetlands Database (Department of the Environment and Energy n.d.h). This includes information in Ramsar Information Sheets and Ecological Character Descriptions (and Management Plans, where available) for each of the Ramsar sites. A map of the Ramsar sites in Tasmania is provided at Figure 16.

Figure 16 – Ramsar sites in Tasmania



Source: Environment Resources Information Network (2008)

Apsley Marshes

The Apsley Marshes is an 880 hectare wetland that was listed under the Ramsar Convention in 1982. The Apsley Marshes Ramsar site covers the freshwater marshes at the mouth of the Apsley River, located on the east coast of Tasmania. The Apsley Marshes store and filter flood waters from the Apsley River for slow release into the adjacent Moulting Lagoon Ramsar wetland. Both these wetlands are geologically significant as they were formed in a long-lived graben system, which is possibly related to the break up of Gondwanaland (Department of the Environment and Energy 2016a).

The Apsley Marshes is considered one of the most floristically rich wetlands in Tasmania, supporting 94 flora species, 82 of which are native wetland-dependent. The site is known to support six wetland-related flora species considered rare and threatened in the Tasmanian bioregion (Department of the Environment and Energy 2016a).

The Apsley Marshes supports the Australasian bittern (*Botaurus poiciloptilus*), a waterbird listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) as endangered (Department of the Environment and Energy 2016a). The white-bellied sea eagle (*Haliaeetus leucogaster*), which is rare in the bioregion and vulnerable in Tasmania, has been recorded breeding within the site (Department of the Environment and Energy 2016a).

It is an important feeding and breeding area for waterfowl which require a freshwater habitat. Parts of the site are important for swan nesting, being considered the second most heavily used nesting site in the area, with up to 1000 nests recorded (Department of the Environment and Energy 2016a).

The marshes have a long history of human use, including use by Indigenous communities. The land is private freehold and used for grazing (Department of the Environment and Energy 2016a).

Moulting Lagoon

The Moulting Lagoon is a 4507 hectare estuary at the mouths of the Swan and Apsley Rivers, on the central east coast of Tasmania. The lagoon formed with the partial closure of the mouths of the Swan and Apsley Rivers, due to the creation of a bayhead spit and associated dunefield between 10 000 and 6000 years ago (Department of the Environment and Energy 2016b).

The lagoon contains areas of both shallow and deep water and is surrounded by periodically exposed mudflats and saltmarsh (Department of the Environment and Energy 2016b).

Moulting Lagoon provides an important resting, breeding, nesting, roosting and feeding habitat for many species of resident and migratory birds, and is an important drought refuge. Approximately 80 per cent of the Tasmanian population of the Black Swan (*Cygnus atratus*) breeds at the site (Department of the Environment and Energy 2016b).

Furthermore, the site supports a number of plant species listed as threatened in Tasmania, such as golden spray (*Viminaria juncea*), sea clubsedge (*Bolboschoenus caldwellii*), largefruit seatassel (*Ruppia megacarpa*) and spreading watermat (*Lepilaena patentifolia*) (Department of the Environment and Energy 2016b).

Moulting Lagoon is part of the Moulting Lagoon Game Reserve, managed by the Tasmanian Parks and Wildlife Service. The area historically was used for the harvest of waterfowl and their eggs by Indigenous people who lived around the lagoon. Current use of the Ramsar site includes recreational activities such as fishing and hunting, and commercial activities such as aquaculture and tourism (Department of the Environment and Energy 2016b).

Moulting Lagoon and the Apsley Marshes are part of the Swan Apsley Catchment. In 2013 this catchment had 46 800 hectares managed by Forestry Tasmania, with 17 000 hectares managed for production forestry (12 per cent of the catchment area). The majority of the harvesting is selective, with some clear fell. There is also some private production forestry, which are predominantly hardwood plantations. The impacts of harvesting on the catchment and the wetlands, such as erosion and sediment are minimised by controls required under the *Forest Practices Act 1985* (Tas), through the Forest Practices Code (Glenmorgan Spring Bay Natural Resource Management Committee 2013). The Tasmanian Parks and Wildlife Service also work

with Forestry Tasmania to reduce and control erosion and sedimentation in the catchment to reduce the impact on the wetlands (Parks and Wildlife Service 2007).

East Coast Cape Barren Island Lagoons

The East Coast Cape Barren Island Lagoons are on the east coast of Cape Barren Island, in Bass Strait, north east of the island of Tasmania. This 4473 hectare complex of freshwater, brackish, saline and sometimes hypersaline lagoons, wetlands and estuaries was listed under the Ramsar Convention in 1982 (Department of the Environment and Energy 2016c).

The East Coast Cape Barren Island Lagoons site is significant as it forms a representative sample of coastal lagoons in the Flinders Biogeographic Region and is relatively undisturbed. The Cape Barren Dunes, within the site, are a geoconservation site in Tasmania (Department of the Environment and Energy 2016c).

The Ramsar site is an important habitat for a number of plant species and vegetation communities. Thirteen threatened species listed in Tasmania occur on the site, including the furze hakea (*Hakea ulicinaea*) and horny cone bush (*Isopogon ceratophyllus*). The site represents the only known reserve in Tasmania for the threatened pink bladderwort (*Utricularia tenella*).

The white-bellied sea eagle (*Haliaeetus leucogaster*), listed as vulnerable in Tasmania, and the ruddy turnstone (*Arenaria interpres*) listed under international migratory conservation agreements, also occur within the site. In addition, the Ramsar site is of great importance for the hooded plover (*Thinornis rubricollis*) (Department of the Environment and Energy 2016c).

This area is of cultural importance to the local Indigenous community, who manage the freehold title to part of Cape Barren Island, including the Ramsar site. Access is currently restricted, keeping the site largely undisturbed, with a single bush track for 4WD vehicles providing access for duck hunters to Flyover Lagoon (Department of the Environment and Energy 2016c). There is no production forestry on Cape Barren Island (Forestry Tasmania n.d.).

Flood Plain Lower Ringarooma River

The 3519-hectare Flood Plain Lower Ringarooma River site is located on the far north-east coast of Tasmania, and was listed under the Ramsar Convention in 1982. The site is situated on the sandy flood plain of the Lower Ringarooma River which encompasses extensive marshlands and a number of shallow lagoons (Department of the Environment and Energy 2016d).

The Flood Plain Lower Ringarooma River Ramsar site is rare within the bioregion, as it is rare for large rivers in Tasmania to be flowing through flood plains and forming the mosaic of wetlands that the Ringarooma River does. The site contains good condition, regionally representative examples of wetland systems within a flood plain, with a mosaic of permanent and seasonal marshlands and a large river estuary (Boobyalla Inlet). Boobyalla Inlet is recognised as a Tasmanian estuary with high conservation significance. Approximately 40 species of wetland dependent plants have been recorded at the site (Department of the Environment and Energy 2016d).

The site supports three fauna species listed on the International Union for Conservation of Nature Red List including: dwarf galaxias (*Galaxiella pusilla*), fairy tern (*Sterna nereis*) and

Australasian bittern (*Botaurus poiciloptilus*). The site provides wetland habitat for two regionally threatened bird species and four regionally listed flora species considered to be at risk in the Tasmanian bioregion. A number of migratory birds have also been recorded at the site, including 11 internationally listed migratory birds (Department of the Environment and Energy 2016d).

The Flood Plain Lower Ringarooma River was traditionally used by Indigenous people. It also has a history of European occupation and mining exploitation since the early 1800s. Currently, the Ramsar site is used for duck hunting and cattle grazing (Department of the Environment and Energy 2016d).

The Floodplain Lower Ringarooma River wetland is in the Ringarooma catchment. In 2014 approximately nine per cent of the catchment was forestry plantations, mostly located in the upper regions of the catchment, and 25 per cent of the catchment had been cleared for grazing and cropping (Department of Primary Industries, Parks, Water and Environment 2014a). The impacts of forestry on the wetlands are minimised by controls for erosion and sediments required under the *Forest Practices Act 1985* (Tas), through the Forest Practices Code.

Interlaken Lakeside Reserve

The 517-hectare Interlaken Lakeside Reserve was listed under the Ramsar Convention in 1982. It lies approximately 20 kilometres west of the township of Tunbridge at an altitude of about 800 metres above sea level. Lake Crescent is a permanent freshwater water body. It is separated from Lake Sorell to its immediate north by a low strip of land, and the waters in each lake are connected by the Interlaken Canal and a drain through the marsh (Department of the Environment and Energy 2016e).

When full, the lake provides important habitat, for feeding, resting and breeding, for the Black Swan and up to five species of ducks. Five migratory bird species listed under international agreements have used the Interlaken Lakeside Reserve for feeding and resting (Department of the Environment and Energy 2016e).

The site is an essential element of the maintenance of ecological diversity in the area. It supports several species which are rare and/or poorly reserved. The site supports one flora species listed as rare under the *Threatened Species Protection Act 1995* (Tas), southern swampgrass (*Amphibromus neesii*). The site supports a significant proportion of the population of the nationally listed endangered endemic golden galaxias (*Galaxiella auratus*), which is also listed as endangered on the International Union for the Conservation of Nature Red List (Department of the Environment and Energy 2016e).

The Interlaken Lakeside Reserve is a public reserve and it is used for fishing, recreational boating, and duck shooting. The site is also traditionally country of the Lairmairrener people, who used the resources of the lake for food, including eels and birdlife (Department of the Environment and Energy 2016e).

Jocks Lagoon

The 19-hectare Jocks Lagoon Ramsar Site is located about five kilometres south-east of the township of St Helens on the north-east coast of Tasmania. It was listed under Ramsar in 1982 (Department of the Environment and Energy 2016f).

It is one of a chain of lagoons, swamps and wetlands occurring along St Helens Point. The site is located in sands and clays separated from the sea by a beach and sand dunes (Department of the Environment and Energy 2016f).

The Jocks Lagoon Ramsar site is a locally important freshwater aquatic habitat in an otherwise dry and saline area. Most of the vegetation communities on the site are threatened in Tasmania. Jocks Lagoon is recognised as a key site for two regionally rare plant species, the jointed twigsedge (*Baumea articulata*) and erect marshflower (*Liparophyllum exaltatum*). The lagoon supports microcrustaceans and macrocrustaceans, including burrowing freshwater crayfish (*Engaeus* sp.) (Department of the Environment and Energy 2016f).

Most of the site is private freehold land, with a small section at the south-east end falling within the St Helens Point Conservation Area. The site is mainly used for conservation and recreation (Department of the Environment and Energy 2016f).

Lavinia

The 7034-hectare Lavinia wetland is located on the north-east coast of King Island, Tasmania. It was listed under the Ramsar Convention in 1982. The boundary of the site forms the Lavinia State Reserve, with major wetlands in the reserve including the Sea Elephant River estuary area, Lake Martha Lavinia, Penny's Lagoon, and the Nook Swamps (Department of the Environment and Energy 2016g).

Water flows into the wetlands from the catchment through surface channels and groundwater, and leaves mainly from the bar at the mouth of the Sea Elephant River and seepage through the young dune systems emerging as beach springs (Department of the Environment and Energy 2016g).

The Lavinia State Reserve is one of the few largely unaltered areas of the island and contains much of the remaining native vegetation on King Island. The vegetation communities present on the site include succulent saline herbland, coastal grass and herbfield, coastal scrub and King Island *Eucalyptus globulus* woodland. The freshwater areas of the Nook Swamps are dominated by swamp forest (Department of the Environment and Energy 2016g).

The site is an important refuge for a collection of regional and nationally threatened species, including the nationally endangered orange-bellied parrot (*Neophema chrysogaster*). This parrot is heavily dependent upon the samphire plant, which occurs in the saltmarsh, for food during migration from mainland Australia to Tasmania. They also roost at night in the trees and scrub surrounding the Sea Elephant River estuary (Department of the Environment and Energy 2016g).

Other nationally threatened species that occur on the site are the green and gold frog (*Litoria raniformis*), scrambling ground fern (*Hypolepis distans*) and King Island subspecies of the brown thornbill (*Acanthiza pusilla archibaldi*) (Department of the Environment and Energy 2016g).

The site supports many internationally listed migratory species including the cattle egret (*Bubulcus ibis*), great egret (*Ardea alba*), ruddy turnstone (*Arenaria interpres*), sharp-tailed sandpiper (*Calidris acuminata*), red-necked stint (*Calidris ruficollis*), white-throated needletail (*Hirundapus caudacutus*), caspian tern (*Hydroprogne caspia*) and greenshank (*Tringa nebularia*) (Department of the Environment and Energy 2016g).

The site is currently used for conservation and recreation, including boating, fishing, camping and off-road driving. There are artefacts of Indigenous Australian occupation on King Island that date back to the last ice age when the island was connected to Tasmania and mainland Australia via the Bassian Plain (Department of the Environment and Energy 2016g).

Little Waterhouse Lake

Little Waterhouse Lake is on the north-east coast of Tasmania, and was listed under the Ramsar Convention in 1982. The site forms part of the Waterhouse Point wetlands complex which incorporates Blackmans Lagoon, lakes, marshlands, and creeks with active sand dunes along the coast. The lake is a coastal freshwater lagoon and has a maximum depth of two to four metres, though levels fluctuate depending on rainfall (Department of the Environment and Energy 2016h).

Little Waterhouse Lake has dense aquatic growth and high species richness. It provides habitat for the threatened dwarf galaxias (*Galaxiella pusilla*), and the lake has a high diversity of crustacean species, such as the burrowing freshwater crayfish (*Engaeus* sp.). Three of Tasmania's eleven frog species are known to occur in the site, including the green and gold frog (*Litoria raniformis*) (Department of the Environment and Energy 2016h).

The lake also supports a significant population of the freshwater species of planktonic dinoflagellate (*Procentrum foveolata*), a recently described species classified in a group previously considered entirely marine (Department of the Environment and Energy 2016h).

The area around the Little Waterhouse Lake was significant to Indigenous groups. The North East people used the heaths and plains behind the coast, which they kept open and clear by burning. The Ramsar site is currently used for various recreational activities, particularly fishing for the introduced brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) (Department of the Environment and Energy 2016h).

Logan Lagoon

Logan Lagoon is a 2257-hectare site that was listed under the Ramsar Convention in 1982. The Logan Lagoon Ramsar site is enclosed within the Logan Lagoon Conservation Area and is located on the south-east corner of Flinders Island, Tasmania (Department of the Environment and Energy 2016i).

The wetland is an important part of the East Asian–Australasian Flyway, and 20 migratory bird species listed under international agreements use the site. The site supports a number of vulnerable or endangered species including the dwarf galaxias (*Galaxiella pusilla*), fairy tern (*Sternula nereis*), wedge-tailed eagle (*Aquila audax*) and forty-spotted pardalote (*Pardalotus quadragintus*). Logan Lagoon is listed as an important site for the curlew sandpiper (*Calidris ferruginea*) under the East Asian–Australasian Shorebird Site Network which links wetlands

that are internationally important for shorebirds (Department of the Environment and Energy 2016i).

The site also supports a number of nationally threatened ecological communities including saline aquatic herbland, freshwater aquatic herbland, and Lacustrine herbland (Department of the Environment and Energy 2016i).

The Ramsar site is used for conservation, education, research, and recreation such as walking, sightseeing, bird watching, off-road vehicle driving and beach fishing (Department of the Environment and Energy 2016i).

Pitt Water-Orielton Lagoon

The 3334-hectare Pitt Water-Orielton Lagoon Ramsar site is located on the south-east coast of Tasmania, and was listed in 1982. Most of the Ramsar site is open water fringed by saltmarsh communities, mudflats and rocky shores. The large areas of tidal mud and sand flats leaves extensive areas exposed as suitable feeding areas for wading birds (Department of the Environment and Energy 2016j).

The Pitt Water-Orielton Lagoon Ramsar site supports five species listed on the International Union for the Conservation of Nature Red List or as nationally threatened species under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). These include the Tasmanian endemic viviparous sea star (*Parvulastra vivipara*), the swift parrot (*Lathamus discolor*); wedge-tailed eagle (*Aquila audax fleayi*), fairy tern (*Sterna nereis*) and eastern curlew (*Numenius madagascariensis*). The site also supports subtropical and temperate coastal salt marsh which is listed as a vulnerable threatened ecological community under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (Department of the Environment and Energy 2016j).

Pitt Water-Orielton Lagoon is an important area for migratory birds, saltmarshes and fish. Twenty-seven bird species that occur in and around Pitt Water-Orielton Lagoon are listed under international migratory bird conservation agreements (Department of the Environment and Energy 2016j).

It is the most southern major summer feeding ground for waterbirds in Australia. A number of migratory shorebirds occur at the site and a number of resident and a few migratory waterbirds breed within the site (Department of the Environment and Energy 2016j).

The southern part of the site is a protected shark nursery area, and upper Pitt Water is a significant nursery area for the school shark (*Galeorhinus galeus*), with the highest concentration of juvenile sharks in south-east Australia. Pitt Water is also a nursery area for the gummy shark (*Mustelus antarcticus*) (Department of the Environment and Energy 2016j).

Pitt Water-Orielton Lagoon was traditionally used by Indigenous people of the area and the Ramsar site contains some middens and other evidence of Indigenous occupation. Currently the area has a diversity of land uses including pastureland grazing, forestry, irrigated cropland, residential development, shellfish aquaculture, recreation and nature conservation (Department of the Environment and Energy 2016j).

The 1997 Comprehensive Regional Assessment

Wetland values were investigated as part of the National Estate values during the 1997 Tasmanian Comprehensive Regional Assessment (Tasmanian Public Land Use Commission 1997b), which informed the establishment of the Tasmanian Regional Forest Agreement. The Comprehensive Regional Assessment recognised that wetland areas are important breeding and feeding resources for many fauna species (Tasmanian Public Land Use Commission 1997b).

The Comprehensive Regional Assessment reported that National Estate values with low reservation levels included, amongst others, representative wetland areas. The total area with representative wetland values was 24 397 hectares, with 17 per cent of this area in reserves at the time of the Comprehensive Regional Assessment. The report proposed that the total area to be protected could be increased from 4213 hectares to 22 206 hectares, which would be 91 per cent of the total area with representative wetland values (Tasmanian Public Land Use Commission 1997b).

The Comprehensive Regional Assessment reported that in 1996 Tasmania had a total of 41 migratory bird species which were non-pelagic (that is they are not ocean dwelling). Many of the migratory species were found in wetlands of national and international significance, and listed in international agreements such as the Japan–Australia Migratory Birds Agreement and the China–Australia Migratory Birds Agreement (Tasmanian Public Land Use Commission 1996a).

The report stated that time did not permit an appraisal of the significance of all candidate wetland areas in Tasmania during the Comprehensive Regional Assessment. The Tasmanian component of the *Directory of Important Wetlands in Australia* (Australia Nature Conservation Agency 1996) was considered, by the experts consulted, to meet the National Estate threshold.

State of the Forests Tasmania Report

A summary of the indicators relating to wetland values in the *State of the Forests Tasmania Report 2012* (covering the period from July 2006 to June 2011) (Forest Practices Authority 2012a) is provided below. There are no direct indicators for wetlands, but the following indicators reference and can impact wetland values, as they relate to soil and water management.

Indicator 4.1a – Area of forest land managed primarily for protective functions

This indicator reports the area of forest land managed for the protection of soil and water values. Soil and water values are protected on forest land in Tasmania primarily through the *Forest Practices Code 2015* and the *Tasmanian Reserve Management Code of Practice 2003* (Forest Practices Authority 2012a).

The objectives of the Forest Practices Code provisions in relation to soil and water are to minimise soil erosion, compaction, nutrient loss and landslides and to maintain acceptable water quality and flow. This code applies over private land, multiple-use state forest and unallocated Crown land (Forest Practices Authority 2012a).

Activities that can directly affect soil and water values in forested areas are roading, timber harvesting, burning and recreation activities. The only one of these activities that is broadly excluded from substantive areas of reserved land in Tasmania is timber harvesting. The other three activity types listed are rarely fully excluded. However, the potential impacts of these activities are managed through codes of practice, such as the Forest Practices Code and the Tasmanian Reserve Management Code of Practice (Forest Practices Authority 2012a).

Soil and water values are also afforded protection across the range of nature conservation reserves in Tasmania. The *Tasmanian Reserve Management Code of Practice 2003* applies to all terrestrial reserves managed under the *National Parks and Reserves Management Act 2002* (Tas), the *Forest Management Act 2013* (Tas) and the *Crown Lands Act 1976* (Tas). The reserve management code's provisions for soil and water aim to maintain or restore the natural quality of water and to maintain or restore natural soil processes and avoid soil degradation, within reserved lands (Forest Practices Authority 2012a).

In June 2011 at least 98 per cent of the area of nature conservation reserves is not subject to disturbance which might impact on soil and water values (Forest Practices Authority 2012a).

The total area of land excluded from timber harvesting across all categories of land in 2011 was 1 910 500 hectares, as shown in Table 14.

Table 14 – Area of Tasmanian forest where timber harvesting is excluded, by tenure

Reporting date	Land classification (tenure)				
	Multiple-use forest (ha)	Nature conservation reserve (ha)	Other publicly managed land (ha)	Private freehold land (ha)	Total area excluded (ha)
June 2001	368 300	1 104 500	80 400	2800	1 556 000
June 2006	419 000	1 121 000	85 000	48 000	1 673 000
June 2011	582 500	1 172 000	73 000	83 000	1 910 500

Source: Forest Practices Authority 2012a

Tasmania has large areas of forested catchments within the comprehensive, adequate and representative reserve system, and many of these catchments are used for water harvest for domestic or industrial use, although the majority of these are not explicitly reserved as water catchment areas. However, under the *National Parks and Reserves Management Act 2002* (Tas), all reserve classes have as one of the statutory management objectives the requirement 'to preserve the quality of water and protect catchments'. Two reserves where the role as drinking water catchments is explicitly recognised are Wellington Park and Mt Field National Park. There is no statewide area figure available for forest in catchments explicitly managed for water harvest (Forest Practices Authority 2012a).

Indicator 4.1.b – Management of the risks of soil erosion and the risks to soil physical properties, water quantity and water quality in forests

Indicator 4.1.b reports the extent to which the risks to the physical properties and distribution of soils, and the risks to water quality and quantity in Tasmanian forests have been explicitly assessed and addressed in forest management (Forest Practices Authority 2012a).

Many factors determine the spatial and temporal impacts of forest activities on soil and water characteristics and several of these factors are difficult to measure and monitor at the local or coupe level (Forest Practices Authority 2012a).

Catchment research within Tasmania and in similar temperate forests on the mainland has shown that forestry activities can influence both the hydrological and ecological characteristics of river systems. In catchments the percentage of land under grazing has been shown to be an important predictor of stream health: when the total of grazing land exceeded 40 per cent of catchment area there was a marked decline of sensitive aquatic invertebrates, and these are a key measure of river ecological health. As commercial forests tend to be concentrated in contiguous areas, most forested catchments have healthy rivers (Forest Practices Authority 2012).

In 2001 the Forest Practices Board (now the Forest Practices Authority) commissioned the study *An Analysis of the Growth of Eucalypt Forests on Launceston's Water Supply* by O'Shaughnessy and Bren which indicated that for the last 80 years there has been 'no visible impact of logging on the water flow' (Forest Practices Authority 2012a).

The *Forest Practices Act 1985* (Tas) requires that 'all forests practices are conducted in accordance with the Forest Practices Code.' The Forest Practices Code provides a set of practical guidelines and standards for the protection of environmental values (including soil, and water quality and flow) during forest planning and operations (Forest Practices Authority 2012). Key sections of the Forest Practices Code relating to soil and water include:

- *Section D1: Soils*—Details prescriptions and principles which underpin operations in order to protect soil values. This includes a guide for identifying a soil's erodibility class (Appendix 6 of the code). Erodibility class then influences operational prescriptions and limitations designed to ameliorate the impact of forest activities on soil values (Forest Practices Authority 2012a).
- *Section C4: Water Quality and Watercourse Protection* and *Section D2: Water Quality and Flow*—Focuses on prescriptions and principles which protect all water catchments and watercourses identified during planning and operational activities within forests. Specific guidelines include culvert spacing along roads, wet weather harvesting criteria and wet weather limitations (Section C2) and the establishment of streamside reserves and machinery exclusion zones (Forest Practices Authority 2012a).

The Forest Practices Code and support manuals (some of which are listed below), other regulatory instruments, environmental certification schemes (such as the Australian Forestry Standard and ISO 14001) and internal agency or company operational guidelines provide the

benchmarks against which the management of soil and water values can be assessed (Forest Practices Authority 2012a).

The Forest Practices Code support manuals which apply to the management of soil and water values include:

- Soil
 - Forest Soil Fact Sheets
 - Forest Soils of Tasmania
 - Quarry Code of Practice
 - A method for assessing the erodibility of Tasmanian forest soils
 - Basalt Talus Guidelines
 - Dolerite talus Guidelines
 - Guidelines for cut road batters in high erodibility soil
- Water
 - Estimation of Peak Flows for Small to Medium Sized Rural Catchments
 - A Guide to Riparian Vegetation and its Management
 - Riparian Land Management Technical Guidelines
 - New Guidelines for the Protection of Class 4 streams (Forest Practices Authority 2012a).

Assessments for soil and water risks occur when a forest activity is carried out under the *Forest Practices Act 1985* (Tas) irrespective of land tenure or forest type. Assessments are also commonly undertaken on public (including conservation) forests and large industrially managed private forests in relation to road and other site developments (e.g. major recreation facilities, ongoing maintenance or infrastructure) not specified under the *Forest Practices Act 1985* (Tas). Forest activities not specified under the *Forest Practices Act 1985* (Tas) are not reported (Forest Practices Authority 2012a).

Forestry activities potentially impacting on soil and water values are generally subject to both internal and external assessment. High standards were achieved, on average, across all tenures in the Forest Practices Authority annual assessments of Forest Practices Plans covering roading, bridge construction, quarries, harvesting, log landings, stream reserve integrity and site preparation (Forest Practices Authority 2012a).

Conservation forest, other Crown land and private forests are not externally assessed unless subject to a Forest Practices Plan. There has been a marked increase of forest companies establishing native species in streamside reserves on second rotation plantation sites, which are now subject to the Forest Practices Code, and on ex-pasture sites where the code restricts establishment of plantation species adjoining streams (Forest Practices Authority 2012a).

The Department of Primary Industries, Parks, Water and Environment maintains an extensive water quality and river health monitoring network in Tasmania's major rural catchments. As reported in the State of the Forests Tasmania 2012 water quality is regularly monitored at 52 sites for a range of nutrients, turbidity, dissolved oxygen and pesticides. River health is monitored at 60 sites. In four catchments with significant forestry activities, flood waters are also sampled for a range of pesticides (Forest Practices Authority 2012a).

The monitoring undertaken by the Department of Primary Industry, Parks, Wildlife and Environment, combined with the findings from the 12 'State of River' reports and a major river health study carried out between 1994 and 2002, indicated that streams within catchments with significant forestry operations showed no significant impacts in terms of river health and possessed similar macroinvertebrate communities to those without such operations (Forest Practices Authority 2012a).

Between 1 July 2006 and 30 June 2011, Forestry Tasmania conducted 1134 water monitoring tests at sites downstream of chemical application operations. During this period, one minor chemical detection was made. This detection was of metsulfuron-methyl at 0.5 micrograms per litre, well below the Australian drinking water guideline values (30 micrograms/litre). The detection nevertheless led to a review of chemical application procedures (Forest Practices Authority 2012a).

Issues relating to wetland values raised during the first independent five-yearly review of the Tasmanian Regional Forest Agreement

Wetland values were not specifically raised in the *Inquiry on the Progress with Implementation of the Tasmanian Regional Forest Agreement (1997) Final Recommendations Report* (Resource Planning and Development Commission 2002a) (first five-yearly review). Integrated catchment and water management were addressed though, which are issues that can impact on wetland values.

In Attachment 10 of the 1997 Tasmanian Regional Forest Agreement the Tasmanian Government committed to further improvements of ecologically sustainable forest management. These included, amongst other measures, implementing a state policy on water quality management, and developing a state policy on catchment management.

The first independent five-yearly review of the Tasmanian Regional Forest Agreement reported that the Tasmanian Government implemented the State Policy 'Setting New Standards for Water Quality' as it committed in Attachment 10 the Tasmanian Regional Forest Agreement. The first independent five-yearly review also noted that the *Water Management Act 1999* (Tas) provided for the preparation of statutory water management plans, which in turn were a vehicle for integrating the priorities for use of water on a catchment scale. Issues that were raised by submissions in the independent first five-yearly review included catchment and water quality management issues, in particular the impact of chemicals and native forest clearing and conversion to plantations on hydrology cycles and water quality.

The *Supplementary Tasmanian Regional Forest Agreement 2005*, which formed the final response to the first independent five-yearly review, addressed these issues. Under clause 45 of the *Supplementary Tasmanian Regional Forest Agreement*, the Parties agreed to phase out the broad scale clearing and conversion of native forest in Tasmania, through revisions to the Permanent Forest Estate Policy, which amongst other things would help protect water quality values.

In clause 69 of the *Supplementary Tasmanian Regional Forest Agreement*, the Australian Government committed to provide \$1 million to a catchment water quality program, developed and delivered in consultation with the State and drawing on expertise of the Commonwealth Scientific and Industrial Research Organisation. The program built on Tasmania's chemical audit and water monitoring programs to assess the impact of chemical usage in Tasmania's water catchments.

Issues relating to wetland values raised during the second independent five-yearly review of the Tasmanian Regional Forest Agreement

Wetland values were not referred to in the *Report to the Australian and Tasmanian Governments on the Second Five Yearly Review of Progress with Implementation of the Tasmanian Regional Forest Agreement* (Ramsay 2008) (the second five-yearly review).

The second five-yearly review of the Tasmanian Regional Forest Agreement outlined six recommendations to the Australian and Tasmanian governments relating to integrated catchment management.

The Ringarooma catchment, which contains the Ramsar Convention-listed Flood Plain Lower Ringarooma River, was specifically mentioned in the *Joint Australian and Tasmanian Government Response to the Second Five Yearly Review of Progress with Implementation of the Tasmanian Regional Forest Agreement*. The governments' noted that the Tasmanian Government Department of Primary Industries, Parks, Water and Environment had developed the Water Availability and Forest Land Use Planning Tool and had used the Ringarooma catchment in the tool's initial application.

Issues relating to wetland values raised during the third independent five-yearly review of the Tasmanian Regional Forest Agreement

Wetland values were not referred to in the *Independent Reviewer's Report to the Australian and Tasmanian governments on the third five-yearly review of the Tasmanian Regional Forest Agreement 2015* (Kile 2015).

Similar to previous five-yearly review reports, Kile (2015) provided an analysis of integrated catchment management. He noted that Tasmania has continued to develop Water Management Plans under the *Water Management Act 1999* (Tas) and that improvements to catchment

hydrological models to better model the impacts of forest practices and plantation expansion had been completed.

Matters of relevance to wetland values raised in submissions to the review concerned the protection of catchment headwaters, steep country harvesting and its possible impact on water quality, and pesticide monitoring.

The third five-yearly review reported that the implementation of the State policy for standards of water quality had been ongoing during the review period, as required by Attachment 10 of the Tasmanian Regional Forest Agreement. The Independent Reviewer's Report stated that: 'the State policy on water quality management has led to the definition of Protected Environmental Values for all surface waters in Tasmania and water body specific quality objectives'. The Forest Practices Code were also amended during the review period to meet the water quality objectives.

Kile (2015) also reported on Clause 69 of the Supplementary Tasmanian Regional Forest Agreement (discussed in the first five-yearly review section above). The program funded under Clause 69 produced an 'adaptation of a CSIRO modelling tool to create the Pesticide Impact Rating Tool (PIRI) for predicting risk to water quality of using particular pesticides under various site conditions. The tool is available for use by agencies and forestry companies'.

Future management of wetland values

The 1997 Tasmanian Regional Forest Agreement did not include clauses specifically on wetland management and values. It did however include, in Attachment 10, commitments from the Tasmanian Government to implement measures to improve their catchment and water management, in order to improve their ecologically sustainable forest management. As Kile (2015) reported, these measures have largely been met, though there were also a number of new initiatives and changed approaches to catchment and water quality management in Tasmania.

The Tasmanian Regional Forest Agreement pre-dated the introduction of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). As a consequence, the Regional Forest Agreement at that time did not reflect terminology about the Matters of National Environmental Significance, including Ramsar Wetlands. The Tasmanian Forest Management System however was able to incorporate information from the *Environmental Protection and Biological Conservation Act 1999* to manage impacts on the environment and heritage.

The proposed Tasmanian Regional Forest Agreement variation will include specific reference to Matters of National Environmental Significance. The varied agreement will also acknowledge that forestry operations within Ramsar Convention-listed wetlands are not exempt from the assessment and approval processes of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). Should forestry operations occur within the catchments of Ramsar Convention-listed wetlands, the Forest Practices System will protect the wetlands' ecological character. The Forest Practices System will do this through the soil and water provisions of the Forest Practices Code, having regard to Ramsar Wetland information sheets and Ramsar Wetland ecological character descriptions and by managing the relevant threatened native vegetation communities listed in the *Nature Conservation Act 2002* (Tas).

Online sources of information on environmental values

Information on all environmental values is continuously updated. Some of this information can be found at:

- TASVEG – The Digital Vegetation Map of Tasmania (Department of Primary Industries, Parks, Water and Environment 2017c)
- Natural Values Atlas (Department of Primary Industries, Parks, Water and Environment n.d)
- Threatened Species Link (Department of Primary Industries, Parks, Water and Environment 2017d)
- Commonwealth Listed Threatened Species (Department of the Environment and Energy n.d.j) and Ecological Communities and State listed Threatened species (Department of Primary Industries, Parks, Water and Environment 2014b)
- Commonwealth listing of Ramsar wetlands (Department of the Environment and Energy n.d.k): as of 15 February 2017, there are ten listed Ramsar sites in Tasmania.
- The Department of Primary Industries, Parks, Water and Environment’s wetland web pages (Department of Primary Industries, Parks, Water and Environment 2014c).

Summary and future management of environmental values

Old growth values

Old growth values were one of the criteria used to establish the comprehensive, adequate and representative reserve system under the Tasmanian Regional Forest Agreement. The 1997 Comprehensive Regional Assessment applied the JANIS criteria for protecting old growth forests. The criteria stated that all viable examples of rare or depleted old growth forest and at least 60 per cent for other forest ecosystems should be protected.

The 1997 Comprehensive Regional Assessment identified that there were 1 146 000 hectares of old growth Tasmania. In 2010, the Tasmanian State of the Forests Report reported that there were 1 221 000 hectares of old growth forest in Tasmania. About 80 per cent was protected in reserves, an increase of 300 000 hectares since 1997. This increase is largely attributed to the implementation of the Tasmanian Regional Forest Agreement and the *Tasmanian Community Forest Agreement*.

In 2012, 32 old growth forest communities had at least 60 per cent of their 1996 extent reserved but four communities had less than 30 per cent (Forest Practices Authority 2012a). Most of the remaining old growth for these four communities is on private land, demonstrating that there are still challenges to meeting the JANIS criteria in regard to reserving communities on private land.

In 2015, Kile (2015) noted that harvesting of old growth forest had significantly reduced as a consequence of the Tasmanian Regional Forest Agreement through further reservation and management prescriptions. Kile (2015) further stated that the area of protected old growth forest has increased and harvesting of old growth forests has significantly decreased.

If extended, the Tasmanian Regional Forest Agreement will ensure that the Tasmanian Government will continue publicly report on the area of public old growth forest harvested by silvicultural technique each year.

Wilderness values

Wilderness was one of the criteria used to establish a comprehensive, adequate and representative reserve system under the Tasmanian Regional Forest Agreement. The area of protected high quality wilderness has increased from 86 per cent in 1996 to 97 per cent in 2016, with areas continuing to be added in the last decade. This has met the original JANIS criterion for protecting 90 per cent of high quality wilderness. The largest areas of wilderness are in the Tasmanian Wilderness World Heritage Area and the extent of remote and largely undisturbed country forms the tangible component of wilderness value in the Tasmanian Wilderness World Heritage Area. Wilderness values are now almost entirely protected within the reserve system. If extended, the varied Tasmania Regional Forest Agreement will commit the Australian and Tasmanian governments to undertake measures to minimise the effects of

mineral exploration and mining activities on wilderness values. Rehabilitation activities will be in accordance with the provisions of relevant legislation and aim to achieve world's best practice and to return the site to its wilderness condition. Further, a varied Tasmanian Regional Forest Agreement would continue the protection of environment values through the provision of the comprehensive, adequate and representative reserve system and the application of Tasmania Forest Management System.

Endangered species values

The protection of endangered species was one of the criteria used to establish a comprehensive, adequate and representative reserve system under the Tasmanian Regional Forest Agreement. The 1997 Comprehensive Regional Assessment identified 229 species as priority species for protection, which were subsequently included in the priority species list for protection under the 1997 Tasmanian Regional Forest Agreement. A list of these species and their current status is provided at Appendix A.

The 1997 Tasmanian Regional Forest Agreement addresses the conservation of endangered species in three ways: providing a system of conservation reserves; maintaining a permanent native forest estate; and management of habitat in areas outside the reserve system. Endangered species are further protected under the *Nature Conservation Act 2002* (Tas), *Threatened Species Protection Act 1995* (Tas) and provisions of the Forest Practices Code 2015.

If extended, the Tasmanian Regional Forest Agreement will have new terminology for endangered species that will be in accordance with the terminology in the *Environment Protection and Biodiversity Conservation Act 1999* (Cth), *Threatened Species Protection Act 1995* (Tas) and *Nature Conservation Act 2002* (Tas). An extended Regional Forest Agreement will also ensure that management prescriptions developed for endangered species have a sound scientific basis and provide for the maintenance of the relevant species.

National Estate values

As part of the Tasmanian Comprehensive Regional Assessment process, areas of potential National Estate value were identified and assessed in Tasmanian forests. A subset of these were subsequently delineated and listed on the Register of the National Estate by the Australian Heritage Commission. The former Register of the National Estate has since been replaced by a graduated system under Commonwealth and Tasmanian legislation. Values previously listed as part of the Register of the National Estate are now managed through a combination of the National and Commonwealth Heritage Lists, the Tasmanian Heritage Register, Heritage Codes of local planning schemes, and through the mandatory protection of indigenous and non-indigenous heritage sites through the Tasmanian Forest Practices System. A varied Tasmanian Regional Forest Agreement would continue the protection of heritage values through the provision of the comprehensive, adequate and representative reserve system and the application of Tasmania Forest Management System. If extended, Tasmanian places of aesthetic, historic, scientific and social significance would be comprehensively managed for current and future generations.

World Heritage values

In 1997, the potential World Heritage values of Tasmania's entire forest estate were assessed by an expert panel as part of the development of the Tasmanian Regional Forest Agreement (World Heritage Expert Panel 1997). The potential World Heritage values of the areas identified were considered in the Regional Forest Agreement process. Assessments of World Heritage since 1997 demonstrate that the values protected as World Heritage have grown in both area and number, and continue to well protected and managed (Jaeger and Sand 2016; Australian Government and Tasmanian Government 2007b). If extended, the varied Tasmanian Regional Forest Agreement would commit the Australian and Tasmanian governments to participate in assessments of future World Heritage Places consistent with the Australian World Heritage Intergovernmental Agreement. The varied Tasmanian Regional Forest Agreement would also acknowledge that forestry operations in World Heritage sites are not exempt from the assessment and approval requirements of Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). The ongoing protection and management of World Heritage values is reflected in the Tasmanian Wilderness World Heritage Area Management Plan through management prescriptions for significant natural, cultural and social values within the Tasmanian Wilderness World Heritage Area.

Biodiversity values

Biodiversity values were a fundamental component in the establishment of a comprehensive, adequate and representative reserve system under the Tasmanian Regional Forest Agreement. The agreement resulted in the addition of 396 000 hectares of public land to existing reserves, an increase of 17 per cent. At February 2017, Tasmania's terrestrial reserve system comprised 52 per cent (3.41 million hectares) of the Tasmania's land area. The 1997 Comprehensive Regional Assessment used the JANIS biodiversity criteria to plan a reserve network based on at least 15 per cent of Tasmanian native forest communities estimated pre-1750 extent reserved. In 1997, 18 of the 50 forest communities had met the JANIS criteria but by 2011 as a result of Tasmanian Regional Forest Agreement commitments, 37 of the 50 forest communities had at least 15 per cent of their extent reserved. The reservation of forest communities on private land continues to be particular challenge to meet the JANIS criteria.

Tasmania's forest estate today may be characterised as very large with more than half protected. It is interconnected, healthy, and capable of supporting genetic and species diversity at a level at least equal to that immediately prior to the Tasmanian Regional Forest Agreement. The most significant threats to biodiversity have been identified as the impact of weeds, pests, diseases, and the challenge of climate change. The 2012 Tasmanian State of the Forests Report stated that Tasmania had 3 388 000 hectares of forested land, an increase of 1 per cent since 1996. Tasmania's Permanent Native Forest Estate Policy is therefore achieving its stated aims to maintain an extensive and permanent native forest estate. If extended, a varied Tasmanian Regional Forest Agreement will require the maintenance of an extensive and permanent native forest estate. Further, the varied agreement will continue to provide for the comprehensive, adequate and representative reserve system that conserves and protects environment values.

Wetland values

Wetland values were investigated as part of the National Estate Values during the 1997 Tasmanian Comprehensive Regional Assessment. While the 1997 Tasmanian Regional Forest Agreement did not include clauses specifically on wetland values, commitments from the Tasmanian Government to implement measures to improve their catchment and water management were included. These measures have largely been met.

There are 10 sites in Tasmania that are included in the List of Wetlands of International Importance (Ramsar sites). Ramsar sites is one of the Matters of National Environmental Significance under the *Environmental Protection and Biological Conservation Act 1999*. Ramsar sites in Tasmania are protected from forestry operations in formal or informal reserves. The indirect or offsite impacts to Ramsar sites are managed through the *Forest Practices Code 2015* and the *Forest Practices Act 1985* (Tas).

Wetland vegetation in Tasmania is also a threatened native vegetation community listed under the *Nature Conservation Act 2002* (Tas), and is given legislative protection from clearance and conversion under the *Forest Practices Act 1985*.

If extended, the Tasmanian Regional Forest Agreement will be amended to include specifically reference Matters of National Environmental Significance, including Ramsar Wetlands. An extended agreement will also acknowledge that the *Environmental Protection and Biological Conservation Act 1999* does not exempt forestry operations within Ramsar Wetlands.

Indigenous heritage values

The purpose of this chapter is to report on the Indigenous heritage values associated with paragraph (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth).

The chapter includes a definition of Indigenous heritage values, the status of the values as measured at the time the Tasmanian Regional Forest Agreement was implemented, and changes in values or related matters since 1997. This information is drawn from the original documentation produced as part of the Comprehensive Regional Assessment process; subsequent reports (including State of the Forests and State of the Environment reports), the independent five-yearly reviews of the Tasmanian Regional Forest Agreement and other recent relevant data.

Indigenous heritage values are considered to be the values of a place which are of significance as part of Indigenous practices, observances, customs, traditions, beliefs or history.

These values are reported by the criteria and indicators listed in Table 15 developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests. Indicators grouped under these criteria allow the presentation of data in a consistent and repeatable format.

For clarity, while the *Regional Forest Agreements Act 2002* (Cth) and the Montréal Process Criteria and Indicators use the term 'Indigenous', the Tasmanian Government and community use the term 'Aboriginal'. This report uses both terms depending on the context.

Table 15 – Indicators relating to Indigenous heritage values developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests

<i>Criterion 6: Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of society</i>
6.4 Cultural, social and spiritual needs and values
Indicator 6.4a – Area of forest to which Indigenous people have use rights that protect their special values and are recognized through formal and informal management regimes
Indicator 6.4c – The extent to which indigenous values are protected, maintained and enhanced through indigenous participation in forest management
6.5 Employment and community needs
Indicator 6.5d – Resilience of forest dependent indigenous communities to changing social and economic conditions

The Tasmanian Regional Forest Agreement framework provides for continual adaptive management, which is able to respond to new information on Aboriginal cultural heritage and Aboriginal community views.

Since the signing of the Tasmanian Regional Forest Agreement in 1997, Tasmania's Forest Management System has evolved and continued to improve in its ability to respond to matters of significance to the Aboriginal community.

The 1997 Comprehensive Regional Assessment

During the 1997 Tasmanian Comprehensive Regional Assessment, which informed the establishment of the Tasmanian Regional Forest Agreement, the Australian and Tasmanian governments consulted with the Aboriginal community to determine the matters of concern in relation to Regional Forest Agreements.

At the time of the Comprehensive Regional Assessment in 1997 over 70 places of Aboriginal value in Tasmania were registered on the Register of National Estate (Tasmanian Public Land Use Commission 1996a).

The Comprehensive Regional Assessment did not establish a clear or comprehensive list of Aboriginal heritage values or places of significance, as it was perceived at the time to not have full participation of the Tasmanian Aboriginal community. Rather the Comprehensive Regional Assessment reported on the concerns raised in the consultations, and reinforced the requirement for continuing consultation in order to appropriately manage Aboriginal heritage values (Tasmanian Public Land Use Commission 1996a).

This included concern about cultural heritage and its identification, assessment and management, and the ownership and access to Aboriginal information on Aboriginal heritage, both of which continue to manifest.

Tasmanian and Australian State of the Forests Reports

This section provides a summary of the indicators relating to Indigenous heritage values with information sourced from the *State of the Forests Tasmania Report 2012* (Forest Practices Authority 2012a), *State of the Forests Tasmania Report 2007* (Australian Government and Tasmanian Government 2007a), *State of the Forests Tasmania Report 2002* (Forest Practices Board 2002) and *Australia's State of the Forests Report 2013* (covers the period from July 2006 to June 2011) (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013). Some information collated in preparation of the *State of the Forests Tasmania Report 2017* (Forest Practices Authority, in prep.) has also been included.

Sub-criterion 6.4 – Cultural, social and spiritual needs and values

This sub-criterion reports on the area of forest to which Indigenous people have use and rights to protect their special values and the extent to which these values are protected by Indigenous participation in forest management.

The sub-criterion also reports on the protection of non-Indigenous cultural values and the importance of forests to people.

Indicator 6.4.a – Area of forest to which Indigenous people have use and rights that protect their special values and are recognised through formal and informal management regimes

This indicator reports on the maintenance of an acceptable level of accountability for the protection of Indigenous peoples' cultural, religious, social and spiritual values. This is done by ensuring that adequate land is placed appropriately under the range of tenure classifications and/or dedicated management regimes to protect Indigenous peoples' values associated with forests.

Aboriginal people have formal use and rights by virtue of land title over areas identified under the *Aboriginal Lands Act 1995* (Tas). Formal and informal management regimes that recognise Aboriginal values have been established under the *Aboriginal Relics Act 1975* (Tas), the *Forestry Practices Act 1985* (Tas), the *Forest Practices Code 2015*, and the *National Parks and Reserves Management Act 2002* (Tas). Informal arrangements are also in place to facilitate Aboriginal cultural activities in certain reserves.

The *Aboriginal Relics Act 1995* (Tas) protects all Aboriginal relics; interference with a relic can only occur consistent with a permit issued by the responsible Minister. The *Aboriginal Relics Act 1995* (Tas) is administered by Aboriginal Heritage Tasmania, a branch within the Department of Primary Industries, Parks, Water and Environment, who also manage the Aboriginal Heritage Register (Aboriginal Heritage Tasmania 2015). Forestry Tasmania has not applied for any permits under the *Aboriginal Relics Act 1995* (Tas) since before 2000, as Aboriginal Heritage is managed through procedures that require avoidance of disturbance to of known Aboriginal Heritage.

The *National Parks and Reserved Land Regulations 2009* (Tas) also protects all Aboriginal relics and items of archaeological or historical interest in reserves and national parks.

The Forest Practices Code, established under the *Forest Practices Act 1985* (Tas), provides for the assessment, planning, management and protection of Aboriginal heritage within production forests, and is revised and updated in response to new information. In multiple-use public forests, known sites and identified new sites are coded with special management zones to identify Aboriginal and cultural heritage sites.

Between July 2006 and June 2011, 1330 new Aboriginal heritage places across all land tenures were recorded in the Tasmanian Aboriginal Site Index, a proportion of these were in wood production forests. In November 2014 the Aboriginal Heritage Register replaced the Tasmanian Aboriginal Site Index and other internal systems.

Of the new Aboriginal heritage places identified across all land tenures during 2006–2011, 328 places were located by mechanisms established under the Forest Practices Code by the forest practices system.

Between July 2011 and June 2016, 103 new Aboriginal heritage sites were identified in forested land by the forest practices system. Most of these were single stone artefacts or small scatters. A few were sandstone overhangs which may have served as Aboriginal shelters, though no artefacts were found in these. All sites were recorded on the Conserve Aboriginal database

administered by Forestry Tasmania and the Aboriginal Heritage Register. All new sites have been protected in informal reserves or machinery exclusion zones (Forest Practices Authority, in prep.).

As at June 2011, about 49 900 hectares of multiple-use public forest was zoned for Indigenous and non-Indigenous cultural heritage special management (of which about 11 000 hectares was zoned for Indigenous cultural heritage value and the balance for other cultural heritage values). This compares with about 49 000 hectares zoned for equivalent cultural heritage management in 2006 and 37 000 hectares in 2001.

In June 2011, before the Register of National Estate was retired in 2012, approximately 3000 hectares of native forest with Indigenous heritage significance were listed on the register in Tasmania (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013).

Australia's State of the Forests Report 2013 reported 8000 hectares of forest in Tasmania which was owned and managed by Indigenous peoples, with an additional 750 000 hectares of forest under Indigenous co-management.

Indicator 6.4.c – The extent to which Indigenous values are protected, maintained and enhanced through Indigenous participation in forest management

This indicator reports the extent to which Indigenous people participate in forest management.

As stated in Indicator 6.4.a above, there are significant areas of forest in Tasmania that are owned and managed, or co-managed by Aboriginal people.

During 2014 and 2015 the Forest Practices Authority worked with Aboriginal Heritage Tasmania and the interim Aboriginal Heritage Council to create the *Procedures for managing Aboriginal cultural heritage when preparing forest practices plans* (Forest Practices Authority 2016). These procedures separated Aboriginal cultural heritage management provisions from the *Resource guide for managing cultural heritage in wood production forests*, and updated and clarified management prescriptions. It was endorsed by the Aboriginal Heritage Council in 2016 and was circulated to Forest Practices Officers in April 2016 as an 'agreed procedure'.

The Forest Practices Authority, in conjunction with Aboriginal Heritage Tasmania and local Aboriginal community groups, conducted training courses in these new procedures to over 100 Forest Practice Officers and two Tasmanian Fire Service staff in late 2015. Forest Practices Officers who complete the course are then allowed to access Aboriginal information on the Forestry Tasmania Conserve database and conduct surveys as per the procedures (Forest Practices Authority 2015a).

The *State of the Forests Tasmania Report 2012* stated that as at June 2011 two of eight Aboriginal Heritage Tasmania staff were Aboriginal.

According to the *Australia State of the Environment Report 2016* (Commonwealth of Australia 2017) there were between 13 and 16 full time equivalent staff managing Indigenous heritage in Aboriginal Heritage Tasmania between July 2011 and June 2016.

Indicator 6.5.d – Resilience of forest-dependent Indigenous communities to changing social and economic conditions

While this indicator measures the extent to which Indigenous communities are able to respond and adapt to change successfully, it also takes into account that the use of forests provides and/or improves access to resources for survival and the maintenance of traditional values and cultural heritage.

According to the 2012 and 2017 State of the Forests Tasmania Reports there is little to no data supporting this indicator in Tasmania. The reports make the observation that while the Tasmanian Aboriginal community are not highly dependent on forests, forest managers (both public and private) recognise the cultural and traditional significance of forests to the Tasmanian Aboriginal community, including specific sites and objects within forests. As such forest managers engage with the Tasmanian Aboriginal community in management and planning operations. In 2015 the Forest Practice Authority worked with Aboriginal Heritage Tasmania and members of an Aboriginal community in Launceston to run three training courses for foresters in Tasmania. Forestry companies also consult with Aboriginal communities at the advanced planning stage regarding operations that may impact Aboriginal heritage (Forest Practices Authority, in prep.).

Forestry Tasmania has implemented two policies to recognise and support the Tasmanian Aboriginal people as traditional owners of Permanent Timber Production Zone land and the significance of heritage, including places, objects and stories, for maintaining continuous links with that land (Forest Practices Authority, in prep.).

Forestry Tasmania's Aboriginal Heritage Policy provides the principles by which Forestry Tasmania manages places of Aboriginal heritage. Under this policy, and in collaboration with the Aboriginal community, Forestry Tasmania aims to:

- foster positive and respectful relationships with the Aboriginal community and relevant statutory bodies and agencies to inform and guide forest planning and management activities
- identify, protect and manage places of Aboriginal cultural significance in accordance with the *Aboriginal Relics Act 1975 (Tas)*, Forest Practices Code, and the Australian ICOMOS Burra Charter 2013
- permit access by the Aboriginal community to land and traditional cultural materials where safety and environmental limitations allow
- explore and promote participation and economic opportunities for the Aboriginal community to manage and maintain their heritage, including employment of Aboriginal community members

- develop and implement appropriate training to assist staff gain an awareness of Aboriginal culture and allow for identification of Aboriginal heritage (Forest Practices Authority in prep.).

Australia's State of the Forests Report 2013 (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013) indicates that the proportion of the Indigenous workforce employed in the forest and wood products industry in Tasmania was 2.4 per cent (or 146 people) in 2011. This was the highest proportion reported in any Indigenous Region in Australia. The number of Indigenous people employed in the forest and wood products industry in Tasmania however reduced by 1 per cent in Tasmania during 2006 to 2011.

Aboriginal heritage values in the Tasmanian Wilderness World Heritage Area

The Aboriginal cultural heritage of the Tasmanian Wilderness World Heritage Area is recognised by the UNESCO World Heritage Committee as globally unique and significant, contributing to the property's Outstanding Universal Value (Department of Primary Industries, Parks, Water and Environment 2016a).

Aboriginal heritage values are intrinsically linked with the Tasmanian Wilderness World Heritage Area's World Heritage values, and some information in the section on 4a(i) 'Environmental values' is relevant to the assessment of Aboriginal heritage values.

The Tasmanian Wilderness World Heritage Area contains Aboriginal cultural heritage that is internationally significant. It is thought to be the world's most southerly occupied area during the last Ice Age, approximately 35 000 years ago in the Pleistocene Epoch. This cultural heritage, which includes rich and diverse archaeological sites, was the primary justification for listing the Tasmanian Wilderness World Heritage Area under the World Heritage cultural criteria (Department of Primary Industries, Parks, Water and Environment 2016a).

According to the *Tasmanian Wilderness World Heritage Area Management Plan* in January 2014 there were 962 Aboriginal sites on the Aboriginal Heritage Register in the Tasmanian Wilderness World Heritage Area. This included almost 90 occupied rock shelters, 70 unoccupied rock shelters and 20 registered art sites. Most of the sites registered in the area are activity areas, stone artefact scatters, isolated stone artefacts or middens, from the Holocene epoch. While there have been many sites identified in the Aboriginal Heritage Register, it is important to recognise that the whole Tasmanian Wilderness World Heritage Area is considered by Aboriginal people to be a landscape of Aboriginal cultural expression (Department of Primary Industries, Parks, Water and Environment 2016a).

In the establishment and management of the Tasmanian Wilderness World Heritage Area the protection and management of Aboriginal cultural heritage is a priority. Following the joint UNESCO World Heritage Centre-International Union for the Conservation of Nature-International Council on Monuments and Sites reactive monitoring mission that visited the Tasmanian Wilderness World Heritage Area in November 2015, the Tasmanian Government is leading further work, in cooperation with the Aboriginal Heritage Council, to better understand the cultural heritage values of the property and how this contributes to its Outstanding

Universal Value. In 2015, the Australian Government provided \$575 000 to the Tasmanian Government to progress the work being undertaken with the Tasmanian Aboriginal Community to provide more detailed information on the Aboriginal cultural heritage in the Tasmanian Wilderness World Heritage Area and how these relate to its Outstanding Universal Value.

The *2016 Tasmanian Wilderness World Heritage Area Management Plan* outlines a joint management arrangement to enhance the participation of the Aboriginal community in the management of Aboriginal heritage values.

As well as contributing to the management of the whole property, the Tasmanian Wilderness World Heritage Area contains three land areas, totalling almost 730 hectares, vested in the Aboriginal Land Council of Tasmania in trust for Aboriginal people, under the *Aboriginal Lands Act 1995* (Tas). The Tasmanian Wilderness World Heritage Area Management Plan does not apply to these land areas.

National Heritage List

In 2017, in addition to the Tasmanian Wilderness World Heritage Area, there are two other places of Aboriginal heritage value on the National Heritage List: the Jordan River levee site and the Western Tasmania Aboriginal Cultural Landscape (Department of the Environment and Energy n.d.b).

Australia State of the Environment Report 2016

The extensive fires in early 2016 affected the Aboriginal heritage values in the Tasmanian Wilderness World Heritage Area, the Western Tasmania Aboriginal Cultural Landscape, the Arthur-Pieman Conservation Area and Sundown Point State Reserve. According to the *State of the Environment Report 2016* the Tasmanian Parks and Wildlife Service are using the opportunity to survey and document Aboriginal heritage values in the west coast region of Tasmania, before the regeneration and regrowth of vegetation, or coastal erosion (Commonwealth of Australia 2017).

Summary of Aboriginal heritage values

A summary of the known Aboriginal heritage values in Tasmanian forests that have been detailed in this chapter is available in Table 16.

Table 16 – Summary of Aboriginal heritage values in Tasmanian forests, as detailed in this chapter

Aboriginal heritage value	Reference
1330 Aboriginal heritage places recorded in the Aboriginal Heritage Register, including 328 identified through the Forest Practices System (July 2006 to June 2011)	Forest Practices Authority 2012a
130 new Aboriginal heritage sites identified through the Forest Practices System (July 2011 to June 2016)	Forest Practices Authority, in prep.
8000 hectares of forest in Tasmania under Indigenous ownership and management (June 2011)	Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013
750 000 hectares of forest in Tasmania under Indigenous co-management (June 2011)	Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013
Approximately 962 Aboriginal sites on the Aboriginal Heritage Register in the Tasmanian Wilderness World Heritage Area Management Area (TWWHA), including: <ul style="list-style-type: none"> • 90 occupied rock shelters • 70 unoccupied rock shelters • 20 art sites • middens • stone artefact scatters • isolated stone artefacts (January 2014)	Department of Primary Industries, Parks, Water and Environment 2016a
Approximately 730 hectares of land in the TWWHA vested in the Aboriginal Land Council of Tasmania for Aboriginal people (June 2011)	Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013
TWWHA, Jordan River levee and Western Tasmania Aboriginal Cultural Landscape are places of Aboriginal heritage value in Tasmania on the National Heritage List (April 2017)	Department of Environment and Energy n.d.a
3000 hectares of native forest with Aboriginal heritage significance was listed on the Register of National Estate before it was retired (June 2011)	Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013
11 000 hectares of multiple-use public forest was zoned for Aboriginal cultural heritage value (June 2011)	Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013

Issues relating to Indigenous heritage values raised during the first and second independent five-yearly reviews of the Tasmanian Regional Forest Agreement

The only specific commitment in the Tasmanian Regional Forest Agreement regarding Aboriginal issues was to introduce into the Tasmanian Parliament legislation to provide an improved legislative basis for management of Aboriginal heritage values. The new legislation would replace the *Aboriginal Relics Act 1975* (Tas).

The first independent five-yearly review of the Tasmanian Regional Forest Agreement noted the sensitive and complex nature of discussions surrounding the review of this legislation and concluded that it was not reasonable to impose a time frame on the development of the new legislation (Resource Development and Planning Commission 2002a).

The first independent five-yearly review of the Tasmanian Regional Forest Agreement raised the issue that management plans for two national parks had been delayed while policy issues regarding Aboriginal community involvement in management were resolved.

Clause 37 of the 2005 *Supplementary Tasmanian Regional Forest Agreement*, which acted as the Joint Government Response to the first five-yearly review of the Tasmanian Regional Forest Agreement, addressed Aboriginal heritage issues in Tasmania's north west forests (Commonwealth of Australia and the State of Tasmania 2005). The clause reads:

The Parties acknowledge, in particular, the importance of the north west forests both to Aboriginal and other communities, and agree that management arrangements for new reserves will involve consultation with these communities to maintain access for traditional land uses and to agree the basis for long term management plans to maintain cultural links and uses, consistent with the conservation values of these areas.

While the *Supplementary Tasmanian Regional Forest Agreement* addressed issues of Indigenous heritage, the *Tasmanian Community Forests Agreement*, which was the policy position behind the *Supplementary Tasmanian Regional Forest Agreement*, did not.

Issues relating to Indigenous heritage values raised during the third five-yearly Regional Forest Agreement review

In the third five-yearly review the Independent Reviewer made three recommendations relating to Indigenous heritage values (Kile 2015):

Recommendation 4: The Parties seek opportunities to encourage greater involvement of the Aboriginal community in management planning and forest stewardship during the Tasmanian Regional Forest Agreement renewal/extension process.

Recommendation 3: The State reassess the process and timeframe for completing the management plans for Rocky Cape, Mount William and Savage River national parks with a view to their completion as soon as possible.

Recommendation 15: The State considers improved mechanisms for the protection of Aboriginal cultural heritage as part of the Tasmanian Regional Forest Agreement renewal/extension.

The Australian and Tasmanian governments agreed to these recommendations and their responses were as follows:

Recommendation 3

The Tasmanian Government is currently working with the Aboriginal Heritage Council to progress an agreed approach to management planning for national parks and reserves, including Rocky Cape and Mount William national parks, which are of significant interest to the Tasmanian Aboriginal community.

In addition, a draft Savage River National Park Management plan has been prepared and will be finalised in the near future.

Recommendation 4

The Australian and Tasmanian governments are committed to meaningful consultation on forest management, including consultation with Aboriginal community members who have relevant interests.

The Australian and Tasmanian governments invited public comments during the third five-yearly review of the Tasmanian Regional Forest Agreement to inform the extension process. Submissions were sought from the Aboriginal community through advertising in the Koori Mail (22 April 2015) and other media outlets.

In addition, the Australian Government undertook consultation specifically associated with the extension of the Tasmanian Regional Forest Agreement. Submissions were sought from the Aboriginal community through advertising in the Koori Mail (30 November 2016). Further, Aboriginal Heritage Tasmania was invited to meet face-to-face with government officials and broader Aboriginal communities invited to make submissions.

The Tasmanian Government has improved its consultation processes with the Aboriginal community in forest management planning and stewardship since the third five-yearly review reporting period (2007 – 2012). The Forest Practices Authority has released a number of documents to provide specific guidance on the process to be undertaken if Aboriginal cultural heritage is discovered or suspected during forest management planning processes. Forest Practices Officer training courses covering Aboriginal cultural awareness and management of Aboriginal cultural heritage have been instigated in 2015, with significant input from Aboriginal Heritage Tasmania and delivery by members of the Aboriginal community.

One of these documents by the Forest Practices Authority was the March 2016 Procedures for managing Aboriginal cultural heritage when preparing Forest Practices Plans (Forest Practices Authority 2016a) which was developed with Aboriginal Heritage Tasmania and the Interim Aboriginal Heritage Council. The Interim Aboriginal Heritage Council wrote in the foreword to the procedures: “We believe the Procedures for managing Aboriginal cultural heritage when preparing Forest Practices Plans reflects the forest industry’s

genuine intent to ensure protection and management of Aboriginal heritage sites and places within Tasmania.”

The establishment of the Interim Aboriginal Heritage Council in 2012 and its expansion as the Aboriginal Heritage Council in 2015 provides a formal mechanism for broad-based consultation with Tasmanian Aboriginal organisations and groups on relevant issues.

Recommendation 15

The Tasmanian Government has committed to acknowledging and managing Aboriginal cultural heritage. This includes supporting regulatory and non-regulatory mechanisms for heritage protection, in addition to community engagement and public education. This approach is broad-based and designed to guide land management across all tenures. It will inform mechanisms to protect Aboriginal cultural heritage as part of the Tasmanian Regional Forest Agreement extension.

The Tasmanian Government has made significant efforts to develop contemporary legislative protection mechanisms, arising in part from commitments associated with Tasmanian Regional Forest Agreement five-yearly review. However, these efforts have failed to gain passage through both Houses of the Tasmanian Parliament in 2013. The Tasmanian Government, however, remains committed to ongoing dialogue with the Tasmanian Aboriginal community. In particular the Aboriginal Heritage Council provides a formal mechanism for broad-based consultation with Tasmanian Aboriginal organisations and groups on relevant issues.

The Tasmanian Government has improved its consultation processes with the Aboriginal community in forest management planning and stewardship since the third five-yearly review reporting period (2007 – 2012). The Forest Practices Authority released a number of guides/procedures to provide specific guidance on the process to be undertaken if Aboriginal cultural heritage is discovered or suspected during forest management planning processes. Forest practices officer training courses covering Aboriginal cultural awareness and management of Aboriginal cultural heritage have been instigated in 2015, with significant input from Aboriginal Heritage Tasmania and delivery by members of the Aboriginal community.

Summary and future management of Indigenous heritage values

An extension of the Tasmanian Regional Forest Agreement, and potentially indefinitely, will continue the current protection and management of Aboriginal heritage values, and based on the improvements that have been made in the first 20 years of implementation will likely enhance them.

Tasmania’s Forest Management System provides a framework for the protection of Aboriginal heritage values through Commonwealth and Tasmanian legislation. This includes the formal use

and right to access forests for Aboriginal people, and the protection of sites and relics of cultural significance. Certain reserves also have informal arrangements that allow for Aboriginal cultural activities.

As such, in the proposed Tasmanian Regional Forest Agreement variation the Australian and Tasmanian governments agree that the forest management system provides a framework for the protection of Aboriginal heritage values in forests.

In the 1997 Tasmanian Regional Forest Agreement the Tasmanian Government committed to replacing the *Aboriginal Relics Act 1975* (Tas) after formal consultation with the Aboriginal community to ensure the appropriate management of Aboriginal heritage (Clause 83). As discussed earlier in this chapter, the first independent five-yearly review of the Tasmanian Regional Forest Agreement noted that this was a complex and sensitive process.

The *Aboriginal Relics Amendment Bill 2017* (Tas) was introduced to the Tasmanian Parliament on 15 March 2017. The *Aboriginal Relics (Consequential Amendments) Bill 2017* (Tas) was also introduced. This short bill simply amended references to the *Aboriginal Relics Act 1975* (Tas) in other legislation so they cite the new name, the *Aboriginal Heritage Act*.

Introduction of the bills followed extensive consultation that included a public consultation process in June–July 2016 and release for comment of a draft exposure bill, from 30 November 2016 to 24 February 2017. During February 2017 there was a further round of direct consultation with Aboriginal community organisations and industry stakeholders.

The bills passed the House of Assembly on 6 April. Debate in the Legislative Council led to the insertion of one minor amendment and both Bills concluded their passage through Parliament on 1 June 2017.

The bills are expected to come into force in August 2017.

The amendments have addressed a number of inadequacies in the existing legislation, by:

- changing the name of the act to the ‘Aboriginal Heritage Act’
- removing reference to 1876 as being a ‘cut-off’ point for what is considered as Aboriginal heritage (still referred to as ‘relics’ in the Act)
- increasing penalties for damage to Aboriginal heritage to be in line with the penalties for damage to non-Aboriginal heritage
- introducing tiered offences, in association with the removal of the ignorance defence
- introducing new defences related to emergency responses and compliance with guidelines; and removing the six-month time limit for prosecuting offences
- establishing a statutory Aboriginal Heritage Council of Aboriginal people to advise the Minister
- setting a statutory three-year deadline for a full review of the Act.

In the proposed Tasmanian Regional Forest Agreement variation the Tasmanian government’s commitment to update this legislation has been removed, as this is now a statutory commitment contained in the new legislation. The Commonwealth and Tasmanian governments are

committing in the variation to meaningful consultation on forest management with the Aboriginal Heritage Council and Aboriginal community in relation to the protection of significant sites and places.

Clause 37 of the *Supplementary Tasmanian Regional Forest Agreement*, discussed above, has been removed from the proposed Tasmanian Regional Forest Agreement variation. This clause was in response to issues the north-west Tasmanian Aboriginal community raised in the Tasmanian Community Forest Agreement. Instead of specifically mentioning the consultation commitments in the north-west region, the governments are committing to meaningful consultation on forest management with the Aboriginal Heritage Council and Aboriginal community across the state.

The Tasmanian Government and the Tasmanian Aboriginal community have increased their cooperation to inform the protection, maintenance and enhanced management of Aboriginal heritage values in Tasmanian forests. Mechanisms for consultation and cooperation have included:

- the completion of the new 2016 Tasmanian Wilderness World Heritage Area management plan, and the potential for joint management arrangements
- submissions to the Tasmanian Regional Forest Agreement five-yearly reviews and extension process
- consultation with the Forests Practices Authority in periodical reviews of the Forest Practices Code
- the development of procedures for the management of Aboriginal cultural heritage by the Forest Practices Authority
- the creation of a Memorandum of Understandings between the Aboriginal communities and public forest managers
- the specific consideration of Aboriginal values in forest management certification.

Since the signing of the Tasmanian Regional Forest Agreement in 1997 the Tasmanian Government has endeavoured to improve their engagement with the Aboriginal community, to enhance the management and protection of Aboriginal heritage values in Tasmanian forests. This continual improvement in engagement in of the Tasmanian Aboriginal community in forest management is likely to lead to improved protection and management of Indigenous heritage values in Tasmanian forests.

Economic values

The purpose of this chapter is to report on the economic values of forested areas and forest industries relevant to the Tasmanian region associated with paragraph (a)(iii) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth).

As the data and information for this section has been drawn from a range of sources that vary by reporting frequency and reporting periods, the reporting periods for indicators included in this section vary. Where possible, the largest span of data available from 1995–6 to present has been reported to provide an assessment of the indicator's change since the Tasmanian Regional Forest Agreement came into force.

Significant data have been collected and published since the Australian and Tasmanian governments entered into the Tasmanian Regional Forest Agreement in 1997. Since that time, there have been a number of reports produced that detail the economic significance of Tasmania's forested areas and forest industries.

The *State of the Forests Tasmania Report* series and *Australia's State of the Forests Report* series are published every five years, and provide comprehensive data relevant to how the forest sector provides multiple economic benefits to Tasmanian society.

The *State of the Forests Tasmania Report* series have been compiled for the periods:

- July 1996 to June 2001 (Forest Practices Board 2002)
- July 2001 to June 2006 (Australian Government and Tasmanian Government 2007a)
- July 2006 to June 2011 (Forest Practices Authority 2012a).

Some information from the *State of the Forests Tasmania Report 2017* (Forest Practices Authority in prep.) has been included, which is due to be published later this year.

The *State of the Forests Tasmania Report* series and *Australia's State of the Forests Report* series are reported based on the indicators developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests. Indicators grouped under these criteria allow the presentation of data in a consistent and repeatable format.

Criteria 2 and 6 of the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests are concerned with economic values. Specifically these criteria are listed as 'Maintenance of productive capacity of forest ecosystems' and 'Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies'.

Criterion 2 measures the ongoing productive capacity of forests by monitoring the area of native forests and plantations available for producing timber and other forest products. Areas covered include native forest area available for wood production, area harvested, growing stock of merchantable and non-merchantable tree species, age class of plantations, annual removal of wood products compared to the volume determined to be sustainable for native forests and

future yields for plantations, annual removal of non-wood forest products compared to the level determined to be sustainable, area of native forest harvested and the proportion of that effectively regenerated, and the area of plantation clear-felled and the proportion of that effectively re-established.

Criterion 6 monitors and reports across five sub-criteria relevant to how the forest sector provides multiple socio-economic benefits to society. Areas covered relevant to this chapter include the production and consumption of forest products, investment in the forest sector and forest-related employment and community needs.

Table 17 – Indicators relevant to the economic values of forested areas and forest industries

<i>Criterion 2: Maintenance of productive capacity of forest ecosystems</i>
Indicator 2.1a – Native forest available for wood production, area harvested and growing stock of merchantable and non-merchantable tree species
Indicator 2.1b – Age class and growing stock of plantations
Indicator 2.1c – Annual removal of wood products compared to the volume determined to be sustainable for native forests and future yields for plantations
Indicator 2.1d – Annual removal of non-wood products compared to the level determined to be sustainable
Indicator 2.1e – The area of native forest harvested and the proportion of that effectively regenerated and the area of plantation clear-fell harvested and the proportion of that effectively re-established
<i>Criterion 6: Maintenance and enhancement of long-term socio-economic benefits to meet the needs of society</i>
6.1 Production and consumption
Indicator 6.1a – Value and volume of wood and wood products
Indicator 6.1b – Values, quantities and use of non-wood forest products
Indicator 6.1c – Value of forest based services
Indicator 6.1d – Production and consumption and import/export of wood, wood products and non-wood products
Indicator 6.1e – Degree of recycling of forest products
6.2 Investment in the forest sector
Indicator 6.2a – Investment and expenditure in forest management
Indicator 6.2b – Investment in extension and use of new and improved technologies

Criterion 2 – Maintenance of productive capacity of forest ecosystems

This criterion measures the ongoing productive capacity of forests by monitoring the area of native forests and plantations available for producing timber and other forest products. The sustainable removal of wood and non-wood products is monitored to the extent that is possible. To ensure long-term sustainability is achievable, the regeneration of native forests and the re-establishment of plantations are measured.

Indicator 2.1.a – Native forest area available for wood production, area harvested, and growing stock of merchantable and non-merchantable tree species

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

Net harvestable area of forest

Maintaining an adequate land-base for wood production is an important component in meeting the Tasmanian Regional Forest Agreement's commitment to sustain a minimum level of high-quality sawlog production. Under the Tasmanian Regional Forest Agreement the state is obliged to review the sustainable level of high-quality sawlog production from public land every five years. The net harvestable area, or native forest area available for wood production, is the basis of sustainable yield calculations for Tasmania's multiple-use public native forest.

Net harvestable area is estimated by subtracting from the gross available multiple-use public native forest area:

- areas within multiple-use forests that are reserved for nature conservation, water and heritage, and/or are zoned for management purposes that do not permit wood harvesting
- forest exclusions resulting from the application of codes of forest practice
- forests determined to have operational constraints (e.g. access) or to be non-merchantable—that is, they are not suitable for wood production because of the age, size and type of trees, or because they have been damaged by fire or disease (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013).

The net harvestable area therefore represents the net area of available and suitable forest on multiple-use public native forest land after allowing for local and/or operational constraints on harvesting (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013).

During the course of the Tasmanian Regional Forest Agreement, the net harvestable area has declined substantially (Table 18) (Montréal Process Implementation Group for Australia and

National Forest Inventory Steering Committee 2013; Forest Practices Authority, in prep.). There were approximately 811 000 hectares of public native forest potentially available for wood production on public land preceding the Tasmanian Regional Forest Agreement. This reduced to 787 000 hectares following implementation of the Tasmanian Regional Forest Agreement. The net harvestable area on public land at 30 June 2016 was 376 000 hectares (Forest Practices Authority, in prep). The proportion of Tasmania’s total public native forest estate available for harvesting decreased from 36 per cent in 1995–96 to 17 per cent in 2015-16 (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013; Forest Practices Authority, in prep.).

Table 18 – Net harvestable area of public native forest, and proportion of total public native forest

Public native forest ^a	Unit	1995-96	2000-01	2005-06	2010-11	2015-16
Net harvestable area	'000 ha	811	787	607	563	376
Proportion ^b	per cent	36	35	27	23	17

a Public native forest comprises the tenures multiple-use public native forest, nature conservation reserve and other crown land

b Proportion of total public native forest. Note: Area statements of public forest reported in ABARES’ Australia’s State of the Forests Report series (1998, 2003, 2008, 2013) and Forest Practices Authority (in prep) are used to calculate proportion of total public native forest.

Source: Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013; Forest Practices Authority (in prep.)

Most of the change in the net harvestable area of multiple-use public native forests has arisen from the consequences of further agreements following the signing of the original Tasmanian Regional Forest Agreement (Forest Practices Authority 2012a). These are the:

- *Tasmanian Community Forest Agreement* in 2005 (enacted through the *Supplementary Tasmanian Regional Forest Agreement*) (Commonwealth of Australia and the State of Tasmania 2005)
- *Tasmanian Forest Agreement Act 2013* (Tas).

In addition, changes to requirements under the Tasmanian Forest Practices Code, and continual improvements inherent in the forest practices system which underpins forest management in Tasmania, has resulted in further areas falling outside of harvested zones (Forest Practices Authority 2012a).

The area of private forest land potentially available for wood production is not mapped and therefore is not able to be reported. Because the discounting process used to adjust the private-forest resource availability estimates is not specifically area-based, it is not possible to provide a meaningful net area estimate. For private forests, in addition to area discounts such as Forest Practices Code constraints, the most significant discount to be applied results from ‘owner intent’, which varies from year to year and must be determined by periodic survey. Hence predicting the potential forest estate available for timber production in a reliable way is problematic. Similarly, the area harvested on all private lands is not mapped and is also not able to be reported.

Area harvested

The area of native forest harvested on public land varies from year to year. This activity is driven by sustainable sawlog supply, market conditions and silvicultural prescription. This area includes clear-fell, selective harvesting and thinning.

In 1996-97, a total area of 8434 hectares of native forest was harvested in state forest (Table 19). Native forest harvesting in state forest averaged 15 778 hectares per year over the 2001-02 to 2005-06 period, and 11 200 hectares per year over the 2006-07 to 2010-11 period (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013). The area of public land harvested fell to an historic low of 2400 hectares in 2011-12, but had increased to 5000 hectares in 2015-16 (Forest Tasmania 2016a).

Table 19 – Forest area harvested annually from multiple-use public native forest

Public native forest	Unit	1996-97	2002-03	2006-07	2010-11	2015-16
Area harvested	ha	8434	16 900	11 520	10 490	5000

Source: Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013; Forestry Tasmania (2016a)

A surrogate for native forest area harvested is the area of native forest approved for harvesting each year, as covered by certified forest practices plans. This dataset has been published by the Forest Practices Authority since 1999-2000, and includes both public and private land tenure (Forest Practices Authority 2000-2010, 2011a, 2012c, 2013, 2014, 2015b, 2016c). However, it is important to note that actual native forest area harvested is likely to be less than the planned area, and may occur in a subsequent year.

There has been a downward trend in the area of native forest approved for harvesting since the early implementation of the Tasmanian Regional Forest Agreement. In 1999-2000, the total area approved for harvesting across all land tenures was 35 100 hectares, and was shortly followed by a peak in 2001-01, when 42 000 hectares of native forest area was approved.

In the 2001-02 to 2005-06 period, there was an average of 17 359 hectares of forested area annually approved for harvesting on public land (Table 20). Between 2006-07 and 2010-11, the area approved for harvesting on public land reduced to 12 465 hectares a year on average. The area approved for harvest each year on public land has varied little from year to year since 2011, and recent approvals remain less than half the average area approved for harvesting reported over the period 2006 to 2011.

On private land, from 2001-02 to 2005-06, there was an average of 16 812 hectares of native forest area approved for harvesting. Over the period from 2006-07 to 2010-11, this reduced to an average of 13 817 hectares a year. From 2011-12 to 2015-16, average approvals on private land declined to 2956 hectares.

Table 20 – Five-year mean of native forest area approved for harvest by tenure

Land tenure	Unit	2001-02 to 2005-06	2006-07 to 2010-11	2011-12 to 2015-16
Public	ha	17 359	12 465	4 844
Private	ha	16 812	13 817	2 956
Total	ha	34 172	26 282	7 800

Source: Forest Practices Authority (2000-2010, 2011a, 2012c, 2013, 2014, 2015b, 2016b)

Growing stock—merchantable and non-merchantable trees

'Growing stock' is the total volume of wood in all living trees in a forest at a given time. Increases or decreases in growing stock can indicate (among other things) the sustainability of resource use.

Information on growing stock is not available across all tenures and has thus not been reported the *State of the Forests Tasmania Report* series or this Assessment Report.

Indicator 2.1.b – Age class and growing stock of plantations

This indicator provides a state-wide summary of the progress of plantation establishment of native and exotic species over time. An increase in the size and quality of the plantation estate is a significant element in the longer-term sustainability and growth of the forest industry in Tasmania.

The 1997 Tasmanian Regional Forest Agreement lists a number of plantation expansion actions under Clauses 14, 15, and 16 of Attachment 12. The expected contribution of plantations to sustainable high quality eucalypt sawlog supply from State forest is addressed independently in the review required by Clause 98 of the current Tasmanian Regional Forest Agreement.

Tasmania's plantations are concentrated in the north of the state and in the south-east corner inland from Hobart. A range of species, particularly eucalypts, have been planted in Tasmania. However, as the industry has developed, plantations are growing a narrower range of species: the softwood resource is dominated by *Pinus radiata*, whereas *Eucalyptus nitens* and *E. globulus* dominate the hardwood resource. *E. globulus* is the favoured pulping species, but it grows only in relatively frost free sites. *E. nitens* is the preferred alternative in exposed, frosty or high-altitude sites and is the more widely planted (ABARES 2016a).

The state's softwood plantations supply a pulp mill at Boyer and several sawmills. Most of the hardwood plantations were established to supply the export woodchip market via ports at Burnie and Bell Bay (ABARES 2016a).

Table 21 shows the trend in plantation area over the 1995-96 to 2015-16 period. In line with Australia-wide trends, the area of hardwood plantations increased at a rapid rate until around 2008-09, and subsequently plateaued. The area of softwood plantations in Tasmania has remained comparatively stable.

Table 21 – Plantation areas

Type	Unit	1995-96	2000-01	2005-06	2010-11	2015-16
Hardwood	'000 ha	73.6	119.9	174.0	235.6	233.9
Softwood	'000 ha	68.5	75.3	73.6	75.1	75.9
Total	'000 ha	142.1	195.2	247.7	310.7	309.8

Note: Plantation area may increase or decrease between reporting years as new plantations are established, some plantation areas are removed which growers deem to be commercially unviable, some plantations are not re-established after harvest and as growers and managers provide revised net planted and fallow areas for their plantation estates. **a** Total includes plantations where type is unknown. Source: Forest Practices Board (2002); ABARES (2017, 2012, 2001).

Table 22 shows the trend in plantation establishments over the 1995-96 to 2015-16 period. The establishment of new hardwood plantations peaked in 2006-07 at around 25 000 hectares and then declined significantly as investment in plantation Managed Investment Schemes collapsed (Table 22). The majority of softwood plantations in Tasmania were established on public land under joint ownership (public and private) for sawlog production. No new plantations have been established since 2013-14 (ABARES 2017)

Table 22 – Plantation Establishment Trends^a

Type	Unit	1995-96	2000-01	2005-06	2010-11	2015-16
Hardwood	'000 ha	8.13	12.31	18.53	1.15	0.00
Softwood	'000 ha	1.23	2.64	1.96	0.39	0.00
Total	'000 ha	9.36	14.95	20.49	1.54	0.00

a New areas planted (excludes replanting). Totals may not add due to rounding. Source: ABARES (2017, 2012, 2001)

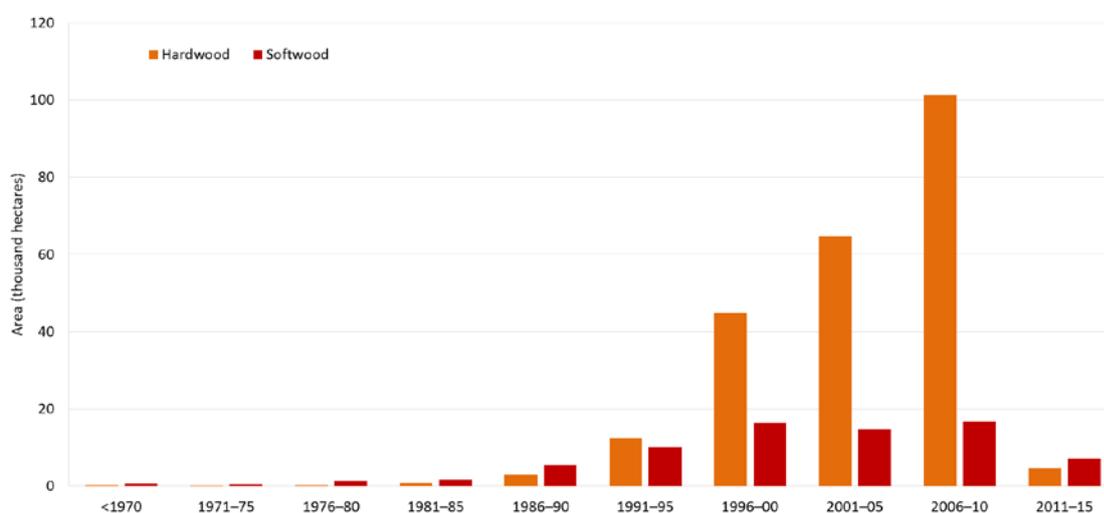
Table 23 and Figure 17 report plantations in five-year age classes at an aggregated state level. The table and figure confirm the high proportion of hardwood plantations planted between 2001 and 2010.

Table 23 – Area of Tasmanian plantations by age class

Age classes	Hardwood plantations (ha)	Softwood plantations (ha)
Unknown	1 800	100
Pre-1976	1 400	1 700
1976-80	300	1 300
1981-85	700	1 600
1986-90	2 400	5 500
1991-95	10 000	10 100
1996-00	38 300	16 200
2001-05	63 100	14 600
2006-10	99 000	16 700
2011-15	7 000	7 200
Total	224 000	75 000

Source: Forest Practices Board (2002); Australian and Tasmanian Governments (2007); Forest Practices Authority (2012a); Forest Practices Authority (in prep.)

Figure 17 – Age class of plantations by five-year period



Source: ABARES 2016a

Indicator 2.1.c – Annual removal of wood products compared to the volume determined to be sustainable for native forests and future yields for plantations

This indicator measures the harvest levels of wood products in relation to future yields. The capacity to implement strategies to deal with changing demand for forest products based on future yields from both native and plantation forests is an integral part of sustainable forest management

Sustainable yield from native forests

Calculated sustainable yield is the estimated volume of wood that can be removed each year while ensuring maintenance of the functioning of the native forest system as a whole. Sustainable yield volumes vary over time according to changing management strategies and utilisation standards, improved resource data, and changes in the net area of public native forest available for harvesting.

Public land

The calculated sustainable yield of high quality sawlogs averaged 300 000 cubic metres over the period 1992-03 to 1995-96 (Forest Practices Board 2002). This volume was based on the Forests and Forest Industry Council's 1991 strategy to meet a minimum legislated sawlog requirement of 300 000 cubic metres per year (Forest Practices Board 2002).

The Tasmanian Regional Forest Agreement maintained the commitment to sustain a minimum production volume of 300 000 cubic metres per year of high quality sawlogs from public land, which the calculated sustainable yield has been based on over the Tasmanian Regional Forest Agreement period (Forest Practices Board 2002; Australian and Tasmanian Governments 2007; Forest Practices Authority 2012a). Pulpwood supply has arisen from meeting this sawlog commitment; consequently, sustainable yields are not determined for pulpwood (Table 24). Under Clause 98 of the current Tasmanian Regional Forest Agreement, sustainable yield of high quality sawlogs from public land must be reviewed every five years.

The volume of sawlogs harvested from Tasmanian multiple-use public forests has remained within sustainable levels over the period of the Tasmanian Regional Forest Agreement.

Over the period 1996-97 to 2000-01, the calculated sustainable yield of high quality sawlogs on public land increased to an annual average of 360 000 cubic metres in line with short-term forest management strategies (Table 24). Actual harvest volumes also increased over this period due to strong market demand (but remained below the calculated sustainable yield) (Forest Practices Board 2002).

Over the period 2001-02 to 2005-06, the calculated sustainable yield of high quality sawlogs on public land slightly decreased to annual average of 350 000 cubic metres, while actual harvest volumes increased (but remained below the calculated sustainable yield) as market demand remained strong (Table 24) (Australian and Tasmanian Governments 2007).

Over the period 2006–07 to 2010–11, the calculated sustainable yield decreased further, as well as actual harvest volumes. Particularly significant decreases in harvest volumes occurred over the 2009–10 to 2010–11 period, largely due to lower market demand (Table 24) (Forest Practices Authority 2012a). During this period, the actual harvest volume from public native forests was 21 per cent below the calculated sustainable sawlog yield.

After the 2014 review of the *Sustainable high quality eucalypt sawlog supply from Tasmania's Permanent Timber Production Zone Land*, the minimum volume of high quality eucalypt sawlog from public land to be made available to industry was reduced to 137 000 cubic metres per year, and the current calculated sustainable yield volume remains at this level. This reduction reflects changes in land tenure and reduction in areas of public forest available for wood production. The next sustainable yield review will be published later this year (Forestry Tasmania 2016a).

Table 24 – Average annual removal and sustainable yield of wood products from multiple-use public native forests

Wood product	Unit	1992–93 to 1995–96	1996–97 to 2000–01	2001–02 to 2005–06	2006–07 to 2010–11	2011–12 to 2015–16
High quality sawlog and veneer log^a						
- Calculated sustainable yield	'000 m ³	300	360	350	320	210
- Actual harvest	'000 m ³	272	275	334	253	121
Pulpwood - actual harvest	'000 t	n.a.	2 043	2 858	2 156	536
Special species sawlogs - actual harvest^b	'000 m ³	11	18	18	15	11

a Sustainable yield and actual harvested level are of category 1 (incl. veneer) and category 3 sawlogs. Doesn't include special species or low quality (category 2) sawlogs or minor log products. n.a. – not available.

b Includes craft woods for data from 2011–12 onwards.

Source: data for 1992–93 to 2010–11 period sourced from Forest Practices Board (2002); Australian and Tasmanian Governments (2007); Forest Practices Authority (2012a). Data for the period from 2011–12 onwards sourced from Forestry Tasmania (2012a–2016a).

The cut of special species sawlogs (blackwood, celery top pine, myrtle, Huon pine and sassafras) averaged 18 500 cubic metres per year from for the period 1996–97 to 2005–06, 15 000 cubic metres per year from 2006–07 to 2010–11, and 11 000 per year from 2011–12 to 2015–16. The timber was obtained from selective harvesting of Special Timber Management Units, harvesting blackwood swamps and salvaging individual trees in eucalypt sawlog harvesting coupes.

Wood production eucalypt plantations have been a small proportion of the public land cut over the period of the Tasmanian Regional Forest Agreement (Table 25). Most of the plantation wood produced over the period of the Tasmanian Regional Forest Agreement was from thinnings from stands planted in the early 1990s and from clear-fell of older, under-performing plantation

sites that are being replanted to meet the goals of the *Forestry Growth Plan* (Forest Practices Board 2002; Australian and Tasmanian Governments 2007; Forest Practices Authority 2012a).

Softwood plantation wood production has remained relatively static over the period of the Tasmanian Regional Forest Agreement. The age-class structure of the softwood plantations has limited the opportunity to increase the cut in the medium term.

Table 25 – Average annual removal of wood products on from plantations on public land

Wood product	Unit	1996-97 to 2000-01	2001-02 to 2005-06	2006-07 to 2010-11
Eucalypt plantations				
- Sawlogs and veneer	'000 m ³	0	0	5
- Pulpwood	'000 t	16	94	158
Softwood plantation				
- Sawlogs and veneer	'000 m ³	500	454	402
- Pulpwood	'000 t	281	454	402

Excludes minor log products. Source: Forest Practices Board 2002; Australian and Tasmanian Governments 2007; Forest Practices Authority 2012a

Private land

Over the period of the Tasmanian Regional Forest Agreement, the strategy for private forest management has been to maintain, if not increase, the forested area, recognising that infrastructure and agriculture expansion will continue to act as a reducing agent on forest area. The total private-forest resource, in both spatial and product terms, varies as forest is harvested and reforested or converted to agricultural uses, and as agricultural land is converted to plantations. Because of these variations, most of the production from private land in the medium to long-term is likely to be based on planted forests.

There is no sustainable sawlog cut determined on private land, due to the mixture of tenures and complexity of determining owner intent. However, successive *State of the Forest Tasmania Reports* have confirmed that the annual harvest of all products on private land is within predicted wood-flow estimates (Forest Practices Board 2002; Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a). Private native forest management must also comply with the forest practices system which sets standards for sustainable forest management. The average annual removal of wood products on private land from 1996–97 to 2010–11 is shown in Table 26.

Table 26 – Average annual removal of wood products on private land

Sales category	Unit	1996-97 to 2000-01	2001-02 to 2005-06	2006-07 to 2010-11
Native forest				
- Eucalypt sawlog and veneer log	'000 m ³	174	98	49
- Pulpwood	'000 t	1747	1541	789
- Special species sawlogs	'000 m ³	n.a.	n.a.	n.a.
Eucalypt plantations				
- Sawlogs and veneer	'000 m ³	0	4	9
- Pulpwood	'000 t	219	693	914
Softwood plantation				
- Sawlogs and veneer	'000 m ³	74	126	128
- Pulpwood	'000 t	278	206	235

n.a. Not available. Excludes minor log products.

Source: Forest Practices Board 2002; Australian and Tasmanian Governments 2007; Forest Practices Authority 2012a

Other wood products

The supply of other wood products, such as low-quality sawlogs, girders, poles, piles, non-pulpwood logs (logs that are not sawlogs or pulplogs), timber for mining, split and round posts, bush sawn/hewn timber and sleepers are generally harvested in association with high-quality sawlogs and pulplogs. These products are a major resource in Tasmania (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013). Table 27 shows average annual harvest volumes for these products from Tasmania's multiple-use public native forests. Limited data are available on harvest rates for these products from private forests. Fuelwood and firewood are treated separately from these products, and are discussed separately.

Table 27 – Average annual harvest of other wood products from Tasmania's native multiple-use public forests

Year	1992-93 to 1995-96	1996-97 to 2000-01	2001-02 to 2005-06	2006-07 to 2010-11
Other wood products ('000m ³)	n.a.	158	249	338

Source: Australian Bureau of Agricultural and Resource Economics and Sciences databases

Firewood

Firewood is one of the most commonly used wood products. Its use is an important segment of the forest sector and is important to regional communities. Table 28 shows the average annual harvest of firewood over the period of the Tasmanian Regional Forest Agreement.

Table 28 – Average annual harvest of firewood from Tasmania's native multiple-use public forests

Year	1991-95	1996-2000	2001-05	2006-10	2011-16
Firewood ('000 m ³)	1627	1690	1069	1090	1020

Source: Australian Bureau of Agricultural and Resource Economics and Sciences databases; Forestry Tasmania 2016a.

Future yields for plantations

ABARES' (2016a) *Australia's plantation log supply 2015-2059* report provides forecasts of Tasmania's hardwood and softwood plantations, and the below text is a direct extract from that report.

Hardwood plantations managed for sawlog production are forecast to have available around 111 000 cubic metres of high-quality and low-quality sawlog over the 2015-19 period and to peak at around 513 000 cubic metres a year over the 2040-44 period. Sawlog estimates include peeler logs, high-grade and low-grade sawlogs and posts and poles. Hardwood plantations managed for sawlog production will supplement the supply of sawlogs from native forests.

The plantation hardwood pulplog availability is forecast to be around 2.7 million cubic metres a year for the 2015-19 period and to peak in the 2025-29 period at around 4.4 million cubic metres a year (Table 29, Figure 18).

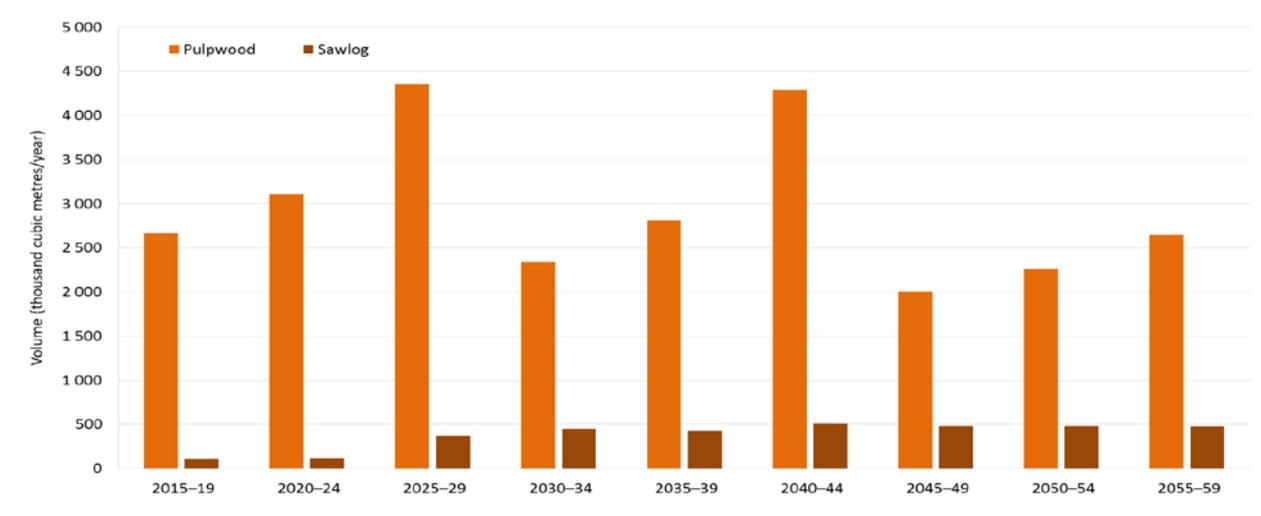
The softwood sawlog availability is forecast at around 599 000 cubic metres a year in the 2015-19 period, peaking in the 2035-39 period at around 1 million cubic metres a year. Softwood pulplog availability is forecast to vary from 694 000 cubic metres a year in the 2015-19 period to 546 000 cubic metres a year in the 2055-59 period (Table 29, Figure 19).

Table 29 – Forecast plantation log availability, average per year for each five-year period

Category	2015-19	2020-24	2025-29	2030-34	2035-39	2040-44	2045-49	2050-54	2055-59
Hardwood ('000 m ³)									
- pulplog	2 668	3 106	4 357	2 335	2 808	4 287	2 002	2 261	2 648
- sawlog	111	117	370	449	429	513	480	480	474
Softwood ('000 m ³)									
- pulplog	694	647	590	597	640	572	649	614	546
- sawlog	599	580	651	681	1023	623	625	595	625
Overall total ('000 m ³)	4 072	4 450	5 968	4 062	4 900	5 995	3 756	3 949	4 293

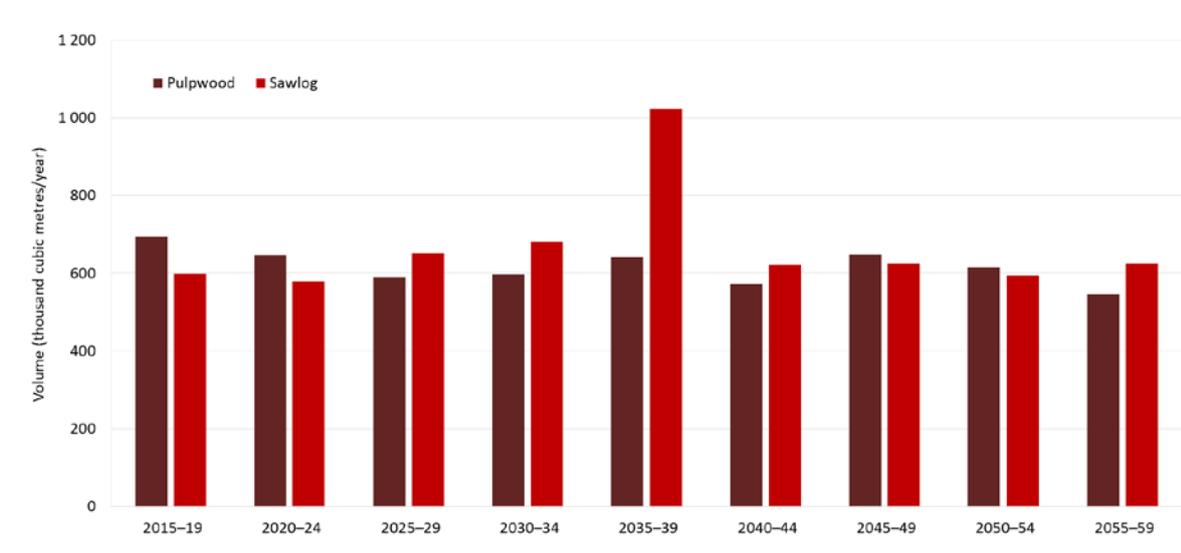
Source: ABARES (2016a)

Figure 18 – Forecast hardwood plantation log availability



Source: ABARES 2016a

Figure 19 – Forecast softwood plantation log availability, Tasmania



Source: ABARES 2016a

Indicator 2.1.d – Annual removal of non-wood forest products compared to the level determined to be sustainable

This indicator recognises that forests are sources of non-wood products, including for use by Indigenous people, and that it is important to monitor the level of use and, where practical, assess whether that level is sustainable. Further information on non-wood forest products is reported on in *Indicator 6.1.b*.

While there are some state-wide data for this indicator available on removal of non-wood products, the data on sustainable yields of these products are very limited. The different levels of available data reflect market driven responses where demand for particular non-wood products determines what, if any, monitoring systems are developed.

There are no data available on indigenous resources collected or used for cultural activities.

Honey

The sustainable yield of honey production from forests has not been determined. Honey production is dependent on seasonal conditions which determine flowering productivity. Honey production steadily increased until the mid-1980s and has fluctuated seasonally at a relatively high level over the last 20 years.

Forestry Tasmania annually reports on the number of sites available for beekeeping on state forest, which includes non-commercial operators as well as commercial operators. Data on the annual quantity of seed collected by Forestry Tasmania over the period of the Tasmanian Regional Forest Agreement are shown in Table 30 and Table 31 (Forest Practices Authority 2012a, in prep.). The number of sites has varied annually over the Tasmanian Regional Forest Agreement period. In recent years, there have been a relatively low amount of sites available.

Table 30 – Number of beekeeping sites and hives in state forest

	1996-97	2000-01	2004-05	2008-09	2012-13	2015-16
No. of sites	343	322	325	303	421	231
No. of hives	12 607	11 212	12 534	9 583	16 477	7616

Source: Forest Practices Authority (2012a, in prep.)

Table 31 – Five-year mean of the number of beekeeping sites and hives in state forest

	1996-97 to 2000-01	2001-02 to 2005-06	2006-07 to 2010-11	2011-12 to 2015-16
No. of sites	334	319	334	324
No. of hives	12 156	12 179	11 199	11 715

Source: Forest Practices Authority (2012a, in prep.)

The *State of the Forests Tasmania Report 2012* reported that Tasmania's honey industry encompassed 180 registered beekeepers; a decline from the 250 registered beekeepers reported in the *State of the Forests Tasmania Report 2007* (Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a). The number of registered beekeepers was not reported in the *State of the Forests Tasmania Report 2002*. Around 70 per cent of all production is sourced from leatherwood forests in north-west, south-west and south-east Tasmania. The most highly productive sites are located in State forest. However, about 20 per cent are within the Tasmanian Wilderness World Heritage Area (Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a).

Apiary industry data for other land tenures has not been reliably or consistently reported over the period of the Tasmanian Regional Forest Agreement.

Treeferns

The harvesting of treeferns (or manferns) (*Dicksonia antarctica*) is strictly regulated in Tasmania under the provisions of the *Forest Practices Act 1985*.

Data on the harvesting of treeferns prior to 2002 is not available. Since 2002, a tagging system has been in place for all ferns, and harvesting has been considered to be well within sustainable limits. The treefern tags are issued by the Forest Practices Authority. These tags must remain on the stems at all times to ensure that the origin of treeferns can be tracked to a previously approved harvesting area.

Harvesting of treeferns must be conducted in accordance with a management plan for the sustainable harvesting of treeferns that has been endorsed by the Australian and Tasmanian governments. Under the current management plan, the harvesting of treeferns must be covered by a certified Forest Practices Plan that includes a suitable prescription for treefern harvesting (Forest Practices Authority 2012a). Treeferns may be salvaged from native forest to be converted to another land use, native forest to be intensively harvested and regenerated, existing softwood and hardwood plantations, and treefern plantations or nursery sites.

In 2005, it was estimated that there were over 63 million individual tree ferns occurring in Tasmania's forests (Australian Government and Tasmanian Government 2007a). By 2016, this had increased to over 130 million individual treeferns (Forest Practices Authority, in prep.).

Table 32 presents data on the number of treeferns harvested since 2002-03 (based on number of tree fern tags issued). The number of treeferns harvested has varied annually due to changes in market demand. In 2002-03, 64 182 treeferns were harvested Tasmania. During 2006–11, harvesting of treeferns averaged 25 600 stems per year - less than 0.04 per cent per year of the estimated total number of treeferns (Australian Government and Tasmanian Government 2007a). During 2011-16, the average annual harvesting of treeferns decreased to around 12 800 stems per year (Forest Practices Authority, in prep.).

Treeferns rapidly recolonise coupes disturbed by harvesting. Spores are dispersed from mature treeferns retained in streamside reserves or wildlife corridors. Regenerating treeferns have a height growth rate of 3.5–5.0 cm per year indicating that treeferns can reach maturity (able to produce spores) and also a harvestable size if required in less than 30 years (Forest Practices Authority 2012a). The available treefern resource combined with treefern recolonisation and growth rate knowledge indicates that current harvest levels are well within sustainable yields.

Table 32 - Treefern harvesting

Year	Number of treefern tags issued
2002-03	64 182
2003-04	54 886
2004-05	61 368
2005-06	45 131
2006-07	54 802
2007-08	35 361
2008-09	17 529
2009-10	19 905
2010-11	10 729
2011-12	22 177
2012-13	8572
2013-14	8982
2014-15	11 014
2015-16	13 086

Source: Forest Practices Authority (2012a; in prep.)

Native seed and flora collection

Seeds are collected by private collectors and Forestry Tasmania principally for their own use in native forest regeneration, propagating nursery stock and the establishment of plantations (Forest Practices Authority 2012a).

Seed collection continues to focus on commercially important species, predominantly trees for forest plantations on public and private land and to a lesser extent to service tree planting activities of organisations such as Landcare and Greening Australia.

Seed collected on private land for commercial horticultural use is not regulated and is likely to be limited in extent. Commercial seed collectors harvesting from public land are small in number and are regulated by permits.

Data are available for seed collection from Forestry Tasmania which provides information on seed weight, origins, site details and germination capacity as standard practice. Data on the annual quantity of seed collected by Forestry Tasmania over the period of the Tasmanian Regional Forest Agreement are shown in Table 33 and Table 34 (Forest Practices Authority 2012a; in prep.).

Table 33 – Annual collection of native tree seed collected by Forestry Tasmania

	Unit	1996-97	2000-01	2004-05	2008-09	2012-13	2015-16
Raw Seed	kg	2012	1712	3408	5787	1406	1066

Source: Forest Practices Authority (2012a; in prep.)

Table 34 – Five-year mean of the annual collection of native tree seed collected by Forestry Tasmania

	Unit	1996-97 to 2000-01	2001-02 to 2005-06	2006-07 to 2010-11	2011-12 to 2015-16
Raw seed	kg	1387	3432	5018	787

Source: Forest Practices Authority (2012a; in prep.)

Wildlife harvesting

Brushtail possums, and to a lesser extent wallabies and pademelons, are primarily forest and woodland species whose densities are highest where this habitat is adjacent to agricultural land or disturbed forest.

No estimate has been made of the sustainable yield for wallabies from forest, although a sustainable yield formula under a commercial harvest plan is calculated annually based on spotlight surveys.

There have been fluctuating markets for skins and meat over the Tasmanian Regional Forest Agreement implementation period, as shown in Table 35, (note: the reporting format changed from calendar year reporting to financial year reporting in 2005/06). In addition to targeted markets, there has been culling of these species where browsing of eucalypt seedlings and agricultural crops has been a problem. Since 1995, there have been attempts to develop a trade in brushtail possum meat. Tasmania is the only state processing brushtail possum meat for human consumption.

Table 35 – Annual harvest of brushtail possums

	1996	2000	2004	2008-09	2012-13	2015-16
Commercial permits	59	42	47	7	10	75
Est. commercial harvest	13 917	55 200	120	4680	5978	32 945

Note: the reporting format changed from calendar year reporting to financial year reporting in 2005/06. Source: Forest Practices Authority (2012a; in prep.)

Table 36 – Annual harvest of wallaby meat

	1996	2000	2004	2008	2012	2016
Commercial licences sold	113	44	60	28	33	38
Game meat produced (kg)	69 617	61 642	2630	20 746	n.a.	n.a.
Non-commercial shooting*	4956	4392	4518	6534	7236	7583

n.a.: Not available. Source: Forest Practices Authority (2012a; in prep.)

Table 37 – Five-year mean of the annual harvest of brushtail possums

	1996 to 2000	2001 to 2005	2006-07 to 2010-11	2011-12 to 2015-16
Commercial permits	70	34	9	32
Est. commercial harvest	20 742	2 698	3 365	18 155

Note: the reporting format changed from calendar year reporting to financial year reporting in 2005/06.

Source: Forest Practices Authority (2012a; in prep.)

Table 38 – Five-year mean of the annual harvest of wallaby meat

	1996 to 2000	2001 to 2005	2006 to 2010	2011 to 2015
Commercial licences sold	70	50	30	36
Game meat produced (kg)	61 657	n.a.	23 036	n.a.
Non-commercial shooting*	4982	4540	6483	7205

n.a.: Not available. Source: Forest Practices Authority (2012a; in prep.)

Since 1985, the Department of Primary Industries, Parks, Water and Environment has been monitoring population levels of the brushtail possum, Bennetts wallaby and the Tasmanian pademelon. These results are reported in Indicator 1.2.c. – Hunting or culling has not impacted on populations levels of wallabies, pademelons or brushtail possums across Tasmania indicating that current harvesting of these species is within sustainable levels (Forest Practices Authority 2012a).

Dry eucalypt forests and woodlands are important to the introduced fallow deer for shelter, fawning and resting, though wet forests and rainforests are too dense to be utilised by them. The number of game licences sold has steadily increased since 1996, while the number of male deer taken has plateaued in recent years. This is likely to reflect the availability of hunting opportunity for trophy males rather than any population limitations. Take of male and female fallow deer for crop protection purposes has risen significantly in recent years. Table 39 presents data on the annual harvest of deer from game licences over the period of the Tasmania Regional Forest Agreement.

Table 39 – Annual harvest of deer from game licences only

	1996	2000	2004	2008	2012	2016
Deer licences	2 672	2 737	3 135	3 849	4 325	5 165
Estimated male deer taken under game licence (not Crop Protection permits)	580	760	1 153	1 479	1 652	1 945

Source: Forest Practices Authority (2012a; in prep.)

Table 40 – Five-year mean of annual harvest of deer from game licences only

	1996 to 2000	2001 to 2005	2006 to 2010	2011 to 2015
Deer licences	2 775	2 989	3 911	4 468
Estimated male deer taken under game licence (not Crop Protection permits)	615	1 047	1 459	1 594

Source: Forest Practices Authority (2012a; in prep.)

The third independent five-yearly review of the Tasmanian Regional Forest Agreement confirmed that opportunities were available to improve the monitoring of productive capacity, particularly in relation to the collection of non-wood products.

Indicator 2.1.e – The area of native forest harvested and the proportion of that effectively regenerated, and the area of plantation clear-felled and the proportion of that effectively re-established

This indicator reports on the extent of native forest harvested and the success of re-establishing regeneration. It also compares the area of plantations clear-felled with the area effectively replanted, and gives an indication of the success of the planting effort.

The term 'forest regeneration' usually refers to new trees that establish in a forest after harvesting, fire or other agents (e.g. wind or flood damage) have removed some or all trees from the forest overstorey. For native forests, this indicator provides annual information on the area regenerated after harvesting, the proportion of the total area of harvesting that this represents and the success of the regeneration effort.

Effective regeneration of harvested native forest is required for all forest unless permanent conversion to another land use is approved. Results of regeneration success are publicly reported for State forest. In native forests, the *Forest Practices Code 2015* prescribes that sowing and planting mixtures must approximate the natural composition of the canopy trees of the harvested forest. The *Forest Practices Code 2015* requires regeneration surveys after clear-felling to be conducted one year after clear-felling or two years after partial harvesting. Where surveys show survival is less than the required stocking standard remedial work should be considered. This is achieved through appropriate seed mixtures, natural seeding and the effects of ecological sifting.

Plantations are not necessarily re-established following clear-felling of existing plantations. Environmental (e.g. inappropriately located on steep slopes or unstable soils), cultural (e.g. urban expansion) or economic (e.g. distance to mills, land use change) factors may influence whether a plantation is re-established or an alternative land use and/or tree crop is established. The reason for conversion is not reported.

All forestry operations on public and private land are undertaken under a forest practices plan. Under the *Forest Practices Act 1985* (Tas), a certificate of compliance must be lodged upon

completion of the operations under the plan indicating whether regeneration or reestablishment has occurred in accordance with the *Forest Practices Code 2015* and forest practices plan.

The Forest Practices Authority reports annually on the extent of planned forest operations across all tenures. The figures provided, however do not reflect actual completed hectares as there is often a reduction in area due to operational reasons. Data are only available in a consistent format from 1999–2000.

Table 41 shows the area (hectares) of native forest planned and approved for clear-fell harvesting and planned for reforestation, conversion or non-forest land use since 1999–00 (Forest Practices Authority 2000-2010, 2011a, 2012c, 2013, 2014, 2015b, 2016c). Conversion of native forests to commercial hardwood plantations, which had been a significant feature of forest change in previous years, ceased on 1 June 2007 (Forest Practices Authority 2012a).

In Table 41, most of the area planned for clear-felling followed by regeneration to native forest by seeding is on State forest, whereas the majority of the area planned for clear-felling following by plantation establishment is on private land.

Table 41 – Total area of native forest (public and private) planned for clear-fell harvesting and proposed for regeneration, conversion to plantations or non-forest land use

Reporting year	Clear-felled followed by regeneration by seeding (ha)	Clear-felled followed by plantation (ha)	Clear-felled followed by non-forest land use* (ha)
1999–2000	4 500	13 400	1 910
2000–01	4 650	11 810	1 620
2001–02	3 750	7 660	1 620
2002–03	6 180	5 720	2 700
2003–04	5 080	7 300	1 970
2004–05	4 590	6 460	1 540
2005–06	3 100	12 510	850
2006–07	3 770	11 950	1 730
2007–08	5 030	5 660	2 300
2008–09	4 910	7 770	1 920
2009–10	4 610	5 220	1 350
2010–11	4 630	230	2 130
2011–12	3 076	107	545
2012–13	2 325	0	729

2013-14	3 541	8	2 281
2014-15	2 637	74	2 078
2015-16	1 905	40	480
5-year mean 2001-01 to 2005-06	4 540	7 930	1 736
5-year mean 2006-07 to 2010-11	4 590	6 166	1 886
5-year mean 2011-12 to 2015-16	2 697	46	1 223

*Non-forest land use is minor on state forest and restricted to infrastructure requirements such as roads, power lines and dams.

Source: Forest Practices Authority (2000-2010, 2011a; 2012b; 2013-2015; 2016b)

Table 42 provides information on plantations planned for reforestation or conversion to non-forest land use since 1999-2000 (when plantation data were collected). The area of plantation planned for harvesting each year increased during the period 1999-2000 to 2007-08 as plantations established in the 1980s and 1990s began to mature. The area of plantation planned for harvesting has declined from the high in 2007-08, as a result of tightening market conditions and the closure of Gunns Ltd. Increased harvesting was again reported in 2013-14 as the industry recovered (Forest Practices Authority, in prep).

Plantations clear-felled and followed by native forest re-establishment reflects the reforestation of streamside reserves with native species in plantations originally established prior to the introduction of the Forest Practices Code in 1987. (Forest Practices Authority 2012a; in prep.).

Table 42 – Total planned area of plantation forest (public and private) harvested and proposed for re-establishment or converted to non-forest land use

Reporting year	Plantation clear-felled followed by plantation re-establishment (ha)	Plantation clear-felled followed by conversion to non-forest use* (ha)	Plantation clear-felled followed by native forest reestablishment** (ha)
1999-2000	3600	50	-
2000-01	5230	90	-
2001-02	5350	360	-
2002-03	7740	130	-
2003-04	8250	420	-
2004-05	6550	220	-
2005-06	7590	510	-
2006-07	9450	260	-

2007-08	9760	610	-
2008-09	7360	400	110
2009-10	7940	280	240
2010-11	6370	340	120
2011-12	3691	350	162
2012-13	3827	550	24
2013-14	7515	1496	209
2014-15	6847	2313	41
2015-16	11879	3394	64
5 year mean 2001-01 to 2005-06	7 096	328	n.a.
5 year mean 2006-07 to 2010-11	8 176	378	n.a.
5 year mean 2011-12 to 2015-16	6 752	1 621	100

*Non-forest land use is minor on state forest and restricted to infrastructure requirements such as roads, power lines and dams – area not reported.

**Largely from native streamside reserves re-established in pine plantations which were established prior to the Forest Practices Code.

Source: Forest Practices Authority (2000-2010, 2011a; 2012b; 2013-2015; 2016b)

Forestry Tasmania reports annually on the level of regeneration achieved for all harvested native forest operations on state forest. Data are only available in a consistent format from 1998-99.

The state requires that at least 85 per cent of harvested forest meets the required stocking rate standard, which is based on the number and spatial distribution of acceptable seedlings, saplings or trees that occur within the area being assessed, and varies depending on forest type and silvicultural system. The standard was achieved from 1998-99 to 2015-16, with the majority of years having a proportion higher than 90 per cent (Table 43) (Forest Practices Authority 2012a; Forestry Tasmania (2012b-2016b). In 2015-16, a 100 per cent success rate was achieved (Forestry Tasmania 2016b).

Regeneration success of eucalypt coupes is reported three years after harvesting operations. Regeneration of rainforest, blackwood swamp and Huon pine coupes is reported at five years after harvesting.

Table 43 – Area of regenerated multiple-use public native forest meeting stocking standards, Tasmania, 1998–99 to 2010–11

Reporting year	Regeneration year		Total area harvested and regenerated (ha)	Total area that achieved standard (ha)	Proportion of total area that achieved standard (per cent)
	Eucalypt clear-felling and partial logging	Rainforest/blackwood swamp			
1998-99	1995-96	1993-94	4 006	3 815	95
1999-00	1996-97	1994-95	5 466	5 184	95
2000-01	1997-98	1995-96	4 145	4 011	97
2001-02	1989-99	1996-97	4 808	4 568	95
2002-03	1999-00	1997-98	4 148	3 837	93
2003-04	2000-01	1989-99	5 526	5 141	93
2004-05	2001-02	1999-00	6 569	6 526	99
2005-06	2002-03	2000-01	7 226	6 942	96
2006-07	2003-04	2001-02	9 445	9 244	98
2007-08	2004-05	2002-03	10 207	10 010	98
2008-09	2005-06	2003-04	7 522	7 002	93
2009-10	2006-07	2004-05	6 882	6 220	90
2010-11	2007-08	2005-06	7 820	6 888	88
2011-12	2008-09	2006-07	9 377	9 002	96
2012-13	2009-10	2007-08	9 190	8 639	94
2013-14	2010-11	2008-09	7 414	7 192	97
2014-15	2011-12	2009-10	4 580	3 985	87
2015-16	2012-13	2010-11	2 994	2 994	100

Source: Forest Practices Authority (2012a); Forestry Tasmania (2012b-2016b)

The proportion of harvested private native forest area in Tasmania meeting required stocking rate standards during the period 2000–01 to 2002–03 averaged 89 per cent and 95 per cent for private independent and private industrial managers, respectively (Forest Practices Authority 2012a).

Reporting of regeneration performance in private forests changed in 2003–04. After this, the Tasmanian Forest Practices Authority applied a performance rating system to measure compliance with regeneration standards for public and private native forests and plantations. A compliance rating of 3.0 was considered the minimum acceptable level, and the maximum rating was 4.0 (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013). In 2014–15 the performance rating system was changed again so that the acceptable rating of 3.0 was also the maximum rating (Forest Practices Authority, in prep.).

Table 44 presents the results on all management tenures from 2003–04 to 2015–16 for regeneration of native forest. During the 2003–04 to 2013–14 period (when the maximum rating was 4.0), state forests averaged a rating of 3.6, with a minimum of 3.4, well above the acceptable minimum compliance level. Private industrial managers averaged 3.5, with one year at 2.6 being below the minimum acceptable compliance level. Private independent managers recorded four years that were below minimum acceptable compliance levels, and averaged a rating of 3.0 (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013; Forest Practices Authority, in prep.). Since the rating system change in 2014–15, state forests and private independent managers have each recorded one year that was below the acceptable compliance level (Forest Practices Authority, in prep.).

Table 44 – Forest Practices Authority’s Annual assessment performance rating for regeneration in native forestry operations

Reporting year	Private industrial	Private independent	State forest	All tenures
2003-04	3.3	4.0	3.5	3.4
2004-05	2.6	2.9	3.4	3.0
2005-06	3.3	3.5	3.8	3.6
2006-07	3.4	2.4	3.7	3.4
2007-08	3.4	3.0	3.8	3.5
2008-09	3.5	3.1	3.7	3.5
2009-10	3.4	3.0	3.5	3.3
2010-11	3.6	3.5	3.6	3.6
2011-12	3.7	3.0	4.0	3.5
2012-13	4.0	2.5	3.8	3.3
2013-14	4.0	2.8	3.4	3.2
Average	3.5	3.0	3.6	3.4

Reporting year	Private industrial	Private independent	State forest	All tenures
New rating system—acceptable and maximum rating changed to 3.0				
2014-15	3.0	1.7	3.0	2.7
2015-16	n.a.	3.0	2.3	2.8

n.a. – not available. Note: Prior to 2014-15, a rating of 3.0 was considered acceptable, and 4.0 was the maximum rating. The rating system changed in 2014-15, so that the acceptable rating of 3.0 was also the maximum rating.

Source: Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee (2013); Forest Practices Authority (in prep.)

Table 45 presents the results on all management tenures from 2003–04 to 2015–16 for the re-establishment success of plantations. During this period, state forests remained above the minimum acceptable compliance level, while private industrial managers and private independent managers respectively recorded one and three years that were below minimum acceptable compliance levels (Forest Practices Authority, in prep.).

Table 45 – Forest Practices Authority’s annual assessment performance rating for re-establishment plantation operations

Reporting year	Private industrial	Private independent	State forest	All tenures
2003-04	4.0	4.0	3.9	4.0
2004-05	3.3	3.6	3.1	3.3
2005-06	3.9	4.0	3.6	3.8
2006-07	3.8	2.5	3.8	3.7
2007-08	3.6	4.0	3.8	3.7
2008-09	3.3	3.3	4.0	3.4
2009-10	3.4	3.0	3.9	3.4
2010-11	3.5	2.3	4.0	3.4
2011-12	3.3	3.5	3.0	3.3
2012-13	3.7	4.0	4.0	3.8
2013-14	4.0	4.0	n.a.	4.0
Average	3.6	3.5	3.7	3.6
New rating system—acceptable and maximum rating changed to 3.0				
2014-15	3.0	3.0	na	3.0
2015-16	2.7	2.8	3.0	2.9

n.a. – not available. Note: Prior to 2014-15, a rating of 3.0 was considered acceptable, and 4.0 was the maximum rating. The rating system changed in 2014-15, so that the acceptable rating of 3.0 was also the maximum rating.

Source: Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee (2013); Forest Practices Authority (in prep.)

Browsing animals

The 2005 *Supplementary Tasmanian Regional Forest Agreement* committed the Tasmanian Government to phasing out use on State forests of 1080, a poison used to control browsing animals such as wallabies that damage new forest plantings, by December 2005. This required alternative strategies for browsing animal control in new forest plantings to be developed and implemented. The governments agreed to a joint program to accelerate research into, and implementation of, alternatives to 1080 for browsing animal control on private forest and agricultural lands. The Commonwealth committed to invest \$4 million in this program. Use of 1080 on State forests ceased as agreed at the end of 2005. The research program continued until 2011, by which time it had delivered several practical outcomes, the most notable being the release of the Tasmanian Institute of Agricultural Research's Wallaby Proof Fencing Guide, launched in 2009. While use of 1080 in Tasmania had declined by 91 per cent by 2009–10, the several alternative control methods developed have not proved as effective as 1080 and increasing damage to crops was being reported (Department of Primary Industries, Parks, Water and Environment 2011).

Criterion 6 – Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of society

This criterion monitors and reports across five sub-criteria relevant to how the forest sector provides multiple socio-economic benefits to society. Areas covered include the value and volume of forest products and forest based services, investment in the forest sector and the recycling of wood products.

Sub-criterion 6.1 - Production and consumption

This sub-criterion monitors socio-economic benefits by ascertaining by reporting trends in the value and quantities of both timber and non-wood products. The benefits include benefits to regional economies and recycling.

Indicator 6.1.a - Value and volume of wood and wood products

This indicator enables socio-economic benefits to be monitored by ascertaining trends in value and volume of wood production.

Volume

Log harvesting has changed dramatically over the period of the Tasmanian Regional Forest Agreement, both in terms of volume and composition.

Due to changes in the availability of data over the Tasmanian Regional Forest Agreement period, the reporting format in the *State of the Forests Tasmania Report* series for the volume of harvested logs has varied, making comparisons across time difficult. As a result, this indicator is reported in two formats. The first format covers the 1991-92 to 1999-00 period, using data sourced from the *State of the Forests Tasmania Report 2002* (Forest Practices Board 2002). The second format covers the 2000-01 to 2015-16 period, using data sourced from ABARES' *Forest and Wood Product Statistics* (2012, 2017).

Table 46 presents data log volumes harvested in Tasmania (from both public and private land) over the 1991-92 to 1990-2000 period. During this period, the total volume of logs harvested fluctuated, however there was no evidence of any long-term decline or increase in production (Forest Practices Board 2002). The volume of sawn, peeled or sliced timber produced also varied over the period, with a trend toward a gradual increase in volumes, particularly in softwood plantation material.

Table 46 – Volume of logs harvested by type

Log type	1991-92 (‘000 m³)	1995-96 (‘000 m³)	1999-00 (‘000 m³)
Eucalypt sawlogs	470	603	510
Other native sawlogs	10	14	30
Plantation softwood sawlogs	325	344	396
Total sawlogs	805	961	936
Pulpwood (hardwood & softwood)	3 173	3 510	4 527
Total sawn, peeled & sliced timber	297	349	366
Plantation softwoods peeled & sliced timber	130	152	191

Source: Forest Practices Board (2002)

Table 47, Table 48 and Figure 20 present data on the volume of logs harvested over the 2000-01 to 2015-16 period (ABARES 2012, 2017). Table 47 and Figure 20 present the data by forest type, while Table 48 presents the data by log type.

In 2000-01, the total volume of logs harvested from all forests was 6.19 million cubic metres. Total log harvest volume peaked in 2002-03 at 7.33 million cubic metres (Figure 20). In 2007-08, the total log harvest volume was 6.97 million cubic metres, but substantially reduced to a low of 2.41 million cubic metres in 2012-13 (ABARES 2012, 2017). This reduction was almost completely due to the loss of the native forest woodchip market (Forest Practices Authority 2012a).

This decline in the total harvest of logs illustrates the difficult period the Tasmanian forest industry experienced over the 2007–08 to 2012–13 period, notably the:

- collapse of the largest private forestry business, Gunns Limited
- collapse of hardwood plantations management entities
- closure of older Japanese pulp mills associated with the global credit crisis
- the comparatively high value of the Australian dollar against the US dollar, in which international wood exports are traded.

More positive levels of harvesting activity in the industry have occurred since 2013–14, with the total log harvest volumes increasing to 4.30 million cubic metres in 2015–16 (ABARES 2017). Particularly significant production increases have occurred in the hardwood plantation sector, with the 2015–16 hardwood plantation harvest up 57 per cent from the previous year to 2.02 million cubic metres (ABARES 2017). This recovery has been assisted by the declining value of the Australian dollar, which has made Australian woodchips more competitive in Asian pulpwood markets.

Table 47 and Table 48 also illustrate that Tasmania’s forest resource base and industry structure has significantly changed over the period of the Tasmanian Regional Forest Agreement. In 2000–01, the native forest hardwood log harvest contributed 82 per cent of the total harvested log volume (5.09 million cubic metres), but this declined to 27 per cent (1.14 million cubic metres) in 2015–16, a fall of around 78 per cent.

Conversely, the proportion of the total harvested log volume sourced from hardwood plantations and softwood logs harvest increased over the 2000–01 to 2015–16 period. In 2000–01, the hardwood plantation and softwood log harvest contributed 4 per cent (238 000 cubic metres) and 14 per cent (862 000 cubic metres) of the total harvested log volume, respectively. These proportions respectively increased to 47 per cent (2.03 million cubic metres) and 26 per cent (1.14 million cubic metres) in 2015–16 (ABARES 2012, 2017). Looking forward, it is expected that the hardwood plantation pulpwood sector will remain the highest yield sector by volume.

Over the last five years, new private plantation enterprises have been established in Tasmania. In particular, New Forests (an investment manager in forestry, land management, and conservation) purchased the hardwood plantations previously owned by Gunns Limited. Since acquiring the former assets of Gunns Limited, New Forests has embarked on an investment program, through its forest manager, Forico, to rapidly build productive capacity. Forico has since gained Forest Stewardship Council (FSC) certification. As Tasmania’s largest private owner of hardwood plantations, the increase in production by Forico has strongly influenced the overall production figures for Tasmania, with the company forecasting even greater volumes over the short to medium term (Forest Practices Authority, in prep.).

Table 47 – Annual volume of logs harvested by forest type^a from public and private forests

Type	2000-01 (’000 m ³)	2005-06 (’000 m ³)	2010-11 (’000 m ³)	2015-16 (’000 m ³)
Hardwood native	5 091	3 783	2 659	1 143
Hardwood plantation	238	1 078	934	2 025
Softwood	862	1 154	1 306	1 136
Total	6 192	6 015	4 900	4 304

^a Excludes firewood removals. Softwood includes native cypress pine. Private hardwood native log estimates prior to 2006-07 are based on estimates provided by state forest services; from 2006-07 estimates are based on ABARES sawmill survey reports and private industry sources.

Source: ABARES (2012, 2017)

Table 48 – Annual volume of logs harvested by log type^a from public and private forests

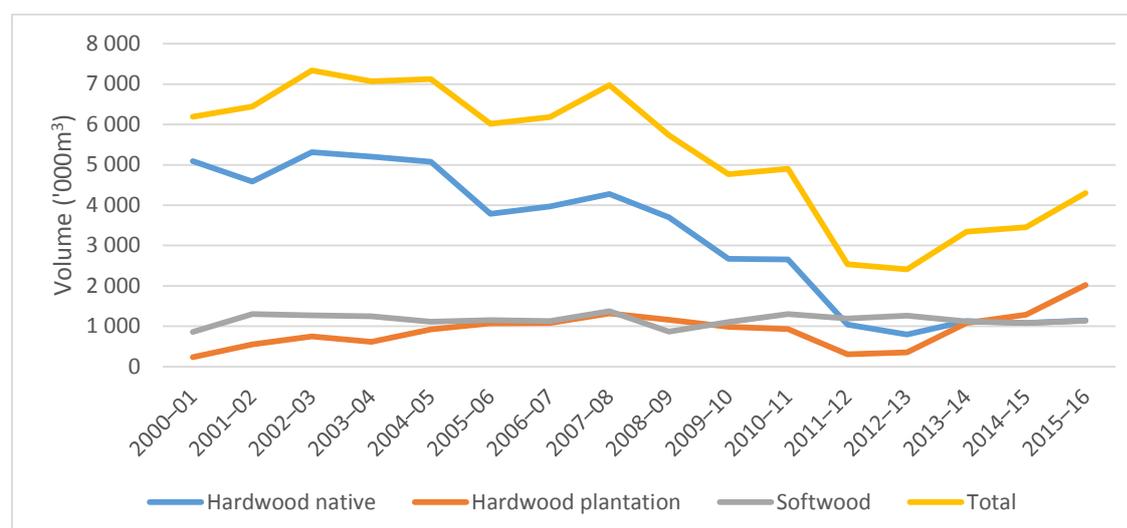
Type	2000-01 (’000 m ³)	2005-06 (’000 m ³)	2010-11 (’000 m ³)	2015-16 (’000 m ³)
Hardwood native				
Sawlog	590	636	711	383
Pulplog	4 493	3 136	1 941	754
Other	8	11	8	6
<i>Total</i>	5 091	3 783	2 659	1 143
Hardwood plantation				
Sawlog	0	18	5	68
Pulplog	238	1 060	929	1 956
Other	0	0	0	1
<i>Total</i>	238	1 078	934	2 025
Softwood				
Sawlog	533	610	581	572
Pulplog	313	534	714	553
Other	16	10	11	11
<i>Total</i>	862	1 154	1 306	1 136

Type	2000-01 (’000 m3)	2005-06 (’000 m3)	2010-11 (’000 m3)	2015-16 (’000 m3)
Total				
Sawlog	1 123	1 264	1 297	1 023
Pulplog	5 044	4 730	3 584	3 264
Other	24	21	19	17
<i>Total</i>	6 192	6 015	4 900	4 304

a Excludes firewood removals. Sawlog includes sawlogs, veneer and peeler logs, poles, piles, fencing and other logs not elsewhere included. Softwood sawlog includes native cypress pine. Private hardwood native log estimates prior to 2006-07 are based on estimates provided by state forest services; from 2006-07 estimates are based on ABARES sawmill survey reports and private industry sources.

Source: ABARES (2012, 2017)

Figure 20 – Annual volume of logs harvested from public and private forests



Source: ABARES (2012, 2017)

Softwood products have somewhat displaced native forest timbers over the period of the Tasmanian Regional Forest Agreement. However, the opening of two new rotary peeler mills in Smithton and the Huon Valley, and an associated plywood mill at Smithton, is one area in which this market trends has been reversed. These mills utilise lower grade native forest logs to produce veneers and plywoods for industrial applications. Processing of lower grade sawlogs for a variety of utility purposes continues. However, the number of sawmills operating in this market has declined considerably.

Meaningful data on other minor wood products such as firewood, poles, fence posts, etc. are not available.

Value

The forest industry in Tasmania is comprised of many different components. Reporting on the value of the industry has changed over the period of the Tasmanian Regional Forest Agreement, making direct comparisons difficult.

Turnover of wood products

The turnover value ('sales and service income') of the Tasmanian wood products industry (defined according to the Australian and New Zealand Standard Industrial Classifications given in Table 49) is only available in a comparable format from 2006–07 for selected years (ABARES 2017). Over the 2006-07 to 2014-15 period, the sales and service income from Tasmania's wood product output (comprising sawmilling, panel production and woodchips) fell by 44 per cent, from to \$678 million to \$381 million. The sales and service income from paper and paper product output declined by 16 per cent in Tasmania between 2008–09 and 2012–13.

Table 49 – Forest product manufacturing sales and service income^a (turnover)

ANZSIC 2006 group and class^b	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15
Total wood products (\$m)	678	n.a.	684	399	616	350	256	335	381
Paper and paper products (\$m)	n.a.	n.a.	398	273	382	356	336	n.a.	n.a.

a Sales and service income is defined as follows: sales of goods whether or not manufactured by the business, exclusive of goods and services tax (GST). See Australian Bureau of Statistics publication Explanatory Notes for full details.

b 2006–07 classification is based on the 2006 edition of ANZSIC, which is not directly comparable with previous years. See Australian Bureau of Statistics publication Explanatory Notes for full details.

n.a. Data not available. Sources: ABARES 2017; Australian Bureau of Statistics, Australian Industry, cat. no. 8155.0, Canberra; Australian Bureau of Statistics, Experimental Estimates for the Manufacturing Industry, 2006–07, 2007–08 and 2008–09, cat. no. 8159.0, Canberra

Value of logs harvested

Due to changes in the availability of data over the period of the Tasmanian Regional Forest Agreement, the value of logs harvested is reported in two formats covering two time periods as listed below (Table 50 and Table 51).

The value of logs harvested in the Tasmanian hardwood sawmilling industry in 1994-95 was reported in the Comprehensive Regional Assessment, with the total value estimated to have been \$167 million (Tasmanian Public Land Use Commission 1997d).

Table 50 – Gross value of logs harvested at mill door in 1994/1995 (\$million)

Log type	Veneer	Category 1/3 Sawlog	Other eucalypt sawlog	Pulplog	Special species sawlog	Total
Value (\$m)	2.1	21.8	13.2	1.6	128.3	167.0

Source: Tasmanian Public Land Use Commission 1996d

The total value of logs harvested in Tasmania in 2000–01 was \$298 million, and rose to a high of \$423 million in 2007–08. The total value declined to a low of \$157 million in 2012–13, but subsequently recovered to \$293 million in 2015–16 (ABARES 2012, 2017).

Table 51 provides an indication of the transition that has taken place in Tasmanian forestry since 2000, where the value of logs harvested from hardwood plantations now exceeds the value harvested from native forests by a significant margin.

Following a significant decline in value from 2011–12, the value of plantation logs (hardwood and softwood) in 2014–15 exceeded \$150 million for the first time since 2010–11 due to growth in the production of hardwood plantations. As noted above, hardwood plantation production is expected to experience strong growth over the short to medium term, with a maturing plantation estate and a simultaneous increased investment in processing technologies to increase processing capacity.

Table 51 – Gross value of logs harvested by forest type^a

Type	2000–01 (\$m)	2005–06 (\$m)	2010–11 (\$m)	2015–16 (\$m)
Hardwood native	242	212	170	78
Hardwood plantation	11	61	65	149
Softwood	45	65	88	66
Total	298	338	323	293

^a Excludes firewood removals. Softwood includes native cypress pine. Private hardwood native log estimates prior to 2006–07 are based on estimates provided by state forest services; from 2006–07 estimates are based on ABARES sawmill survey reports and private industry sources.

Source: ABARES (2012, 2017)

Over the period of the Tasmanian Regional Forest Agreement, the pulp and paper sector has contracted significantly with the closure of the Burnie and Wesley Vale mills, with only Norske Skog at Boyer continuing to operate and converting to a softwood resource (Forest Practices Authority 2012a). This sector is highly dependent on demand for print media, where there is a continuing trend away from newspapers and magazines, to electronic media. This trend is expected to continue for at least the short to medium term (Forest Practices Authority, in prep.).

Indicator 6.1.b – Values, quantities and use of non-wood forest products

This indicator enables socio-economic benefits to be monitored by ascertaining trends in quantities, values and usage of non-wood products against management objectives. Indicator 2.1.d provides further data on the sustainable production of non-wood forest products.

Over the period of the Tasmanian Regional Forest Agreement, the types of data collected for non-wood forest products produced from the forests, and the levels of monitoring by Government and industry bodies, has significantly varied. This implies that consistent reporting and assessment of the indicator across time is infeasible. Accordingly, information on this indicator is presented in varying formats for different time periods.

Honey and beeswax

The apiary industry is regulated by the Department of Primary Industries, Parks, Water and Environment.

Honey is the major commercial output of the honey bee industry. There are a number of other products which also add to the income of honey bee businesses, and include paid pollination services, beeswax production, queen bee and packaged bee sales.

Leatherwood honey is the most distinctive Tasmanian honey, and accounts for a significant proportion of sales, particularly outside of the State. Leatherwood (*Eucryphia lucida*) trees predominantly occur in the state's mature wet eucalypt forest and rainforest.

The *State of the Forests Tasmania Report 2002* included the Australia Bureau of Statistics data of the Tasmanian production of honey and beeswax from 1989–90 to 1999–2000. Over this period, honey production averaged 845 tonnes per year, with considerable annual variations. Beeswax production averaged 13 tonnes per year, and the gross value of beeswax and honey production averaged \$1.69 million. This data is from apiarists with more than 200 hives, representing approximately eighty per cent of total honey production from all state honey sources (not just State forests) (Forest Practices Board 2002).

The Australia Bureau of Statistics has not separately reported on honey and bee statistics since 2001. Due to the discontinuation of Australia Bureau of Statistics data, the *State of the Forests Tasmania Report 2007* and the *State of the Forests Tasmania Report 2012* sourced information on the Tasmanian apiary industry from the following reports:

- *Tasmanian Apiary Industry Profile* (Forests and Forest Industry Council 2005).
- *Australian honeybee industry survey 2006–07* (Crooks 2008)
- *Tasmanian Floral Resources for Honeybees – Focus on tea tree* (Leech 2009).

Consistent with *State of the Forests Tasmania Report 2002*, data concerning honey and beeswax production from the reports listed above are based on all honey sources, not just state forests.

The *Tasmanian Apiary Industry Profile* presented results of a census of registered Tasmanian beekeepers, and sampled approximately 80 per cent of the registered hives on the apiary register from apiarists with greater than 20 hives. The report showed that for the 2003–04 period, approximately 1000 tonnes of honey was produced, with bulk prices varying between \$3000 per tonne to \$5000 per tonne.

The *Tasmanian Apiary Industry Profile* also showed that for 2003–04 year, there were 18 417 registered hives and 37 semi-commercial and commercial beekeepers with up to 10 major commercial operations, including five businesses with more than 1000 hives.

Leech (2009) reported that following the *Tasmanian Apiary Industry Profile* census, there were a series of changes in the industry, including amalgamations of some larger operations. In particular, the number of registered hives on the apiary register decreased from approximately 18 000 in 2003–04 to approximately 15 000 in 2008. The categories showing greatest changes were the 'less than 20 hives' and the '100 to 200 hive' groups, each of which recorded a 50 per cent decrease in number.

In the *Australian honeybee industry survey 2006–07*, Crooks (2008) reported that while around 70 per cent of Tasmanian honeybee businesses operated less than 250 hives, the state also had the nation's highest proportion of honeybee businesses operating in excess of 1000 hives. Tasmanian businesses were the largest compared to other Australian states, operating around 410 hives per business and annually selling around 37.4 tonnes of honey on average. However, Tasmanian businesses accounted for only 4 per cent of national honey production.

Crooks (2008) also reported that the average price received by Tasmanian honeybee businesses for honey sold during 2006–07 was \$2.80 per kilogram. Further, Crooks (2008) found that, relative to other states, Tasmanian honeybee business received the highest price on average for their honey. This is because of the higher price received for leatherwood honey which accounts for a substantial proportion of Tasmanian production and the high proportion of Tasmanian producers who undertake their own honey packaging (Forest Practices Authority 2012a).

More recent data related to the apiary industry is available from the Department of Primary Industries, Parks, Water and Environment's hive registration program. The registration is for disease control purposes. This is not compulsory; however Forestry Tasmania and Parks and Wildlife Service require hives put on State forest to be registered. Registered hive owners get some disease testing benefits and the money goes into a fund that the industry spends on a disease control programme. In 2010–11, there were 175 apiarists and 18 315 hives registered with the Department of Primary Industries, Parks, Water and Environment. These figures respectively increased to 215 apiarists and 19 930 registered hives in 2015–16. In comparison to the 2008 hive registration figures provided by Leech (2009), the Department of Primary Industries, Parks, Water and Environment registration numbers suggest a slightly expanding industry. Notably, while the number of registered beekeepers have recently, the number of hives per registered bee keeper has fallen, suggesting that bulk of the increase has been in small-scale bee keeping operations.

Further information on the number of apiary sites and the number of hives on State forest land over the period of the Tasmanian Regional Forest Agreement is presented in Indicator 2.1.d of this report.

Seed

Data on the annual quantity of seed collected by Forestry Tasmania over the period of the Tasmanian Regional Forest Agreement are presented in 'Indicator 2.1.d' of this report. Data on the value of seed production is not available for any period over the Tasmanian Regional Forest Agreement period, and accordingly cannot be presented in this report.

The *State of the Forests Tasmania Report 2007* stated that anecdotal evidence provided by the Tasmania Seed Centre suggests that the collection of *Eucalyptus globulus* (a key plantation species) seed by commercial operators is concentrated on stands of trees identified as having important genetic characteristics for commercial silviculture. For example, *Eucalyptus globulus* seed worth several hundred thousand dollars may have been harvested from Flinders Island (mainly on private property).

Game

Similarly to seed and honey production, data on the value and volume of game production is limited and has been variably reported over the period of the Tasmanian Regional Forest Agreement.

Wallabies are commercially harvested for meat and skin. Agreed quotas and numbers of wallabies harvested (including Tasmanian pademelon (*Thylogale billardierii*)) are based on management plans. These species dwell in both forests and non-forests, and are common and not endangered. Export of wallaby product from Tasmania ceased after 2007–08. The Tasmanian Government allows harvesting of wallabies for the domestic market, provided the harvesting is within sustainable levels.

Data on the production volume wallabies, possums and deer over the period of the Tasmanian Regional Forest Agreement are presented in presented in 'Indicator 2.1.d' of this report. Limited data on the value of Tasmanian wallaby production is available for the 2005–06 to 2011–12 period. Over this period, the gross value of wallaby meat averaged \$222 000 (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013). This includes wallaby meat harvested from both forest and non-forest areas. Data on the value of possum and deer production are not available.

Treeferns

The only Tasmanian treefern that can be harvested or traded is *Dicksonia antarctica* (manfern or soft treefern). Two other treefern species (*Cyathea cunninghamii* and *Cyathea marcescens*) are protected by the Tasmanian *Threatened Species Protection Act 1995*.

A management plan was developed in 2001 by the Tasmanian Government to facilitate the legal and sustainable harvest and export of treeferns. The Treefern Management Plan provides guidelines for the harvesting of trunked treeferns from native vegetation in Tasmania and has been endorsed by the Australian Government. The Plan was revised in 2007 to enable tree fern harvesters to occur in areas subject to clear-fell, burn and sow silviculture, in addition to areas being converted to plantations and agriculture (Forest Practices Authority 2012a).

All commercially harvested treeferns on any land must be securely tagged with a treefern tag obtained from the Forest Practices Authority at the point of harvest, and cannot be sold without a tag. Severe penalties apply for non-compliance with the regulations (Forest Practices Authority 2012a).

In July 2011 the *Forest Practices Regulations 2007* were amended to allow for two categories of treefern stem lengths: below 30cm (small) and above 30 cm (large). Different tag costs were applied to the two categories.

Table 52 presents data on the value and volume of treefern harvesting from 2002-03 to 2015-16. Data prior to this period is not available. Sales of tree-ferns were reported at between 45 000 and 65 000 ferns each year from 2002-03 to 2005-06. The sale of ferns subsequently dropped significantly due to the loss of major markets in Europe, and reduced harvesting operations on public land. As Table 52 presents, the number of tree ferns harvested (measured in treefern tags issued) reduced steadily from 54 802 in 2006-07 to 10 729 in 2010-11. Steep declines in treefern production occurred in 2012-13 and 2013-14 as the industry restructured, and subsequently improved in 2014-15. This trend can be attributed to the loss of export markets, a reduction in conversion and clear-fell operations, and fewer treefern harvesters in operation.

Table 52 – Value and volume of treefern harvesting

Year	Number of treefern tags issued	Tag cost (\$)	Value of treefern tags issued (\$)
2002-03	64 182	2.16	138 633
2003-04	54 886	2.22	121 847
2004-05	61 368	2.28	139 919
2005-06	45 131	2.34	105 607
2006-07	54 802	2.22	121 660
2007-08	35 361	2.50	88 380
2008-09	17 529	2.56	44 874
2009-10	19 905	2.66	52 947
2010-11	10 729	2.72	29 182
2011-12	22 177	1.40 (L); 0.70 (S)	24 944
2012-13	8 572	1.44 (L); 0.72 (S)	10 413
2013-14	8 982	1.46 (L); 0.73 (S)	10 683
2014-15	11 014	1.48 (L) 0.74 (S)	13 230
2015-16	13 086	1.51 (L) 0.75 (S)	16 575

Source: Forest Practices Authority (2012a; in prep.). L= large treefern; S = small treefern

Indicator 6.1.c – Value of forest-based services

This indicator measures forest-based services such as ecosystem services, carbon credits, salinity mitigation and ecotourism. Forest-based services provide economic values and contribute to the sustainability of forests by providing significant social and environmental benefits.

Forest based services in Tasmania includes ecotourism and credit schemes for carbon, salinity and ecosystem services. These services are increasing in public awareness and growing in economic importance, even though compared to the value of wood products their contribution to the national economy is relatively small.

The *State of the Forests Tasmania Report 2002* did not include this indicator, and the *State of the Forests Tasmania Report 2007* stated that such services had not been quantifiable with a market value in Tasmania. The *State of the Forests Tasmania Report 2007* details that the tourism expenditure from visits to reserves in 1998-99 was estimated to be \$122 million and \$141 million (Australian Government and Tasmanian Government 2007a).

The *State of the Forests Tasmania Report 2012* did not include updated figures for the economic value from the recreational and tourism use of all reserves managed under the *National Parks and Reserves Management Act 2002*, like the 1998–99 figures above. The most recent study from 2007-08 cited in the report was limited to three National Parks, estimating the attributable direct expenditure value to be: Cradle Mountain Lake St Clair National Park—\$112 million; Southwest National Park—\$20 million; and Tasman National Park—\$32 million (Forest Practices Authority 2012a). In Tasmania in 2006–07 tourism accounted for 4.86 per cent of the Gross State Product, and accounted for 6.14 per cent of total employment. From a 2010 study quoted in the 2012 report approximately 61 per cent of tourists in Tasmania visit at least one National Park during their stay (Forest Practices Authority 2012a).

The Tasmanian Wilderness World Heritage Area in 2008 was assessed to contribute to \$313.5 million in annual direct and indirect state value added, and 5372 direct and indirect state jobs (Forest Practices Authority 2012a).

According to the *State of the Forests Tasmania Report 2012* there were some carbon services in Tasmania in 2011, including carbon plantings with 99 year covenants, and 25 year covenants on native forest lands. There was no market for salinity credits (Forest Practices Authority 2012a). The 2012–16 period has seen the development of a community awareness of carbon related issues and the emergence of schemes that seek to sell carbon capture services through planting or retaining trees (Forest Practices Authority, in prep.).

The *State of the Forests Tasmania Report 2017* uses the example of the success of mountain biking as a forest based service, particularly the new Blue Derby Mountain Bike Trail in the North East of Tasmania, including some costs, estimated visitor numbers and benefits (Forest Practices Authority, in prep.).

Indicator 6.1.d – Production and consumption and import-export of wood, wood products and non-wood products

This indicator provides a measure of the trends in the production and consumption of wood and wood related products in Tasmania, and the export of those products from Tasmania. Ongoing access to interstate and international markets is fundamental in ensuring the viability of the forestry sector.

Data is not available at the state level for the consumption of wood products and therefore consumption figures cannot be reported (Australian and Tasmanian Governments 2007; Forest Practices Authority 2012a). Production figures are reported in 'Indicator 6.1.a'.

Wood products exported from Tasmania

Table 53 provides the annual value and volume of Tasmanian wood product exports for specified years over the 1995–96 to 2015–16 period. The data for sawnwood, roundwood and woodchips were sourced from ABARES' *Forest and Wood Product Statistics* (2016b), while the data for medium density fibre board, veneer and paper were sourced from the *Comprehensive Regional Assessment* (Tasmanian Public Land Use Commission 1997d) and the *State of the Forests Tasmania Reports* (Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a). Notably, the data only includes exports that leave directly from Tasmanian ports. Forest products that are exported via mainland ports as part of larger order or following secondary processing are not recoded as Tasmanian in origin.

The supply of sawlogs and high quality veneers is closely linked to the international demand for wood fibre which constitutes a substantial proportion of the processed log volume.

Woodchips have remained the most significant wood product exported from Tasmania the period of the Tasmanian Regional Forest Agreement, with the bulk of this commodity destined for markets in Asia. Woodchip export data is not available for some years over the reporting period due to data confidentiality restrictions.

In 1995-96, 1.4 million tonnes of woodchips were exported at a value of \$224.1 million. For the years for which data is available, the value and volume of woodchip exports were highest in 2007-08, when 2.4 million tonnes were exported at a value of \$416.5 million (ABARES 2016b, 2012). Over the period 2007-08 to 2010-11, the value and volume of woodchips declined significantly (Forest Practices Authority 2012a). Since 2011-12, there has been a successful restructure of private hardwood plantation estates, as well as improved terms of trade through the depreciation of the Australian dollar. These improvements have aided the recovery of woodchip exports (Forest Practices Authority, in prep.).

At the commencement of the Tasmanian Regional Forest Agreement, writing and printing paper exports constituted a significant element of total wood product exports from Tasmania. Writing and printing paper exports relatively remained steady in the period 2001–02 to 2009–10 (Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a). In 2010–11, the export of writing and printing paper declined significantly following the closure of the Wesley Vale paper mill (Forest Practices Authority 2012a).

Medium Density Fibreboard produced from softwoods was an important export wood product in the early 2000's, and production steadily increased over the 2001–02 to 2005–06 period due to improvements in the State's MDF processing plant (Australian and Tasmanian Governments 2007). However, a fire in 2006 destroyed the State's only Medium Density Fibreboard plant and the plant was not rebuilt (Forest Practices Authority 2012a).

Veneer exports averaged around 3 416 cubic metres per year over the period 2001–02 to 2005–06 (Australian Government and Tasmanian Government 2007a). From 2006–07 to 2010–11, exports of veneers increased significantly, peaking in 2010–11 at around 116 730 cubic metres (Forest Practices Authority 2012a). This increase was due to the opening of two new veneer plants (Ta Ann mills) (Forest Practices Authority 2012a). The volume and value of veneer exports has subsequently declined due to the reduced supply of peeler logs from public native forests, which has resulted from reductions in the public native forest estate available for wood production (Forest Practices Authority, in prep.).

In 1995–96, 155 619 cubic metres of roundwood was exported at a value of \$13.8 million. Roundwood exports declined over the 2002–03 to 2005–06 period due to rising shipping costs and the conclusion of trial shipments to various countries to facilitate investment in new peeler plants within Tasmania (Australian Government and Tasmanian Government 2007a). Prior to the opening of the Ta Ann Mills, most of Tasmania's export of roundwood was as eucalypt peeler logs to Asia (Forest Practices Authority 2012a). After the Ta Ann Mills opened, domestic processing of these logs increased. In 2010–11, the volume and value of roundwood exports significantly increased due to changes in Asian demand. Demand from Asia has continued to drive growth in roundwood exports in recent years (Forest Practices Authority, in prep.).

Table 53 – Volume and value of Tasmanian forest wood product exports

Product type	Unit	1995-96	2000-01	2005-06	2010-11	2015-16
Sawnwood						
Hardwood						
- Volume	'000 m ³	0.88	7.33	12.41	11.56	1.90
- Value	\$'000	782.12	5 982.72	11 049.77	10 770.13	1 854.77
Softwood						
- Volume	'000 m ³	3.08	5.02	0.08	1.05	9.27
- Value	\$'000	1 248.41	982.85	29.00	336.47	2,337.57
Total						
- Volume	'000 m ³	3.97	12.35	12.49	12.60	11.17
- Value	\$'000	2 030.53	6 965.57	11 078.77	11 106.60	4 192.34
Roundwood						
- Volume	'000 m ³	155.62	295.64	256.80	239.66	210.92

- Value	\$'000	13 812.70	21 129.18	18 433.62	24 362.77	24 058.27
Wood chips						
<i>Hardwood</i>						
- Volume	kt	1,293.06	n.a.	2,127.50	1,459.32	n.a.
- Value	\$'000	212 800.07	n.a.	336 880.65	227 708.31	n.a.
Softwood						
- Volume	kt	61.98	23.76	0.0	54.49	n.a.
- Value	\$'000	11 343.37	3 553.67	0.0	7 874.39	n.a.
Total						
- Volume	kt	1 355.04	n.a.	2 127.50	1 513.82	n.a.
- Value	\$'000	224 143.44	n.a.	336 880.65	235 582.71	n.a.
Veneer						
- Volume	m ²	n.a.	n.a.	1 752	116 730	n.a.
- Value	\$'000	n.a.	n.a.	1 695.56	45 999.03	n.a.
MDF						
- Volume	'000 m ³	n.a.	n.a.	158.16	0	0
- Value	\$'000	n.a.	n.a.	50 090.52	0	0
Paper – printing and writing						
- Volume	t	n.a.	n.a.	32 909	2 810	n.a.
- Value	\$'000	26 600.00	n.a.	32 587.22	2 986.87	n.a.

Data excludes some state data that has been made confidential.

n.a.: Not available.

Source: ABARES 2016b, 2012; Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a; Tasmanian Public Land Use Commission 1997d;

Wood products imported to Tasmania

Table 54 provides the annual value and volume of Tasmanian wood product imports for specified years over the period 1995–96 to 2015–16. The data for all import products except pulp were sourced from ABARES' *Forest and Wood Product Statistics* (2016b). The data for pulp imports was sourced from the *Comprehensive Regional Assessment* (Tasmanian Public Land Use Commission 1997d) and the *Tasmanian State of the Forests Reports* (Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a). Only imports that arrive directly at a Tasmanian port from overseas are recorded as being imported into Tasmania.

The available data indicates that Tasmania has imported relatively low volumes of wood products compared to the volume exported over the Tasmanian Regional Forest Agreement period.

Table 54 – Tasmanian imports of wood products^a

Product type	Unit	1995-96	2000-01	2005-06	2010-11	2015-16
Roughsawn sawnwood						
- Volume	'000 m ³	2.80	0.19	0.16	0.47	1.36
- Value	\$'000	1 427.68	245.79	39.62	170.78	964.24
Dressed sawnwood						
- Volume	'000 m ³	0.16	0.05	0	0.69	0.96
- Value	\$'000	104.26	28.08	0	280.71	638.65
Total sawnwood						
- Volume	'000 m ³	2.96	0.24	0.16	1.16	2.32
- Value	\$'000	1 531.94	273.86	39.62	451.49	1 602.89
Veneers						
- Volume	'000 m ³	0.04	0.00	0	0	0
- Value	\$'000	94.86	5.80	0	0	0
Plywood total						
- Volume	'000 m ³	0.08	0.03	0.05	1.06	0.49
- Value	\$'000	34.91	12.75	44.62	772.31	612.79
Board Products*						
- Volume	'000 m ³	0.10	0.02	0.37	0.21	0.04
- Value	\$'000	67.48	5.09	172.82	206.76	38.35
Pulp						
- Volume	'000 m ³	n.a.	115.33	90.72	2.83	4.04
- Value	\$'000	46.6	116.38	60.12	2.33	6.29

Source: ABARES (2016b); ^a Due to confidentiality requirements some product details are not available; *Board products include particleboard, hardboard, medium density fibreboard, softboard and other fibreboards.

Table 55 presents the value of Tasmanian imports of secondary wood products. Wooden furniture has remained the most significant secondary wood product imported over the Tasmanian Regional Forest Agreement period.

Table 55 – Value of Tasmanian imports of secondary wood products^a

	Unit	1995-96	2000-01	2005-06	2010-11	2015-16
Wooden furniture	\$'000	1 268.56	3 086.51	6 985.19	9 579.83	9 930.82
Prefabricated buildings	\$'000	128.28	334.47	112.72	260.60	1 654.90
Printed articles b	\$'000	569.95	240.62	260.03	282.89	948.82

a The value of secondary wood products is not directly related to the wood content b Includes newspapers, printed books, magazines, journals and other printed paper products.

Source: ABARES (2016b; 2012)

Non-wood products imported and exported

Data and information on the volumes and values of non-wood forest products exported from Tasmania are limited, and are not available prior to 2002–03. No import data for non-forest wood products is available.

Over the Tasmanian Regional Forest Agreement period, tree ferns have been the main exported non-wood forest product. All treefern exports require an export permit from the Australian Government. The export permit records basic details of the exporter, number of ferns, the forest practices plan number and the tag number. Export destinations for Tasmanian Treefern exports are presented in the 2007 and 2012 *State of the Forests Tasmania Reports* (Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a). This data shows that the main export destinations Tasmanian treefern exports from 2002–03 to 2010–11 were the United Kingdom, Netherlands, Ireland and France.

Some limited tree seed export data is also presented in the 2007 and 2012 *State of the Forests Tasmania Reports*. In 2004–05 a mixture of Eucalyptus, Acacia and other minor species seeds to the value of \$4351 was sold to overseas purchasers, and annually averaged \$5075 over the period 2006–07 to 2011–12 period (Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a). High demand for seed for use within Tasmania limits the ability to export major quantities of seed.

Indicator 6.1.e – Degree of recycling wood products

This indicator provides information on the extent to which recycling or reuse of forest products occurs in Tasmania. Recycling of forest products can, in the broad sense, be linked to the conservation of forest resources by reducing the overall demand for new raw materials direct from the forest.

Data on recycled and/or consumed forest products are available only in a generalised form, and is limited and variable in extent over the Tasmanian Regional Forest Agreement period. Data prior to 2002 is not available. It is known that white office paper, newsprint, cardboard and liquid paperboard are all recycled within Tasmania, although data on actual quantities consumed and recycled are limited.

Table 56 presents data on the consumption and recycling of specific paper products from 2002 to 2005, and 2008—the only years in which the data was collected. It should be noted that the data for Table 56 was collected by a variety of sources, and that the definitions of ‘paper’, ‘recycling’ and ‘waste’ varied between sources, as reported in the 2007 and 2012 *State of the Forests Tasmania Reports* (Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a).

Table 56 – Tasmanian consumption and recycling of forest products (tonnes)

Product	2002	2003	2004	2005	2008
Newsprint					
Consumed	10 801	11 415	12 865	12 187	10 700
Recycled	7 817	7 392	8 295	8 070	8 028
Proportion (per cent)	72	65	65	66	75
Printing and writing					
Consumed	n.a.	32 137	n.a.	n.a.	n.a.
Recycled	n.a.	4 882	n.a.	n.a.	4 863
Proportion (per cent)	n.a.	15	n.a.	n.a.	n.a.
Packaging and industrial					
Consumed	n.a.	40 503	n.a.	n.a.	n.a.
Recycled	n.a.	33 755	n.a.	n.a.	25 511
Proportion (per cent)	n.a.	83	n.a.	n.a.	n.a.

n.a. – Not available.

Source: Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a

More recently, data has been collected on the proportion of households/premises with access to recycling services in Tasmania as part of the *National Environment Protection (Used Packaging Materials) Measure (2011)*. For the period 2011–13, 94 per cent of Tasmanian households had access to a recycling service, and 73 per cent participated in recycling (National Environmental Protection Council 2011-2013). For the period 2013–15 these figures were 82 per cent and 82 per cent respectively (National Environmental Protection Council 2013–15). However, these figures relate to all materials recycled, not just forest-based materials such as paper and cardboard.

Throughout the Tasmanian Regional Forest Agreement period, there has been a reasonable rate of resource recovery of timber products occurring as well, with tip shops and salvage shops offering old timber furniture and items for reuse (including items recovered from demolitions or renovations) (Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a).

Sub-criterion 6.2 – Investment in the forest sector

This sub-criterion reports on the investment and expenditure in forest management, extension and the development and implementation of new technologies.

Indicator 6.2.a – Investment and expenditure in forest management

This indicator aims to monitor the investment in managing all forests and plantations, and expenditure on developing, maintaining, and obtaining goods and services from them.

This indicator was not directly reported against in the *State of the Forests Tasmania Report 2002*.

Over the period of the Tasmanian Regional Forest Agreement, investment in active forest management has been undertaken by a wide range of government agencies, private companies, community groups and associations, and individuals. The level of management has ranged from specific projects to integrated approaches that are funded by grants, budgetary appropriation, commercial operations and private donations. The complexity of organisations and funding models means that comprehensive data on the level of this investment in forest management is not readily available.

Forest management investments include, but not are necessarily restricted to:

- establishing, maintaining, conserving and re-establishing native and plantations for commercial and non-commercial uses, including wood and non-wood products
- identification, maintenance and management of biodiversity values monitoring, maintaining and enhancing water quality and production capacity
- establishing, maintaining and enhancing recreation and tourism facilities and opportunities, including access constructing, maintaining and decommissioning infrastructure such as roads, bridges, walking tracks and fire breaks
- identifying, developing and providing contemporary education, information and training structures, and opportunities for individuals, groups and organisations involved in forest management
- establishing processing facilities for both wood and non-wood forest products.

Business reporting requirements adhere to accounting standards and, as such, do not clearly identify investment and expenditure solely attributable to forest management. There are currently no Australian publicly-traded businesses operating in the forest sector in Tasmania (Forest Practices Authority, in prep.).

Table 57 lists alphabetically the major public and private forest organisations that have undertaken investment in forest management in Tasmania over the Tasmanian Regional Forest Agreement period (note: as stated in the 'description' column, some of the companies listed in Table 57 have ceased trading).

Table 57 – Major organisations that have invested in forest management in Tasmania

Organisation/business	Description
Department of Primary Industries, Parks, Water and Environment	Tasmanian Government agency—monitoring and research into natural forest values including land, biodiversity and water.
Forest Enterprises Australia Ltd	Previously a Tasmanian based company that owned native forest, plantation and wood processing facilities. The company entered voluntary administration in 2010, with Deloitte appointed as Receivers and Managers. The company was delisted from the Australian Stock Exchange in 2010.
Forest Practice Authority	Tasmanian statutory—forest practices regulator.
Forestry Tasmania	Tasmanian government business enterprise—manages native and plantation forests, recreation and tourism facilities, roads and infrastructure, and carries out forest research and analysis either directly or in collaboration.
Forico	Tasmania’s largest private forest company—responsible for New Forests’ hardwood plantation assets. Business concentrates on the management and harvesting of hardwood plantations.
Hydro Tasmania	Tasmanian government owned business—responsible for use and management of water resources to produce power and manages forested land that surrounds dam infrastructure.
Great Southern Plantations	Previously an Australian company listed on Australian Stock Exchange, but was sold to Gunns Limited in 2010. The company established and managed plantations within Tasmania.
Gunns Limited	Previously a major Tasmanian-based company that was listed on the Australian Stock Exchange and owned native forest, plantations and wood processing plants. The company entered voluntary administration in 2012, and was placed in liquidation and delisted from the ASX in 2013.
Natural Resource Management (NRM) groups	A government funded network of three regional bodies working with local communities to co-ordinate improved management of natural resources, including forests.
New Forests	International funds management business—owns Taswood pine estate and Timberlink sawmill, and the former Gunns hardwood plantation assets.
Norske Skog	International company which owns and manages native and plantation forests, and wood processing plants
Parks and Wildlife Service	Part of DPIPWE, which is responsible for the management of large areas of forested reserved lands for conservation and recreation.
Private Forests Tasmania	Tasmanian statutory authority—supports the private forest sector.

Private forest owners	There are approximately 5000 private land owners in Tasmania whose property incorporates native and-or plantation forest.
Resource Management Services LLC	A United-States based forestry investment manager. Purchased the forest assets of Forest Enterprises Australia.
Timberlands Pacific	Provides expertise to manage large plantation forests in Australia, and market forest products both domestically and internationally.
AKS Forest Solutions	A forest management and wood broking company operating in the private and public forest sectors in Tasmania.
Pentarch	Directly involved in the procurement, development and sale of timber products to export markets in Asia and the Middle East.
Tourism Tasmania	Tasmanian statutory authority—promotes tourism within Tasmania including in forested areas.
Wildcare Inc.	Tasmania’s largest environmental volunteer group supporting heritage conservation and reserve management, including many forested areas.

In addition to those listed in Table 57, there are additional organisations involved in the promotion of improved approaches to the management of forests. These include the ARC Centre for Forest Value (UTas), the Forest Industries Association of Tasmania, the Tasmanian Timber Promotion Board, the National Forest Learning Centre, Timber Communities Australia, the Australian Forest Growers, local governments and volunteer organisations including Landcare and Wildcare (Forest Practices Authority 2012, in prep.).

The Tasmanian Government, as the largest forest resource owner, has remained the major investor in forest management throughout the Tasmanian Regional Forest Agreement period (Australian Government and Tasmanian Government 2007a; Forest Practices Authority 2012a; in prep.). Investments by the Department of Primary Industries, Parks, Water and Environment’s Parks and Wildlife Service have been particularly significant.

The Parks and Wildlife Service has made a considerable investment in infrastructure in reserves to facilitate recreation and tourism, including roads, bridges, walking tracks, viewing platforms, picnic facilities, toilets, camping areas, some overnight accommodation, information and interpretation signs as well as management infrastructure including fire trails, water supplies, staff housing, workshops and communications facilities (Australian and Tasmanian Governments 2007; Forest Practices Authority 2012a, in prep.). A conservative estimate of the 2015-16 value of this infrastructure is over \$300 million, up from \$280 million in 2010–11 and \$230 million in 2006 (Forest Practices Authority 2012, in prep.). The increase in estimated value of the infrastructure is due to two main factors: improved recording of assets (i.e. there are now more assets recorded on the asset inventory than previously) and the upgrading of existing infrastructure, leading to increased value.

The annual operating budget for 2015-16 for the Parks and Wildlife Service was approximately \$60 million, up from \$26 million in 2010-11 and \$20 million in 2005-06 (Australian and

Tasmanian Governments 2007; Forest Practices Authority 2012, in prep.). A significant proportion of these funds have been spent on administering and managing forests in Tasmania's parks and reserve system. These areas provide significant environmental, social, cultural and economic benefits and experiences.

Hydro Tasmania manages water in forested catchments to create power, and TasWater manages the supply of water for domestic and other uses from forested catchments. These authorities have made minor investments in forest management throughout the Tasmanian Regional Forest Agreement period (Australian and Tasmanian Governments 2007; Forest Practices Authority 2012a, in prep.).

Forestry Tasmania is responsible for the sustainable management Tasmania's native multiple-use public forest for optimal community benefit, including the sustainable production and delivery of forest products and services; the facilitation of new forest-based industries; the conservation of natural and cultural heritage values; and the provision of education, recreation and tourism services.

Data on Forestry Tasmania's total operational expenditure for wood production and conservation activities on Tasmania's State is available from 2008-09. In 2008-09, its total operational expenditure was \$170 million (Forestry Tasmania 2009a) (Table 58). This included: expenditure on the establishment, protection, tending and harvesting of native forests and plantations; inventory, mapping, and planning of forest; servicing and maintenance of recreational and tourism facilities and conservation reserves; maintenance and development of roads; and maintenance of corporate services and facilities. Forestry Tasmania has been adjusting its business model over the last few years to help it to achieve profitability from its forest management business (Forest Practices Authority, in prep.). This had inevitably resulted in Forestry Tasmania reducing its cost structure in managing Tasmania's native production forest estate. In 2015-16, total operational expenditure for wood production and conservation activities on Tasmania's State forest totalled \$148 million (Forestry Tasmania 2016a).

Table 58 – Forestry Tasmania's total operational expenditure for wood production and conservation activities

Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Expenditure (\$'000)	170 390	167 713	184 554	133 951	114 525	154 091	148 196	148 016

Source: Forestry Tasmania (2009a, 2010, 2011, 2012c, 2013c, 2014c, 2016a)

Forestry Tasmania has continued to invest in forest infrastructure over the period of the Tasmanian Regional Forest Agreement, with millions of dollars each year deployed annually. Investments include:

- maintaining more than 6700 km of roads, bridges and other infrastructure that in addition to industrial processors, provide access, and support, for the:
 - fire protection, firefighting, training and response capacity
 - tourism, fishing, hunting, walking, and cycling

- the honey industry
- the local Tasmanian firewood industry
- recreation and tourist facilities including camping sites, parks, barbecues, boating facilities, and ‘adventure hubs’ (Forest Practices Authority 2017a).

The 2005 *Supplementary Tasmanian Regional Forest Agreement* accelerated the phase out of timber harvesting from old growth forests and therefore changed the characteristics of resources available to the hardwood sawmilling industry. This necessitated further investment in processing and harvesting technology. The agreement therefore included a commitment to jointly manage a program to facilitate forest industry retooling and investment in new plant and technology, aiming to maximise recovery of forest products from increasing use of regrowth and plantation logs. This program was completed in 2008 (Commonwealth and Tasmanian Governments 2010).

The governments also agreed to provide \$4 million towards the development of tourism and visitor facilities in forest areas focussing on new reserves on public land, for example, \$1 million towards the provision of bushwalking infrastructure in north-west Tasmania. These initiatives were completed in 2009–10.

Private expenditure

Little information is available to compare industry expenditure across time. Between 2005–06 and 2012–13, it was estimated that expenditure by the Tasmanian forest industry fell by approximately 70 per cent. In 2005–06 expenditure was estimated at \$1.4 to \$1.6 billion, and had fallen to around \$452 to \$395 million by 2012-13 (Schirmer et al. 2014).

While there has been a progressive increase in commercial activities in reserves, there is no estimate of the value of private investment for tourism in reserves. In 2011, there were 190 business licences issued within national parks and reserves, up from 130 businesses in 2006. Of these, 45 were leasehold businesses involving the lease of reserved land, generally for the provision of serviced facilities such as cabin accommodation, restaurant, caravan parks or safari style camp—there are 10 such camps located from coast to high country. A significant portion of commercial operators undertake activity-based tours such as guided walks, four-wheel driving and cycling tours. All licensed businesses, particularly leasehold businesses, invest to provide infrastructure, services and or equipment for visitors. There has been a regular turnover of lease and licence holders over the past five years. In the last two years, the Tasmanian Government has sought to provide greater opportunities for businesses to operate in the reserved land network.

The Parks and Wildlife Service’s volunteer partner is Wildcare Inc., the largest and fastest growing incorporated environmental volunteer group in Tasmania, with a current membership of around 6000, up from 5000 in 2012. It undertakes volunteer work supporting natural and cultural heritage conservation and reserve management throughout the state. Work is undertaken in reserves and on private land in close partnership with a number of government agencies as well as with local government and private landowners. It is estimated that around 200 000 hours are volunteered year, to the value of almost \$5 million (Forest Practices

Authority, in prep.). Wildcare groups attract significant funding from various grant programs for reserve management.

Indicator 6.2.b – Investment in research, development, extension and use of new and improved technologies

The period of the Tasmanian Regional Forest Agreement has coincided with considerable Government and industry led research and development.

A total of \$1.6 million of Tasmanian Regional Forest Agreement funds was allocated by the Australian Government to the Forests and Forest Industry Council under clause 101(ii) of the current Tasmanian Regional Forest Agreement. These funds were provided to facilitate strategic research and development to help the industry transition from old growth log to regrowth and plantation log processing. With this funding the Forests and Forest Industry Council assisted country sawmillers with the design and commissioning of new technologies, including laminated beam production, solar water heated kilns, and vacuum drying (Ramsay 2008).

The *State of the Forests Tasmania Report 2012* reported that approximately \$140 million had been directly expended on research and development over the decade to 2012 (Forest Practices Authority 2012a). Significantly more has been expended on direct investments in technology or in progressing approvals for the development of new processing capacity.

Tasmanian companies' strong links with research institutions have led to the development of innovative sawmilling methods, improved recovery in harvesting practices and improved tree productivity. In the forest management sector, the last five years have seen significant increases in the adoption of a range of new technologies.

As part of the *Tasmanian Community Forest Agreement*, which was implemented through the *Supplementary Tasmanian Regional Forest Agreement*, \$250 million was provided to 'enhance forest conservation and the development of forest industries' (Australian Government and Tasmanian Government 2005; Commonwealth of Australia and the State of Tasmania 2005). This included programs to assist private industry to re-tool existing mills and improve efficiency and competitiveness.

During the period of the Tasmanian Regional Forest Agreement, new private investment has occurred in the establishment of two rotary peeler veneer mills, and an associated plywood mill.

Significant research and development into the utilisation of plantation hardwood led to the establishment of a purpose built mill to process plantation logs for solid timber products, marketed under the 'EcoAsh' label. The product faced limited market demand. The plant was ultimately sold following the collapse of its owner, with production subsequently focussing on softwoods.

Research and development of new products continues. Forico is currently undertaking pre-feasibility work on the development of a black pellet product, for Japanese energy markets. Norske Skog is assessing the potential development of a commercial solvent plant at Boyer, utilising softwood fibre.

To achieve a coordinated outcome, the government, industry and educational institutes established active partnerships, such as the Cooperative Research Centre for Forestry which was an Australia-wide research venture established to operate from July 2005 until June 2012. The Cooperative Research Centre for Forestry focussed on new technologies, innovation, value-adding, efficiency and competitive advantage; as well as landscape issues and community engagement. The Cooperative Research Centre had its headquarters in Tasmania and received \$26.6 million cash from the Australian Government and \$57 million cash and in kind contributions from partners over the seven years.

Approximately 55 per cent of the overall Cooperative Research Centre for Forestry budget was expended in Tasmania, with research being conducted by the University of Tasmania, CSIRO, Forest Practices Authority and Forestry Tasmania. Tasmanian forestry businesses contributing resources to the CRC were Forestry Tasmania, Gunns Ltd., and Norske Skog. The Tasmanian Government also supports the research via its Department of State Growth, the Forests and Forest Industry Council and the Forest Practices Authority.

The closure of the Cooperative Research Centre for Forestry was closely followed by the National Centre for Future Forest Industries which operated from mid-2012 through 2014. The National Centre for Future Forest Industries came into existence via a Commonwealth funding grant to the University of Tasmania, with the University of the Sunshine Coast, the University of Melbourne, CSIRO, the Queensland Department of Agriculture, Fisheries and Forestry, and the Southern Tree Breeding Association as subcontractors. In the two and a half years of its existence, the National Centre for Future Forest Industries supported work on 19 projects within the following 4 themes: Future Options, Productivity, Risk Mitigation and Education and Communication. Total Investment in the Centre was \$12.3 million, with funds associated with other grants totalling \$6.2 million and leverage not associated with other grants totalling \$3.6 million.

The ARC Centre for Forest Value came into being in early 2015 and is situated on the University of Tasmania's Hobart campus (University of Tasmania 2016). The Centre has as its focus the training of forest scientists to work within the forest industry with a market-driven approach. The Centre has 8 industry partners including Greening Australia, Forestry Tasmania, SFM Environmental Solutions, Forico, Neville-Smith Forest Products, Next 50 Architects, Forest and Wood Products Australia, and the Island Workshop Prefab Lab. The total budget for the first 5 years of the centre, including all in-kind contributions, is \$9 million dollars.

On 4 June 2016, the Commonwealth government announced the establishment of the National Institute for Forest Products Innovation to be jointly based in Launceston, Tasmania and Mt Gambier, South Australia (Senator Anne Ruston 2015). Each of these locations received \$2 million dollars in Commonwealth funding, matched by \$2 million dollars in State Government funding and \$2 million dollars in industry funding. This research centre has as its focus timber processing, wood fibre recovery, advanced manufacturing and the bio-economy.

Independent five-yearly reviews of the Tasmanian Regional Forest Agreement

Comments and recommendations from each of the independent five-yearly reviews in relation to economic values are summarised below.

First five-yearly review

The first independent review of implementation of the agreement found that substantial progress had occurred on the commitments that aimed to provide a framework in which industry could thrive and grow (Resource Planning and Development Commission 2002a). Substantial areas of plantations had been developed that would provide a resource base and employment opportunities for the future. Investment in value adding, development of industry, marketing and research and development had been occurring.

Second five-yearly review

The second independent review of the Tasmanian Regional Forest (Ramsay 2008) noted that:

- The Forests and Forest Industry Council had continued research into developing sawing and seasoning methods for logs from young trees.
- Many initiatives had been undertaken to facilitate improved industry development, training, marketing, export facilitation and research.
- Programs had been established to support development of the wood and wood products industry through re-tooling and new plant investment; 87 projects with a total of \$159 million had been approved under these programs.
- A new regrowth eucalypt sawmill, veneer mills and a wood merchandiser had been constructed and a proposal for a new pulp mill was being developed.

Third five-yearly review

The independent reviewer for the third-five yearly review of the Tasmanian Regional Forest Agreement made five recommendation in relation to economic values, all of which has been agreed or agreed in principle by the Tasmanian and Australian Governments (Kile 2015; Australian Government and Tasmanian Government 2015). The recommendations, and their current status, are as follows:

Recommendation 5 – The State builds on its existing monitoring framework to develop a long term forest condition monitoring system across all forest tenures to assess changes in ecosystem health and vitality.

Through the Australian and Tasmanian State of the Forests Report series, the Australian and Tasmanian governments are continuing to identify the scale and impact on forest health from a variety of processes and agents, both natural and human-induced.

Tasmania's public forest managers have a range of monitoring systems that cover different aspects of the forest estate. The information from these systems is and will continue to be

used to inform adaptive management and continuous improvement approaches to the management of Tasmanian forests.

The Tasmanian Government has agreed to consider implementing a state-wide forest monitoring information system. This will likely require greater integration of existing systems and the development of new tools to assist in the long-term monitoring of forest condition and biodiversity, including threatened species.

Recommendation 7 – The Parties consider the development of a resourced and prioritised Research and Development Plan as part of the Regional Forest Agreement renewal /extension.

The Australian and Tasmanian governments agreed to consider the development of a resourced and prioritised Research and Development Plan as part of the extension process to the Tasmanian Regional Forest Agreement.

On 31 May 2016, the Australian Government announced a \$4 million dollar investment for a National Institute for Forest Products Innovation to assist with collaboration in the forestry research and development sector across Australia. The Tasmanian Government will contribute an additional \$2 million. A research hub will be established in Launceston, Tasmania, and will investigate innovation in areas such as forest management, timber processing, wood fibre recovery, advanced manufacturing and the bio-economy. Funding is currently scheduled to from 2016-17 to 2021-22.

The Tasmanian Government is reviewing its approaches to forest related research and development as part of its broader forest policy and industry growth planning being undertaken throughout 2016.

Recommendation 11 – The Parties continue to include regular reviews of the sustainable sawlog yield as an element of a renewed/extended Regional Forest Agreement.

The Australian and Tasmanian Governments agreed that regular reviews of the sustainable yield, taking into account changing biotic and abiotic risk factors, should continue to be part of the Tasmanian Regional Forest Agreement.

Recommendation 12 – The State ensures matters raised in submissions to this review in relation to the management, supply and marketing of special species timbers be considered through the development of the new State special species timber management plan and the outcomes recognised in a renewed/extended Regional Forest Agreement.

The Tasmanian Government has considered the matters raised in the submissions to the third five-yearly review of the Tasmanian Regional Forest Agreement as part of the development of its special species management plan. The State has commenced the process of developing this plan and is preparing a draft plan for public consultation in accordance with its legislation. The legislation requires the plan to specify a range of matters,

including the species and land to which the plan applies, and established supply levels. This plan will be developed by October 2017.

Recommendation 14 – The Parties support an updated socio economic analysis as part of the Tasmanian Regional Forest Agreement renewal/extension process and periodic collection of socio economic data during the term of a renewed/extended Tasmanian Regional Forest Agreement

The Australian and Tasmanian governments recognise the importance of socio economic data and the periodic collection of robust economic data.

This Assessment Report has provided an assessment of economic and social values related to the Tasmanian Regional Forest Agreement as part of the variation/extension process of the Tasmanian Forest Agreement. As referred to throughout this Assessment Report, existing socio-economic data collected by the Australian and Tasmanian Governments have been used as the primary data sources for this report. These include the Australian and Tasmanian State of the Forests Report series. Additional economic data are provided in a range of reports including Australian forest and wood products statistics, Australian plantation statistics, National Wood Processing Survey and the Census of Population and Housing.

In addition to this Assessment Report, the Australian Government has commissioned Forest and Wood Products Australia to assess the social and economic effects of the forest industry on certain regional areas in Australia. This project has commenced and is currently in its data collection phase (and hence could not be used as part of this Assessment Report). The overall objective of this project is to provide a comprehensive assessment of how the forest industry contributes to the social and economic wellbeing of regional communities in Australia. The project will be conducted over four years. The project will produce two key outputs:

- 1. Profiles of socio-economic effects of the industry in different regions, including Tasmania. These profiles will include multiple components for each region, which may be produced and released gradually over time depending on timing of different components of the work.*
- 2. Guidance on assessing socio-economic impact of the industry. This guidance will provide an overview of recommended uses of the data generated in this project, as well as other available evidence, to assess socio-economic impact of the industry in different regions.*

Should the Tasmanian Regional Forest Agreement be varied, the Australian and Tasmanian governments have agreed that collection of economic data will continue throughout its term.

Summary and future management of economic values

Economic values of forested areas

Over the period of the Tasmanian Regional Forest Agreement, there has been significant change in the structure of the production forest estate, and its management.

Successive forest agreements, subsequent to the original Tasmanian Regional Forest Agreement, have resulted in a reduced area of public forest available for production forestry since 1996. In addition, continual improvements inherent in the forest practices system have resulted in further areas falling outside of harvested zones.

The removal of significant areas of production forests has not diminished the responsibility of the Tasmanian and Australian Governments to ensure that the productive capacity of remaining production forests, and certainty of resource access, is maintained.

The Australian and Tasmanian governments have committed to harvesting at or below sustainable yield of the available production estate over the period of the Tasmanian Regional Forest Agreement. The periodic analysis of sustainable yield from public forests, undertaken in accordance with commitments under the Tasmanian Regional Forest Agreement, confirms that harvesting from public land has remained at or below the long-term sustainable yield of public forests managed for wood production over the life of the Tasmanian Regional Forest Agreement.

On private land, estimates of sustainable yield cannot be made due to the inability to determine key inputs of the area of private forests managed for production forestry. However, harvest rates have remained within forecast wood production yields throughout the period of the Tasmanian Regional Forest Agreement.

The size and structure of the Tasmanian plantation estate has changed dramatically over the period of the Tasmanian Regional Forest Agreement. This was largely the result of significant investment in hardwood plantations arising from tax incentives provided through Managed Investment Schemes, investment in industrial-scale plantations managed for pulpwood, and the conversion of public native forests to hardwood plantations.

New plantation establishment trends indicate that it is likely that the plantation estate has reached its maximum area. Further consolidation of the plantation estate may occur over the period of an extended or varied Tasmanian Regional Forest Agreement, as land is converted to other uses.

Throughout the Tasmanian Regional Forest Agreement period, Tasmania's publicly-owned forests have remained available for multiple-uses. Non-wood related forest products continue to be sourced from Tasmania's forests. The third independent five-yearly review of the Tasmanian Regional Forest Agreement confirmed that opportunities were available to improve

the monitoring of productive capacity, particularly in relation to the collection of non-wood products. Available evidence indicates that all monitored removals of non-wood products remain well within environmental limits based on species populations and dispersal.

Reserved forests and areas managed for wood production are becoming increasingly important elements of the visitor economy

Investment and expenditure in forest management is ongoing, with responsibility for forest management dispersed between public and private land owners and managers. Investment in the sector has been strongly influenced by market conditions and, in the case of private land owners, owner intent. Ongoing investment in research and development is reflected in improved forest management and harvesting strategies.

Economic values of forest industries

The Tasmanian forest industry profile has changed dramatically since 1996. In particular:

- Pulp and paper production has been reduced to a single processor.
- Medium Density Fibreboard production from softwoods commenced and subsequently ceased to be produced in Tasmania.
- Softwood milling has been consolidated in Bell Bay, resulting in the closure of mills elsewhere.
- Two rotary peeled veneer mills and an associated plywood mill have been established.

The financial incentives provided under the Managed Investment Scheme throughout the early to mid-2000s provided a boost to industry activity, as well as further diversification of activity. However, the effects of the collapse of Managed Investment Scheme companies, together with the demise of Gunns Limited, are still being felt in reduced industry activity, loss of key infrastructure, and continuing limited activity in the private native forest sector.

Log harvesting changed dramatically over the period of the Tasmanian Regional Forest Agreement, both in terms of quantity and composition. Considerable declines in log production occurred over 2007–08 to 2012–13 period. The decline in overall harvest of logs reflects the difficult period the Tasmanian forest industry has experienced since 2007–08. More positive levels of total log harvesting activity in the industry have occurred since 2013–14.

While softwood production remained relatively stable over the period of the Tasmanian Regional Forest Agreement, production from hardwood plantations has increased in recent years, reflecting successful sale of plantation assets, maturing plantations and improved market conditions.

Over the period of the Tasmanian Regional Forest Agreement, softwood products have continued to displace native timber products for most structural application purposes. Native forest processors of high quality sawlogs in Tasmania have increasingly focussed on appearance grade markets. However, the development of a rotary peeled veneer mill, and more recently a plywood mill, is one area in which markets trends have been reversed. These mills are utilising lower grade native forest logs to produce veneers and plywoods for industrial applications.

The total value of logs harvested has fluctuated over the period of the Tasmanian Regional Forest Agreement. Particularly steep declines in the total log harvest value occurred in 2012-13, but the value has recovered to some extent in recent years. In particular, the value of plantation logs notably increased in 2014-15, and is expected to experience strong growth over the short to medium term, with a maturing plantation estate and a simultaneous increased investment in processing technologies to increase processing capacity.

The supply of sawlogs and high quality veneers is closely linked to the international demand for wood fibre, which constitutes a substantial proportion of the processed log volume. Recent history has demonstrated the vulnerability of the domestic wood processing sector in the absence of secure, accessible and viable markets for wood fibre.

The Australian dollar traded at near parity with the US dollar for an extended period of time over the Tasmanian Regional Forest Agreement period, which coincided with challenging local conditions to severely reduce economic activity in the industry. Woodchips have remained the most significant wood product exported from Tasmania over the period of the Tasmanian Regional Forest Agreement, with the bulk of this commodity destined for markets in Asia. Significant declines in the value and volume of woodchip exports occurred over the 2007-08 to 2010-11 period. The volume and value of woodchip exports have recovered to some extent in recent years. Tasmania has imported relatively low volumes of wood products compared to the volume exported over the Tasmanian Regional Forest Agreement period.

Public awareness and growth in economic importance of forest based services such as ecotourism and credit schemes for carbon, salinity and ecosystem services has increased over the period of the Tasmanian Regional Forest Agreement.

A varied Tasmanian Regional Forest Agreement will intend to support the Tasmanian forest industry so that it has a strong and sustainable future and to provide additional certainty to industry and the community. The variation will seek to maintain a stable regulatory environment, which will assist in providing for socio-economic stability and opportunities for market growth.

A varied Tasmanian Regional Forest Agreement will continue to support ongoing access by the forest industry to public native forests and plantations, including special species timber, for forestry operations. Further, the variation will continue to periodically review the sustainable yield of high quality sawlogs to reflect changes in forest inventory and management initiatives.

The period of a varied 20-year Tasmanian Regional Forest Agreement will cover the period in which new wood products develop, such as wood pellets for international energy markets. A varied Tasmanian Regional Forest Agreement will aim to support an internationally competitive wood production and wood products industry.

A varied Tasmanian Regional Forest Agreement will also continue to ensure Tasmania's forests remain accessible for a range of recreational pursuits and other uses such as the harvesting of non-wood related forest products.

Social values

Paragraph (a) of the definition of a Regional Forest Agreement contained in the *Regional Forest Agreements Act 2002 (Cth)* provides that, amongst other requirements, an RFA is an agreement entered into having regard to assessment of social values (including community needs) relevant to the region.

These values are reported on based on the indicators listed in Table 59 developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests. Indicators grouped under these criteria allow the presentation of data in a consistent and repeatable format.

Table 59 – Criterion 6: Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of society

6.3 Recreation and tourism
Indicator 6.3.a – Area of forest available for general recreation/tourism
Indicator 6.3.b – Range and use of recreational/tourism activities available
6.4 Cultural, social and spiritual needs and values
Indicator 6.4.b – Registered places of non-indigenous cultural values in forests that are formally managed to protect those values
Indicator 6.4.d – The importance of forests to people
6.5 Employment and community needs
Indicator 6.5.a – Direct and indirect employment in the forest sector
Indicator 6.5.b – Wage rates and injury rates within the forest sector
Indicator 6.5.c – Resilience of forest dependent communities to changing social and economic conditions

Significant data has been collected and published since the Australian and Tasmanian governments entered into the Tasmanian Regional Forest Agreement in 1997. Since that time, there have been a number of reports produced that detail the social significance of Tasmania's forested areas. This has included reports on economic viability and labour force characteristics, socio-demographic structure, community infrastructure, historical response to change, community vitality, social wellbeing, community visions and aspirations and community attitudes towards forest use. Clause 72 of the 1997 Tasmanian Regional Forest Agreement recognises that there are a range of consultative mechanisms which provide for public participation within the Regional Forest Agreement framework. The Tasmanian Regional Forest Agreement itself is subject to independent five-yearly reviews that includes a call for public submissions, but there are numerous other opportunities within Tasmania's Forest Management System that allow for additional consultation to gauge and evaluate community visions and aspirations, and attitudes towards forest use.

Criterion 6 of the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests is concerned with social values. Specifically it is listed as 'Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies'. The indicators under Criterion 6 are intended to show the extent to which forests contribute to national and regional economies, benefit personal and community wellbeing, and support cultural values. This criterion monitors and reports across five sub-criteria relevant to how the forest sector provides multiple socio-economic benefits to society. Areas covered include the production and consumption of forest products, investment in the forest sector, recreation and tourism, the cultural, social and spiritual values provided by forests and forest-related employment and community needs.

As per Table 59, three of these sub-criteria, specifically recreation and tourism (Indicator 6.3.a and 6.3.b), cultural, social and spiritual needs and values (Indicator 6.4.a, 6.4.b, 6.4.c and 6.4.d) and employment and community needs (Indicator 6.5.a, 6.5b, 6.5c and 6.5d) are relevant to this chapter. The other two sub-criteria, specifically production and consumption (Indicator 6.1.a, 6.1.b, 6.1.c, 6.1.d and 6.1.e) and investment in the forest sector (Indicator 6.2.a, 6.2.b), are covered in Chapter 6 in relation to economic values.

Tasmanian communities have strong social and cultural connections to the forests, including for provision of wood and non-wood forest products, direct and indirect employment and nature-based recreation.

Status of the social values in 1997

In 1996 the Tasmanian Public Land Use Commission produced the *Tasmanian-Commonwealth Regional Forest Agreement, Social and Economic Report, Background Report Part D* (Tasmanian Public Land Use Commission 1997d). In it the Commission describes the social values that existed in the lead up to the development of options for the Tasmanian Regional Forest Agreement. Criteria were developed and social values were examined at both the local and regional level.

People then living within forest-dependent communities were concerned about employment for themselves and their children because they had been directly exposed to the previous structural adjustments and change within the industry. Some communities had demonstrated a capacity to adapt to change through diversification and innovation, while other communities had not been able to respond to change in the same way and were, at that time, experiencing a cycle of community decline. Those communities less dependent on the forestry industry were less susceptible to change and were seen to have a more diverse economic base, more stability and a more optimistic outlook.

It was further evident that in smaller communities, the viability of various businesses was interconnected to a greater degree, such that changes in key businesses were likely to have greater impact on profitability of other business in the community and therefore a consequent community impact.

In 1996 Tasmania was experiencing high levels of unemployment, particularly in rural communities with a consequence being loss of skills and youth as they tended to relocate into larger communities, cities and interstate. It was perceived that they were unlikely to return

leading to long term community decline and loss of skill and innovative capacity. Tasmanian forestry workers were viewed as being highly trained and skilled particularly in machinery operations, however these are not always easily transferred to other industries especially with relatively low levels of formal education and limited experience in other industries. In many cases forestry was an intergenerational occupation with several generations working concurrently in mills or contracting teams.

Similar to the current context, the Commission reported that in 1996 industry groups believed the forests were being sustainably managed and that further ongoing access should be maintained. Alternatively, conservationists argue that current practices fail to adequately protect biodiversity, wilderness and old growth values, and that further logging of native forests threatens these values and may impinge on intergenerational equity. All stakeholders believed that forests had values that needed to be maintained and enhanced, and that a long term view and plan was needed.

A key issue raised by forest users was a lack of resource security and that this could impact on the viability of businesses leading to further uncertainty, unemployment and population loss in the regions. There was a call for further downstream value adding, a move away from old growth harvesting and a more efficient use of the native forest resource.

The Aboriginal community was concerned that forestry practices had the potential to impact Aboriginal sites and there was a need to identify ways to define and preserve areas of significant Aboriginal heritage. Training for forestry workers in identifying sites was recommended. Aboriginal heritage matters are reported on in Indicators 6.4.a, 6.4.c and 6.5.d.

The then tourism industry recognised that tourism was very dependent on Tasmania's natural environment and supported a range of tourism activities including bush-walking, cultural and natural history experiences, fly fishing, birdwatching and riverboat tours. Many people involved in the tourism industry were concerned about maintaining 'a clean and green image' and that forestry activities may impact on that. However there was apparently general support for a sustainable, multiple use forestry industry as many tourism operators had family or knew people in the forestry industry and recognised the economic importance of the industry to the state and some communities. Forestry and industry heritage were also seen as tourism opportunities. At the time a full measurement of the economic impact of the tourism industry had not been carried out so it was not possible to compare the economic impact of the industry to others at the time.

In terms of employment, in 1996 the forestry industry employed a total of 6580 people or 3 per cent of the total employment in the state. The various categories of occupation are outlined in Table 60. At the time survey respondents had been working in the industry for an average of 14 and a half years and almost half had family members also employed in the industry.

Table 60 – Categories of occupation within the forestry industry in 1996

Category	Percentage	Numbers
Managers / administrators	16.2	1066
Professionals	2.3	151
Tradespeople	5.2	342
Clerks	7.9	520
Salespersons and personal service workers	3.3	217
Plant and machinery operators or drivers	48.4	3185
Transport drivers	4.9	322
Labourers and related workers	11.8	776
Total	100	6580

Source: Tasmanian Public Land Use Commission 1997d

Thirty-six percent of industry workers indicated they had been injured at work. Mainly these were back or muscle strains, injuries to appendages and minor cuts and sprains. Only a small proportion (10.2 per cent) thought the injury would prevent them from gaining alternative employment, usually as a result of reduced mobility.

In terms of the general population in Tasmania in 1996, 65 per cent had visited a native forest within the last year and around a third had visited native forests once a month. Typically this was for a range of recreational uses, with the most common uses being, bushwalking, picnic and barbeques and sightseeing. With the exception of fishing, hunting and motor bike riding, the majority of activities undertaken were passive use and for recreation. The Tasmanian population were also asked about important aspects to consider in planning for forest management and use. It was found that human uses were equally important as ecological values of native forests, and that the need for public access was rated more important than fauna and flora protection when deciding on issues to be considered when areas were recommended for protection.

Contemporary status of values and reporting

Sub-criterion 6.3 – Recreation and tourism

This sub-criterion reports on the area of forest available for recreation and tourism, the range of uses and facilities available, and the intensity of usage. It recognises that forests have diverse non-consumptive uses that are commercially, socially and culturally important. It is therefore recognised that it is important to monitor whether access is provided to forests for recreation or tourism.

Indicator 6.3.a – Area of forest available for general recreation and tourism

Indicator 6.3.a reports the extent and proportion of forests available for recreation or tourism. For the purpose of this indicator, an area of forest is considered to be available for recreation and tourism if there is no legal or other form of prohibition on access for recreation and tourism activities. This includes areas where patrons may have to pay for public access to private land, such as a privately run wildlife park.

In the first *State of the Forests Tasmania Report 2002*, covering the period 1996–2001, it was reported that the overwhelming majority of forested land reserved under the *National Parks and Wildlife Act 1970* was available for recreation and tourism (Forest Practices Board 2002). This resulted from the 1999 Regional Forest Agreement-related amendments to this Act. Recreation and tourism were then specifically included in the statutory management objectives for all National Parks, State Reserves, Game Reserves, Historic Sites, Conservation Areas, Nature Recreation Areas and Regional Reserves. Recreation and tourism are however omitted from the objectives for Nature Reserves and the two private land reserve types. The exceptions where tourism and recreation were not specified as objectives encompass only about 130 000 hectares, or less than 5 per cent of the area reserved under the *National Parks and Wildlife Act 1970*. In total it was estimated that no more than 0.5 per cent of the forested land reserved under the *National Parks and Wildlife Act 1970* was unavailable for general recreation and tourism as at 2001 (Forest Practices Board 2002).

Under the now repealed *Forestry Act 1920*, Forest Reserves (as at 2001) were available for public recreational use, the preservation or protection of features of the land of aesthetic, scientific or other value, and the preservation or protection of species of flora or fauna. The statutory management objectives included ‘to encourage appropriate tourism, recreational use and enjoyment’. State forest were able to be accessed for recreational purposes that were not incompatible with the *Forestry Act 1920*. Under that Act public access could be restricted for safety reasons, which was usually a temporary and short-term restriction.

As at 2016, the overwhelming majority of forested land managed under the *National Parks and Reserves Management Act 2002* is available for recreation and tourism. Recreation and tourism are statutory management objectives for most reserve classes within the Act ‘to encourage tourism, recreational use and enjoyment consistent with the conservation of the reserve’s natural and cultural values.’

Public access to a reserve can be restricted by declaring a ‘restricted area’ in a management plan or by erecting a sign prohibiting access, either year round or on a seasonal basis. From time to time roads and tracks may be closed for safety reasons as well as environmental protection. Under the *Phytophthora cinnamomi Strategic Regional Plan for Tasmania* (Schahinger, Rudman and Wardlaw 2003), a number of locations in reserves have been identified as ‘special management areas’ where it is recommended that no further formed access be provided so that the introduction of the root rot fungus can, hopefully, be prevented. Whilst access will not be restricted to these areas, it will not be facilitated through construction of roads and tracks.

Under the *Forestry Act 1920* (repealed in December 2013), forest reserves were available for public recreational use, the preservation or protection of features of the land of aesthetic, scientific or other value, and the preservation or protection of species of flora or fauna. The statutory management objectives included 'to encourage appropriate tourism, recreational use and enjoyment'. State forest could be accessed for recreational purposes that are not incompatible with the *Forestry Act 1920*. Under the Act public access could be restricted, usually temporarily, for safety reasons associated with active forestry operations or management of identified hazards. In 2013 the majority of Forest Reserves were proclaimed conservation areas under the *Nature Conservation Act 2002* and management responsibility, including for recreational use, was transferred to the Parks and Wildlife Service.

On private forest, some recreation, such as camping, hunting and fishing does occur at the owner's discretion and there are also some small commercial tourism ventures on private forested land.

Almost all public forested land in Tasmania, including wilderness, is now available for recreation and tourism. In total, 3.35 million hectares of forest across tenures is available for recreation and tourism. This figure has remained largely the same over the period of the Tasmanian Regional Forest Agreement.

Indicator 6.3.b – Range and use of recreation/tourism activities available

This indicator reports the range of recreation and tourism facilities available in forests and how frequently the facilities are used. Activities may be provided for at a specific location, such as dedicated campgrounds or caving experiences, or are generally allowed but are not specifically related to a specific site, including scenic flights, cycling and climbing. Other activities are only permitted in certain land tenures such as off-road driving and horse-riding.

Some facilities are provided solely for recreation or tourism. These might include walking or riding tracks, picnic sites and camp grounds. Other facilities, such as roads and vehicular track are provided for a range of management purposes and are also available for use for recreation and tourism.

As reported in the *State of the Forests Tasmania Report 2002*, shortly after the Tasmanian Regional Forest Agreement was signed, 2012 sites were being managed for recreation and tourism use either by Forestry Tasmania or the Department of Primary Industries, Parks, Water and Environment (Forest Practices Board 2002).

The first independent five-yearly review of implementation of the Tasmanian Regional Forest Agreement noted several initiatives underway to promote tourism and recommended that the Tasmanian Government finalises its nature based tourism and recreational management policy by 31 March 2003 (Resource Development and Planning Commission 2002a).

Table 61 – Sites being managed for recreation and tourism as at 2002

Activity	Forestry Tasmania Sites	Department of Primary Industries, Parks, Water and Environment	Total
Accommodation (huts, remote campsites)	0	43	43
Accommodation (other public accommodation)	2	39	41
Boating (boat ramps)	5	*	5
Camping (developed campgrounds)	6	57	63
Canoeing/kayaking/rafting	4	*	4
Caving (developed caves)	0	4	4
Education (Forest Education/Visitor Centres)	3	7	10
Fishing	11	*	11
Interpretation (information booths)	18	19	37
Picnicking (picnic areas)	27	108	135
Skiing (ski fields with facilities)	0	2	2
Touring/sightseeing (formal lookouts)	15	53	68
Tourist operators (commercial)	23	121	144
Walking (formal routes/tracks)	226	1119	1345
Walking (nature trails/walks)	28	68	96
Wildlife observation (hides)	0	4	4

*Separate data not available.

New forest-based tourism and recreational facilities which had been developed in the second review period (Ramsay 2008) included:

- a visitor centre in Freycinet National Park
- facilities at Dismal Swamp, Maydena and at Styx River reserve were developed or upgraded
- expanded facilities at the Tahune Airwalk
- upgrades to walking tracks as part of the Tasmanian Walking Track Strategy.

The third *State of the Forests Tasmania Report 2012*, also reports on facilities being managed for recreation and tourism use either by Forestry Tasmania or the Department of Primary Industries, Parks, Water and Environment. During the reporting period more than 3240

facilities and activities were available for recreation and tourism uses (Forest Practices Authority 2012a).

Table 62 – Sites being managed for tourism and recreation 2012

Facility/activity	State forest	National parks and reserves
Disabled access	32	132
Information/Visitor Centre	18	31
Toilets	34	345
Gas barbecue	9	*
Wood barbecue	32	*
Picnic shelter	28	94
Picnic area	35	655
Fireplace	16	*
Boat ramp	4	30
Lookout (platform)	17	101
Short walk	105	*
Day walk	42	438
Overnight walk	2	197
Camping area (vehicle)	5	126
Camping area (foot access)	4	72
Caravan site	1	29
Accommodation (walkers)	2	48
Accommodation cabins	1	41
Self-guided interpretation	10	*
Guided interpretation	3	*
Interpretation booths	13	52
Wildlife observation hides	0	5
Education	2	*
Cultural Heritage	7	*
Mountain bike riding	7	*

Trail bike riding	19	11
Recreational vehicle driving	22	*
Horse riding	17	*
Boating	13	*
Canoeing	11	*
Fishing	27	*
Hang gliding	2	1
Playground equipment	1	5
Skiing (ski fields with facilities)	0	2
Special events	6	*
Licensed tourism businesses	90	190

Overall, during the period of the Tasmanian Regional Forest Agreement, there has been an increase in the number of facilities provided by the Parks and Wildlife Service for recreation and tourism. New assets have been provided while others have been decommissioned. Substantial work has gone into upgrading, replacing and maintaining retained assets.

Over the period of the Tasmanian Regional Forest Agreement, Forestry Tasmania has invested in a number of tourism related ventures in production forests, including the Tahune Airwalk, Dismal Swamp, Maydena Adventure Hub and Eagle's Eyrie and the Scottsdale Eco Centre. Some of these have subsequently ceased operation.

Forestry Tasmania continues to maintain a wide range of facilities to support activities in production forests including visitor information, picnic areas, lookouts and interpretation facilities.

The Tasmanian Parks and Wildlife Service manages over 800 parks and reserves in Tasmania. The PWS cannot monitor visitors to all sites. The PWS maintain counts of visitors at 11 selected parks and reserves (called 'reference sites') across the state. Information from the reference sites gives a general idea of visitor trends generally.

Over the long-term, the underlying trend has been for visitor numbers to increase. However, there have been periods of growth and decline:

- Visitor numbers were growing before the first reporting period. Visitor numbers peaked in the period between 2003 and 2005.
- Visitor numbers plateaued throughout 2005–06 to 2008–09.
- Visitor numbers declined to most reference sites from about 2009–10 to 2012–13.

- Visitor numbers rebounded from 2012–13 onwards, with increases occurring earlier in some places, whilst there was a lag at other sites.
- As at 2015–16, visitor numbers have increased across most reference sites and, in some cases, visitor numbers are at record levels (Forest Practices Authority, in prep.).

Sub-criterion 6.4 – Cultural, social and spiritual needs and values

This sub-criterion reports on the area of forest to which Indigenous people have use and rights to protect their special values and the extent to which these values are protected by Indigenous participation in forest management.

The sub-criterion also reports on the protection of non-Indigenous cultural values and the importance of forests to people.

Indicator 6.4.d – The importance of forests to people

Management of Tasmania’s forest estate provides a range of benefits to society, which include environmental, social and economic benefits. The modern management approach reflects changes in community priorities and values over time, including a greater emphasis on conservation, while also developing a robust and world-leading forest practices system to enable ongoing access to forests to supply wood products.

From a socio-economic perspective, the forest industry remains a key component of regional communities in Tasmania. Forests are valued in the community for a range of attributes, from forests as a source of income and job security to broader values encompassing renewable resources, biodiversity, clean air and water.

In the *State of the Forests Tasmania Report 2002*, it was stated people will always hold a variety of views in relation to the use and management of Tasmania's forest resources (Forest Practices Board 2002). These views are formed through many factors including an economic dependency on forests. It was again recognised at the time that the views held by contractors, apiarists, saw-millers and craft wood users will differ from those held by people with a non-commercial dependence, such as tourists and recreational visitors.

Tasmania has extensive areas of forested land located within the formal reserve network. The total Tasmanian Reserve Estate, as at 30 June 2015, indicates a total terrestrial reserved area of 3 412 500 hectares, or 50.1 per cent of the area of Tasmania (Department of Primary Industries, Parks, Water and Environment 2016b).

In the period since the *State of the Forest Tasmania Report 2012*, the management of 500 000 hectares of land, dispersed across the state, has attracted considerable attention at a state, national and international level. Under the *Tasmanian Forests Agreement Act 2013*, this land was identified as Future Reserve Land, and scheduled for proclamation as reserves under the *Nature Conservation Act 2002*. Native forest harvesting was prohibited on the Future Reserve Land. The Future Reserve Land included areas of former production forest and informal reserves.

In 2014, a new Tasmanian Government was elected with a policy position to not support the Tasmanian Forest Agreement. The *Tasmanian Forests Agreement Act 2013* was repealed and the Future Reserve Land was converted to a new category of land, called Future Potential Production Forest land. Native forest harvesting continues to be prohibited on Future Potential Production Forest land. However, the legislation allows small scale native forest harvesting to be undertaken on FPPF land from October 2017. The legislation also allows for the Future Potential Production Forest land to be converted back to production forest from 2020.

The changes in management approach, and ongoing debate over the future role of the Future Potential Production Forest land, reflect the divergent community reviews about the role of forests. The debate also emphasises the ongoing importance of forests to people, whether it be for income, recreation or environmental benefits.

The need to balance the often conflicting views and values of our communities is reflected in the actions of commercial forest managers striving to demonstrate the sustainability of their forest practices. Forest management certification continues to grow in importance as a means of demonstrating to communities and consumers that forests are managed consistent with community expectations. This has extended to forest managers seeking, and holding, multiple certifications.

In 2012, it was reported that the *Forest Practices Code* covers aspects of environmental care expected by the community, including biodiversity, geodiversity, visual amenity and the protection of natural and cultural values (including soil and water resources). The code addresses all aspects of existing and future forest operations on private and public land including preharvest planning, silviculture (including thinning), road construction, plantation establishment and reforestation. Forest Practice Officers monitor all forestry operations in Tasmania from the planning stage through harvesting, site restoration and thinning operations.

This system was independently assessed in 2007 by researchers from Yale University and the Australian National University. The effectiveness of the forest practices system in protecting values in the adjoining World heritage Areas was also considered separately by the joint UNESCO World Heritage Centre-IUCN-ICOMOS mission report on the conservation of the Tasmanian Wilderness World Heritage Area. These reports found that the management practices being implemented by Tasmania's forest industry are appropriately contributing to the protection of conservation, biodiversity and cultural values (Forest Practices Authority 2012a).

Public comments as part of the third independent five-yearly review of the Tasmanian Regional Forest Agreement were sought from 17 April to 12 June 2015. In total, 28 submissions were received from individuals and organisations. Of these submissions, 25 were provided for web publication and are available from the Tasmanian Government Department of State Growth's website (Department of State Growth 2016b).

Additional discussions, interviews and community workshops about a possible extension to the Tasmanian Regional Forest Agreement have been held with interested stakeholders across Tasmania. These discussions and interviews were conducted in Hobart, Huonville, Launceston, Burnie and Scottsdale between 5 and 9 December 2016.

Based on these fora, it appears that the Tasmanian population hold a variety of values in relation to the use and management of Tasmania's forests. Many believe there is a need to both protect forest areas but also use them as a source of employment.

Below is a summary of some of the views that have been expressed to the Australian and Tasmanian governments as part of the third five-yearly review and as part of the additional consultation about extension of the Tasmanian Regional Forest Agreement:

- Key industry groups advocate that forests within Tasmania are currently being managed on a sustainable basis and that access to resources for a productive industry should be maintained (or in some instances, expanded).
- Conservationists argue that the current forest practices fail to adequately protect biodiversity and wilderness values, and that further harvesting of native forest areas throughout the state threatens existing values and intergenerational equity.
- Residents living in communities that are highly dependent upon the forest industry are concerned about employment for themselves and their children. Such communities have expressed that any further reduction in key industry sectors would impact detrimentally on physical and social infrastructure in their area.
- Some community members wish to see a reduction in the degree of regulation over forestry activities, while some wish to see an increase in the level of legislative control over native forests.
- Aboriginal communities are concerned with the possibility of damage to Aboriginal sites and water quality through logging activities.
- The mining industry is concerned about obtaining access to land with mineral potential as previous debates over land use have resulted in a loss of resource
- For other forest users, dependence upon forests vary from those with an economic dependence (e.g. apiarists, sawmillers, craft wood users) to those with a non-commercial dependence such as the recreationists and traditional land users. Access to native forests is a major issue for both of these groups. While roads provide access to forested areas, the main purpose of these roads is to provide access for forestry activities. Without forestry roads a range of social uses and values may be restricted.
- Concern was also expressed over diminishing resource and job security, the extension of the Tasmanian Wilderness World Heritage Area and national parks (preferred multiple use rather than a 'lock up' approach), the future of the special species timber industry and the exploration for minerals in national parks, all of which have the potential to reduce employment and social amenity that reduces community well-being.

Sub-criterion 6.4 – Employment and community needs

This sub-criterion reports on direct and indirect employment in the forest sectors and wage rates. The health and welfare is also considered important and trends in work injury rates are reported. The resilience of forest dependent communities is also discussed.

Indicator 6.5.a – Direct and indirect employment in the forest sector

Employment is an important measure of the contribution of forests in meeting community needs.

Employment is also an important measure of the contribution of forests in meeting community needs and social values. In the *State of the Forests Tasmania Report 2002* it was reported that there were 8259 full-time equivalent workers employed in the Tasmanian forest sector in 1999–2000. The authors also conclude that most of those employed (just under two-thirds) were full-time employees. A further 20 per cent were contractors, 11 per cent were casual, and 3 per cent were part-time employees. Harvesting and plantation establishment contractors represented approximately 34 per cent of total employment in the forest sector; forest growing and sawmilling were also significant employers, representing a further 30 per cent and 21 per cent of total employment respectively. The remaining share of employment was fairly evenly distributed between other business activities (Forest Practices Board 2002).

In 2007, the *State of the Tasmania Forests Report 2007* indicated that the Forest and Forest Products Employment Skills Company (FAFPESC—now known as ForestWorks) collected information on employment in the sector through a questionnaire and phone survey. The report also examined various sources of publicly available data on the forest and wood products industry. The findings identified that there were 10,693 employees in the forest industry in 2003. There are no specific figures available on indirect employment resulting from the forestry industry in Tasmania, although Felmingham (2002) reported that Tasmanian forest industry multipliers from input-output analysis vary from 1.8 to 2.3. If a multiplier of two is used, this would mean that for every dollar and job created directly by the forest sector another dollar and job was generated in indirect employment.

In 2010, the Cooperative Research Centre for Forestry ‘Communities Project’ reported that they had conducted employment surveys in 2006, 2008 and 2010 (Schirmer 2010). Surveyed businesses were those classified as growers, processors, harvest and haulage contractors, nursery and seed suppliers, silvicultural contractors, roading and earthmoving contractors. Other businesses, such as those involved in regulation, lobbying or industry support and research were also included. The key employment findings from the Report included that between 2006 and 2008, employment in Tasmania’s forest industry rose by 7.0 per cent, from 6 510 to 6 960 people. However, employment to 2010 had since fallen substantially with a decline of 33.3 per cent or 2 310 jobs between 2008 and 2010. This downturn was reported to have been driven by multiple factors, including: a reduced demand for wood and paper products as a result of the global financial crisis, a strong Australian dollar reducing the competitiveness of exported wood and paper products, successful campaigns by environmental non-government organisations to reduce demand for native forest woodchips, reduced investment in new plantations, and the closure of older processing facilities that had become uncompetitive.

In 2014, another employment report provided additional analysis of employment numbers in the forest industry from 2008 to November 2013 (Schirmer et al. 2014). The report highlights some of the changes the forestry industry has experienced including that Tasmanian forest

industry employment has declined substantially from 6,963 people in 2008, to 2,715 people in November 2013. However, the rate of employment loss has slowed since 2011.

During 2013, employment stabilised to some extent for the first time since 2008, with the number of people employed in the industry falling by 40 between November 2012 and November 2013. During this same period, full-time equivalent employment grew slightly despite the loss of 40 jobs, a consequence of many part-time workers in the industry increasing their work hours during 2013, particularly in the harvest and haulage sector (Schirmer et al. 2014).

The number of businesses operating in the industry had fallen steadily over time, with the decline continuing in 2012 even as employment numbers stabilised. This ongoing fall in business numbers is largely due to a number of small firms exiting the industry completely after having undertaken relatively little work in the industry for several years.

Dr Schirmer's 2014 report notes that forest industry jobs remain widely spread around Tasmania, with three key 'clusters' of employment:

- the northern cluster of Launceston, Dorset, and Meander Valley, where jobs depend on native forest, softwood plantations and hardwood plantations
- the north-west cluster of Circular Head and Burnie, which are highly dependent on native forest timber and have little plantation-related employment except in Burnie
- the southern cluster, comprised of the LGAs located around Hobart, together with Derwent Valley and Huon Valley. These jobs are largely dependent on native forests (particularly in Huon Valley) and softwood plantations (particularly Derwent Valley), with little hardwood plantation dependent employment."

The Report further notes that

While employment is clustered around Tasmania's larger population centres, the LGAs that have experienced the greatest loss of employment opportunities as a result of decline in the forest industry since 2008 are rural LGAs with smaller population and employment bases: in particular, Dorset, Glamorgan-Spring Bay, and Southern Midlands.

As previously noted, the 2014 report predates the increased activity in the hardwood plantations, subsequent to the purchase of Gunns plantation assets by New Forests.

The significant decline in employment over the last 20 years, and since 2008 in particular, has had a considerable impact on regional communities. In common with other sectors, forest industry jobs are increasingly mechanised, with greater emphasis on technical skills associated with that process of mechanisation.

The Independent Verification Group (O'Hara et al. 2013) reported an industry multiplier of between 1.92 and 2.85. The forestry sector continues to support additional full-time equivalent jobs in other sectors of the economy such as suppliers, manufacturers, and maintenance providers of logging and wood processing equipment, fuel and fertiliser suppliers, financial and training service providers. Increased spending from wages earned also creates and supports jobs in other sectors, including in retail, hospitality, education and health. Without this indirect

employment, many regional communities would be disadvantaged both socially and economically.

Indicator 6.5.b – Wage rates and injury rates within the forest sector

A sustainable industry will ensure high levels of workforce health and welfare and wage rates comparable with national averages for occupations.

Little information is available to compare wage rates across time as the data specific to the forestry industry are no longer published by the Australian Bureau of Statistics.

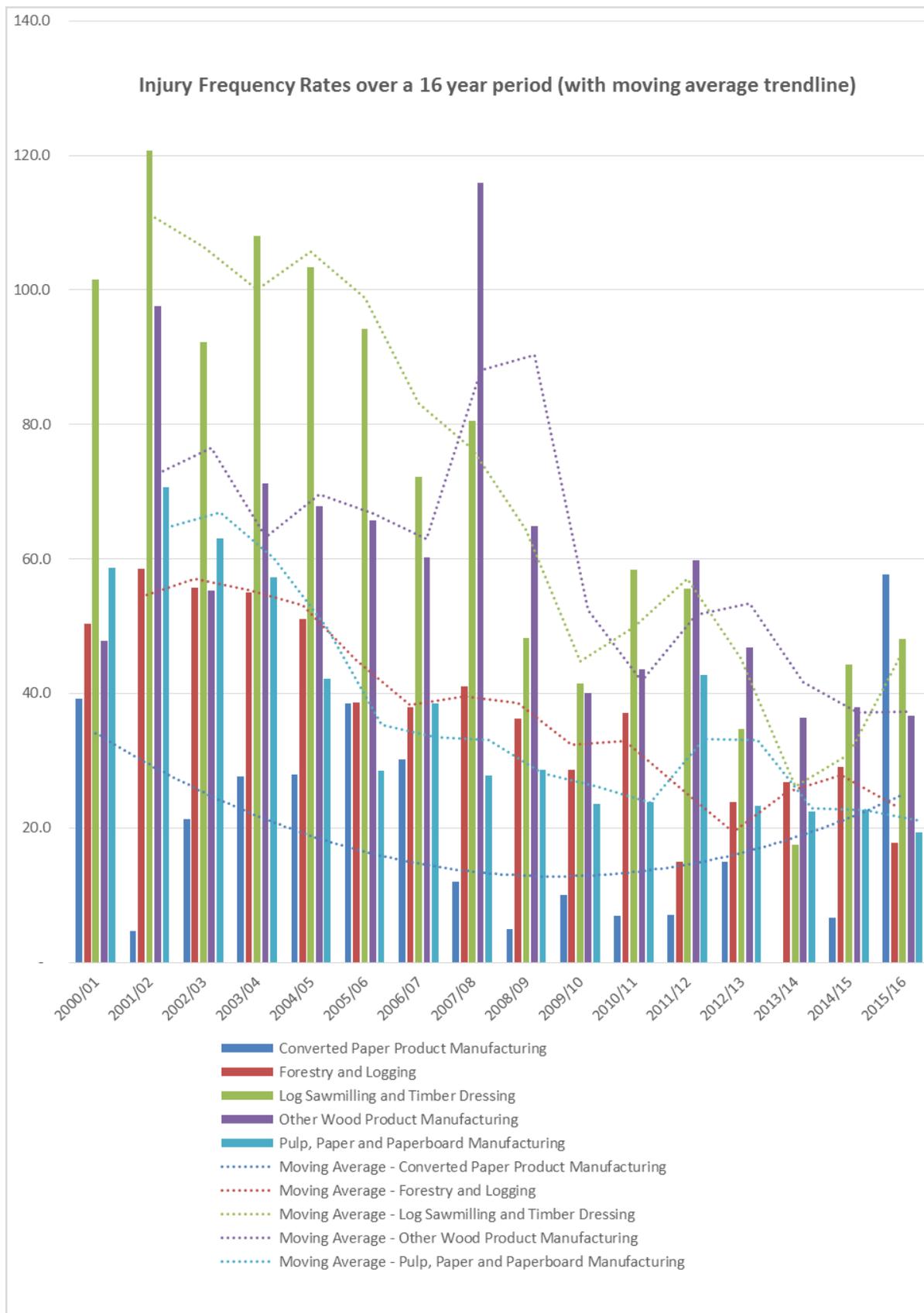
In the *State of the Forests Tasmania Report 2002* wage rates for a selected range of employment positions and levels in Tasmania's forest sector were reported. These included Chainsaw operator, saw mill worker, forestry officer, park ranger and regional managers. Salary levels for these positions were later reported to have increased at an average of approximately 13 per cent over the period to 2006. In the period to 2011, these wages again increased between 12.4 and 31.8 per cent (Forest Practices Board 2002).

The Fair Work Ombudsman has more recently developed the Timber Industry Award 2010 (Award) where pay rates change and are updated from 1 July each subsequent year. The Award is the minimum pay that employees in the timber industry must be paid for undertaking a particular job. It is not necessarily what employees are paid whilst working in those jobs, as employers may well pay above Award rates. The rate of increase in wages under the award between 2011 and 2016 has been between 13.4 and 14.1 per cent (Fair Work Ombudsman 2011, 2016).

The series of *State of the Forests Tasmania Reports* indicates that the injury frequency rate per million hours worked has generally decreased through time (see Figure 21 below).

In total there were eight fatalities in the Forestry and Logging sector of the industry between 1996–97 and 2000–01 (Forests Practices Board 2002); four in the period to 2004–05 (Australian Government and Tasmanian Government 2007a); four in the period to 2010–11 (Forest Practices Authority 2012a); and no fatalities in the period to 2015–16 (Forest Practices Authority, in prep.). No other sectors reported fatalities during the period of the Tasmanian Regional Forest Agreement.

Figure 21 – Injury frequency rates over a 16-year period (with moving average trend line)



Source: Forest Practices Authority (in prep.)

Indicator 6.5.c – Resilience of forest dependent communities to changing social and economic conditions

This indicator provides a measure of the extent to which communities are able to respond and adapt to change successfully.

Communities in Tasmania vary from those with a high dependence on forestry to those with a more diverse economic base. The Tasmanian forestry industry has historically been a driver for regional economies that delivers wealth, employment and broad community benefits that include economic, recreational and environmental outcomes. Skills development has been shown to improve the chances of finding employment in other industries during periods of structural adjustment thereby contributing to individual and community resilience.

The first independent five-yearly review of Tasmanian Regional Forest Agreement (Resource Planning and Development Commission 2002a) noted that training is an important means of improving environmental, social and economic outcomes, including the health, safety and productivity of those that work in the industry and that the agreement contains a number of actions for forest industry training. However the review made no substantive comment on implementation of those actions.

The 2005 *Supplementary Tasmanian Regional Forest Agreement* included a commitment by the Commonwealth to fund and administer a program to support improved training and skills development throughout the forestry sector, including environmental care, changing forest management and wood processing, safety, product quality, and business skills. Funding was provided to ForestWorks Ltd. for a 'Skills Enhancement and Training' project, which was completed in 2010.

The second independent five-yearly review of Tasmanian Regional Forest Agreement (Ramsay 2008) noted that the forest industry skills and training program established under the 2005 Tasmanian Community Forest Agreement had become the primary focus for delivery of the Tasmanian Regional Forest Agreement commitments in these areas. The skills and training initiatives addressed included log grading, forest practices and sawmilling techniques specifically necessary for handling smaller diameter sawlogs.

In the 2005-06 Cooperative Research Centre for Forestry report (Schirmer 2008a), it was noted that:

Overall, the forest industry contributes significantly to Tasmanian communities and the Tasmanian economy. The extent to which different parts of Tasmania depend on the industry varies widely, however, with some local government areas having high dependence on forest industry employment and spending, while others have a more diverse economy in which only a small proportion of activity derives from the industry.

Overall, Australia Bureau of Statistics data indicate that employment in the growing, harvest and haulage, and processing sectors fell 4.5 per cent over 1996-2001, and 2.5 per cent over 2001-06.

In 2005–06, Cooperative Research Centre for Forestry in *Forest industry employment and expenditure in Tasmania, 2005-06* (Schirmer 2008b) identified the LGAs most dependent on the forest industry (by total workforce employed in the forest industry):

- Derwent Valley (32 per cent)
- Dorset (23 per cent)
- Kentish (19 per cent)
- Central Highlands (13per cent)
- Huon Valley (9 per cent)
- Georgetown (9 per cent)
- Glamorgan-Spring Bay (8.5 per cent)
- Circular Head (7.5 per cent).

In 2008, LGAs with the highest proportion of the employed labour force working in the forest industry were:

- 17.6 percent in Dorset;
- 13.5 per cent in the Central Highlands
- 9.8 per cent in Glamorgan-Spring Bay
- 7.9 per cent in the Derwent Valley
- 7.6 per cent in the Southern Midlands
- 6.8 per cent in Circular Head.

And in 2013:

- 8.7 percent in Dorset
- 7.3 per cent in the Central Highlands
- 0.4 per cent in Glamorgan-Spring Bay
- 4.7 per cent in the Derwent Valley
- 0.2 per cent in the Southern Midlands
- 5.3 per cent in Circular Head.

The LGAs that have experienced the greatest loss of employment as a result of the decline in the forest industry are primarily rural LGAs with smaller populations and employment bases. Where these LGA's are heavily dependent on forestry employment, these job losses have a significant impact on the general working community. This is further evidenced by the economic multiplier (between 1.92 and 2.85) each forestry job is understood to have on other related and non-related sectors of the economy (O'Hara et al. 2013).

The scale of job losses in many regional communities represents a significant challenge to the economies and resilience of those communities.

With the exception of the period between 2006 and 2008, the period of the Tasmanian Regional Forest Agreement has seen decline in employment and economic activity generated by the forest industry. The work has not been done to date to measure the impact on communities in terms of changes in population, levels of participation in the workforce, average incomes and diversity of economic activity. It is clear, however, that the impact has been considerable, and the need for local economies to diversify has been unavoidable.

The 2011 *Tasmanian Forests Intergovernmental Agreement between the Commonwealth of Australia and the State of Tasmania* recognised the impacts of industry re-structuring on forest workers, their families and communities (Commonwealth of Australia and the State of Tasmania 2011a). The agreement provided support including \$45 million in assistance for voluntary exits from public native forest operations for haulage, harvest and silvicultural contractors, transition support payments for displaced workers, mental health counselling, community well-being services for forest workers and contractors and a voluntary sawlog contract buy-back program for additional sawmillers wishing to leave the industry. Employment and training opportunities were supported at the regional and local level, including by working in partnership with ForestWorks and Skills Tasmania.

In some regions, new economic activities provided by growth industries such as aquaculture will have created alternative employment opportunities. For a period, the mining boom provided opportunities for 'fly in/fly out' work on a significant scale.

In Dorset, the recent growth in adventure tourism generated by the establishment of mountain biking trails in the municipality points to a potential additional economic drawcard in the region.

The last two to three years has also seen a marked increase in employment in the sector, as highlighted in 'Indicator 6.5a' of this document. The early phase of this recovery is captured by Schirmer (2014), where businesses in the forest industry were reporting cautious optimism about their future. A majority of respondents believed they would increase capital expenditure, and increase profits. Approximately 40 per cent of respondents indicated that they would consider hiring more staff to cope with the expected increase in demand for forestry products in the future.

The downturn in the forestry sector over the last decade has resulted in a wholesale restructure of the forest industry, and forest businesses. These businesses are now in a position to capitalise on the improved trading conditions that have emerged over the last two years. This can be expected to have material long-term benefits for the regional communities that still have a large dependency on the forestry sector, in spite of the undoubted hardship that has been experienced over the last ten years.

Third independent five-yearly review of the Tasmanian Regional Forest Agreement

The independent reviewer for the third-five yearly review of the Tasmanian Regional Forest Agreement made five recommendation in relation to social values, all of which have been agreed or agreed in principle by the Tasmanian and Australian Governments (Kile 2015; Australian Government and Tasmanian Government 2015). The recommendations, and their current status, are as follows:

Recommendation 2 – The State considers continuing improvements to transparency in the development of Forest Practices Plans and the accessibility to non-private information for these plans.

Transparency and access to information is important in the management of forests on both public and private land.

The Tasmanian Government agreed to continue to provide access to Forest Practices Plans through the Forest Practices Authority, and will continue to refer enquiries on the preparation of draft documents and background material directly to Forest Practices Plan applicants.

The Tasmanian Government also agreed to continue to seek opportunities to improve transparency in the development of Forest Practices Plans following consultation with the Forest Practices Authority Board and the Forest Practices Advisory Council.

Recommendation 3 – The State reassess the process and timeframe for completing the management plans for Rocky Cape, Mount William and Savage River national parks with a view to their completion as soon as possible

The Tasmanian Government is currently working with the Aboriginal Heritage Council to progress an agreed approach to management planning for national parks and reserves, including Rocky Cape and Mount William national parks, which are of significant interest to the Tasmanian Aboriginal community.

In addition, a draft Savage River National Park Management plan has been prepared and will be finalised in the near future.

Recommendation 14 – The Parties support an updated socio economic analysis as part of the Tasmanian Regional Forest Agreement renewal/extension process and periodic collection of socio economic data during the term of a renewed/extended Tasmanian Regional Forest Agreement

The Australian and Tasmanian governments recognise the importance of socio economic data and the periodic collection of robust economic data.

This Assessment Report has provided an assessment of economic and social values related to the Tasmanian Regional Forest Agreement as part of the variation/extension process of the Tasmanian Forest Agreement. As referred to throughout this Assessment Report,

existing socio-economic data collected by the Australian and Tasmanian Governments have been used as the primary data sources for this report. These include the Australian and Tasmanian State of the Forests Report series. Additional economic data are provided in a range of reports including Australian forest and wood products statistics, Australian plantation statistics, National Wood Processing Survey and the Census of Population and Housing.

In addition to this Assessment Report, the Australian Government has commissioned Forest and Wood Products Australia to assess the social and economic effects of the forest industry on certain regional areas in Australia. This project has commenced and is currently in its data collection phase (and hence could not be used as part of this Assessment Report). The overall objective of this project is to provide a comprehensive assessment of how the forest industry contributes to the social and economic wellbeing of regional communities in Australia. The project will be conducted over four years. The project will produce two key outputs:

1. Profiles of socio-economic effects of the industry in different regions, including Tasmania. These profiles will include multiple components for each region, which may be produced and released gradually over time depending on timing of different components of the work.

2. Guidance on assessing socio-economic impact of the industry. This guidance will provide an overview of recommended uses of the data generated in this project, as well as other available evidence, to assess socio-economic impact of the industry in different regions.

Should the Tasmanian Regional Forest Agreement be varied, the Australian and Tasmanian governments have agreed that collection of economic data will continue throughout its term.

Summary and future management of social values

The past five years has seen significant changes to Tasmanian forestry legislation, a changing forestry business environment, and a renewed interest in the Tasmanian forestry sector. The impact of these changes are reflected in the socio-economic data reported.

Submissions to the third independent five-yearly review of the Tasmanian Regional Forest Agreement reflect the broad range of views held in the community with regard to forests. Forests are valued in the community for a range of attributes, from forests as a source of income and job security to broader values encompassing renewable resources, biodiversity, clean air and water.

Over the period of the Tasmanian Regional Forest Agreement, Tasmania's forests have remained accessible for a range of recreational pursuits. Reserved and production forests have become increasingly important as attractors in the emerging Tasmanian visitor economy, particularly in the development of adventure tourism.

Tasmania's forest practices system provides a framework within which to identify and manage historic sites in forests. State and Commonwealth legislation provides further protection for sites of state, national and international significance.

Over the period of the Tasmanian Regional Forest Agreement, it is apparent that there has been a significant reduction in employment in the forest industry, with consequent effects for industry dependent communities and regional service-based economies.

Employment data provides one insight into how communities have been affected, but does not give any insight as to how communities have responded and adapted. The current assessment of the social and economic effects of the forest industry on regional areas in Australia, being conducted by the University of Canberra, will begin to address this gap. Continued collection of socio-economic data is critical to helping communities move forward and for developing policies to suit the community.

A varied Tasmanian Regional Forest Agreement will intend to support the Tasmanian forest industry so that it has a strong and sustainable future and to provide additional certainty to industry and the community. By providing such support, a varied Tasmanian Regional Forest Agreement will seek to maintain a stable regulatory environment, which will assist in providing for socio-economic stability. A varied Tasmanian Regional Forest Agreement will also continue to ensure Tasmania's forests remain accessible for a range of recreational pursuits.

Principles of Ecologically Sustainable Management of forests

This chapter outlines the implementation of the Tasmanian Regional Forest Agreement in relation to the Principles of Ecologically Sustainable Management, which is a requirement of the *Regional Forest Agreements Act 2002* (Cth) (Section 4 (a)(v)). The chapter begins with an explanation of how the internationally developed concept of sustainable development evolved to become Ecologically Sustainable Management of forests, which was used to develop the management framework underpinning Regional Forest Agreements. It then explains how the suitability of the Tasmania's Forest Management System was assessed as a basis for implementing the Tasmanian Regional Forest Agreement and how the implementation of the Tasmanian Regional Forest Agreement is monitored with respect to Ecologically Sustainable Management of forests. The chapter ends with a summary and an explanation of how Ecologically Sustainable Management of forests would continue to be implemented under a varied Tasmanian Regional Forest Agreement.

Development of the concept of Ecologically Sustainable Management

The concept of ecologically sustainable management grew out of the definition of sustainable development provided by the World Commission on Environment and Development (World Commission on Environment and Development 1987). That commission aimed to find ways to reconcile issues about the conservation and sustainable development of natural resources, hence the term 'sustainable development'. 'Ecologically' was later added in the Australian context to emphasise the concern for ecology and protection of the environment and biodiversity (Emmery 1994), giving the term ecologically sustainable development.

In 1990, the Australian Government established working groups, including one to address forest use, as part of the development of an ecologically sustainable development strategy for Australia. The Ecologically Sustainable Development Working Group on Forest Use (Commonwealth of Australia 1991) assessed how the sustainable development concept could be applied to forests, and found that it provided a framework of operational principles that can be applied to forest use and management. Those principles included such aspects as improvement in material and non-material wellbeing, intergenerational equity, maintenance of ecological systems, and protection of biodiversity.

The *National Forest Policy Statement* (Commonwealth of Australia 1992a) brought together the findings and recommendations of the Resource Assessment Commission inquiry into forests, the National Plantations Advisory Committee inquiry into plantations, the Ecologically Sustainable Development Working Group on Forest Use and other background work. When the policy was developed, the term 'development' gave way to 'management' to relate sustainability concepts to Australian forests, perhaps borrowed from the term 'natural resource management' and indicating that in the Australian context management of existing forests, rather than

development of forests *per se*, was generally the focus. The foreword to the *National Forest Policy Statement* accordingly states:

In order to achieve the full range of benefits that forests can provide now and in the future, the Governments have come together to develop a strategy for the ecologically sustainable management of these forests. (Commonwealth of Australia 1992a).

The *Regional Forest Agreements Act 2002* (Cth) (Section 4 (a)(v)) accordingly required that agreements under the act have regard to assessments of, *inter alia*, the principles of ecologically sustainable management as applied to forests, that is, Ecologically Sustainable Forest Management, in the regions concerned. Table 63 provides definitions and shows the evolution of terms associated with sustainability and forests.

Table 63 – Definitions and evolution of terms associated with sustainability and forests (Source: Davey (in prep.).

Term	Definition
Sustainable	Performing an activity such that the activity can continue forever (International Union for Conservation of Nature - The World Conservation Union, United Nations Environment Program & World Wide Fund for Nature 1991).
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainable development provides a framework for the integration of environment policies and development strategies (World Commission on Environment and Development 1987).
Ecologically sustainable development	<p>Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased (Commonwealth of Australia 1992a; Emmerly 1994).</p> <p>The following principles are principles of ecologically sustainable development:</p> <ul style="list-style-type: none"> a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation c) the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making e) improved valuation, pricing and incentive mechanisms should be promoted (EPBC Act 1999: Section 3A).

<p>Ecologically sustainable development (forest)</p>	<p>Guided by the need to optimise the material and non-material benefits accruing to the community from all forest uses, in accord with the principles of equity for both current and future generations (Resource Assessment Commission 1992).</p> <p>The three requirements for sustainable forest use specified by the Ecologically Sustainable Development Working Group on Forest Use are:</p> <ul style="list-style-type: none"> • maintaining the ecological processes within forests (the formation of soil, energy flows, and the carbon, nutrient and water cycles) • maintaining the biological diversity of forests • optimising the benefits to the community from all uses of forests within ecological constraints. <p>These requirements were adopted as principles of ecologically sustainable development for forests by the <i>National Forest Policy Statement</i> (Commonwealth of Australia 1992a).</p>
<p>Sustainable forest management</p>	<p>The definition of sustainable forest management has changed over time:</p> <p>Multipurpose management of the forest so that its overall capacity to provide goods and services is not diminished (Food and Agriculture Organization 1993).</p> <p>Management regimes applied to forest land which maintain the productive and renewal capacities as well as the genetic, species and ecological diversity of forest ecosystems (Aird 1994).</p> <p>The practice of stewardship and use of forests and forest lands in such a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity and vitality, and their potential to fulfil, now and in the future, relevant ecological, economic and social functions at local, national and global levels, and that does not cause damage to other ecosystems (Food and Agriculture Organization 2000; Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013).</p> <p>A set of objectives, activities and outcomes consistent with maintaining or improving the forest's ecological integrity and contributing to people's wellbeing now and in the future (Montréal Process Implementation Group for Australia 2008, Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013).</p> <p>As a dynamic and evolving concept, aims to maintain and enhance the economic, social and environmental benefits of all types of forests and, as such, can significantly contribute to addressing climate change, desertification, forest and land degradation, forest biodiversity and soil and water conservation (United Nations 2009).</p>
<p>Ecologically Sustainable Forest Management</p>	<p>The integration of commercial and non-commercial values of forests so that the welfare of society (both material and non-material) is improved, while ensuring that the values of forests, both as a resource for commercial use and for conservation, are not lost or degraded for current and future generations (Joint Commonwealth and Victorian Regional Forest Agreement Steering Committee 1996, 1997; Australian Government 2000, Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013).</p>
<p>Sustainable use</p>	<p>The use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations (United Nations 1992).</p>

Ecologically sustainable use	Use of natural resources within their capacity to sustain natural processes, while maintaining the life-support systems of nature and ensuring that the benefit of the use to the present generation does not diminish the potential to meet the needs and aspirations of future generations (EPBC Act 1999: Section 528; Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2013).
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Ecologically sustainable management principles in Regional Forest Agreements

As described above, Regional Forest Agreements were pre-figured in the *National Forest Policy Statement*. Their aim is to provide long-term strategic and holistic plans that implement the principles of ecologically sustainable management for forests in the main timber production regions. The principles, provided at Appendix C, were considered during the Comprehensive Regional Assessment process for the Tasmanian Regional Forest Agreement, leading to seven specific and two general principles being identified as the basis for ecologically sustainable forest management under the agreement (Tasmanian Public Land Use Commission 1997a). Public transparency, monitoring, compliance, scientific and technical basis and review mechanisms, with the principles, were used to assess ecologically sustainable forest management for the Tasmanian Regional Forest Agreement. The definition of Ecologically Sustainable Forest Management (Table 63) was used to incorporate and implement Ecologically Sustainable Forest Management in the agreement. Ecologically sustainable management can be operationally defined as the management of forest on all land tenures to maintain the overall capacity of forests to provide goods, protect biodiversity, and protect the full suite of forest values at the regional level. It requires a variety of mechanisms: implementation of a comprehensive, adequate and representative reserve system, complementary off-reserve management, consideration of economic and social factors and monitoring through performance indicators.

The seven specific principles are:

- Principle 1 – Maintain and enhance long-term socio-economic benefits
- Principle 2 – Protect and maintain biodiversity
- Principle 3 – Maintain the productive capacity and sustainability of forest ecosystems
- Principle 4 – Maintain forest ecosystem health and vitality
- Principle 5 – Protect soil and water resources
- Principle 6 – Maintain forests’ contribution to global carbon cycles
- Principle 7 – Maintain natural and cultural heritage values (Appendix C).

The two general principles are overarching principles regarding sustainability expressed as ‘planning and management of forests should maintain the suite of forest values for present and future generations’ and the ‘precautionary principle’.

Maintain the full suite of forest values for present and future generations. This principle addresses the issue of intergenerational equity, that is, that forests be managed to meet present needs without compromising the ability of future generations to meet their own needs (Young 1993). It provides the context in which all other principles must be considered. Whilst there can be a range of interpretations of intergenerational equity, the Brundtland Report (World Commission on Environment and Development 1987) expresses the relevance of this concept to sustainability and the long-term management of forests.

Humanity has the ability to make developments sustainable - to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. (Young 1993)

Maintain and enhance long-term multiple socio-economic benefits to meet the needs of societies. The basis of this principle is the promotion of forest-related economic activity which is consistent with the maintenance of the environment and satisfaction of the socio-economic requirements for income, employment, goods and services. Implicit in this principle is the optimum use of the forest economy's capital stock (human, man-made and natural resource capital) through management so as to maximise the long-term welfare or benefit of society in terms of goods and services it requires. The forest economy covers timber and other forest products and uses, water supply, minerals, grazing, recreation and tourism.

Protect and maintain biodiversity. The maintenance of biodiversity is fundamental to achieving ecologically sustainable forest use (Commonwealth of Australia 1991, 1992b). In the *National Forest Policy Statement*, biodiversity is defined as the variety of all life forms, the plants, animals and micro-organisms, the genes they constitute, and the ecosystems they inhabit. Incorporated into the concept of biodiversity is variation occurring at the ecosystem, species and genetic levels.

Maintain the productive capacity and sustainability of forest ecosystems. The concepts of productive capacity and sustainability of forests underpin this principle. Productive capacity covers the ability of a forest to produce biomass. Sustained production of biomass by forest ecosystems, whatever its fate (whether utilised by man or as part of nutrient and energy cycles), is essential to the well-being of all living things. The productive capacity of a forest can be influenced through the silvicultural regime and other management activities. Implicit in the term sustainability is the understanding that irreversible damage through resource use is not imposed on the capacity of the forest to supply goods or services to present and future generations (Ferguson et al. 1996). Sustainable yield of forest products underpins this principle.

Maintain forest ecosystem health and vitality. This principle reflects the concept of ecological integrity whereby the health and vitality of an ecosystem is maintained under changing environmental conditions. Structural and functional changes can occur in ecosystems as a result of threatening processes, such as land clearing, fire, pollution, pests and diseases. These can cause significant shifts in species composition, loss of key biological components such as decomposers, pollinators or food chain relationships, or the degradation of ecosystem processes (soil formation, energy flows and the carbon, nutrient and water cycles). Consideration of ecological integrity means determining thresholds of environmental change whereby each threshold results in a reorganisation of the ecosystem to a different but

appropriate level. The properties and processes of forest ecosystems over management periods become important considerations for maintaining ecological integrity over time.

Protect soil and water resources. Forests contribute significantly to the maintenance and conservation of the soil resource; they afford water catchment protection, and maintain the quality and quantity of water.

Maintain forest contribution to global carbon cycles. Carbon is stored in Australian forests as living plant and animal biomass and dead organic matter in the form of forest debris. As a general rule, carbon is accumulated and stored in forests that are growing and which, as a consequence, contribute positively to carbon storage. Forests in which carbon is accumulated through photosynthesis but offset by the loss of carbon resulting from biomass, decomposition or death, are carbon neutral. Generally, forests that make a negative contribution to carbon storage are those where the disturbance interval is reduced whether through natural disturbance, such as a bushfire, or in forests subject to heavy soil disturbance.

Maintain natural and cultural heritage values. Heritage encompasses archaeological sites, historic places and customs (cultural heritage), and natural values or objects (natural heritage) that are of aesthetic and social values and passed down to the present generation from past generations. Management of national estate and world heritage values and indigenous heritage are important considerations in this principle.

Utilise the precautionary principle for prevention of environmental degradation. The incorporation of the precautionary principle into decision making has been endorsed by state and Commonwealth governments (Commonwealth of Australia 1992a, 1992b) and is defined as 'where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.' In applying the precautionary principle, public and private decisions should be guided by:

- careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment
- an assessment of the risk-weighted consequences of various options.

In interpreting this principle, particular attention was paid to processes based on 'risk assessment' and 'risk management' strategies. Such processes are important to minimise environmental impacts and avoid serious or irreversible damage to the environment. The 'precautionary principle' has been applied by Tasmanian agencies to provide for the prevention of environmental degradation, and especially to the consideration of Tasmanian processes for forest management dealing with risk assessment and management.

The nine principles were delivered through the accredited Tasmanian Forest Management System, which ensures an extensive comprehensive, adequate and representative reserve system for the conservation of forest and non-forest vegetation communities in perpetuity through secure land tenures, while at the same time as implementing Ecologically Sustainable Forest Management on the public and private forest estate to provide for wood and non-wood products, ecosystem services and other societal benefits.

Ecologically sustainable management of Tasmanian forests before the Regional Forest Agreement

An Independent Expert Advisory Group assessed the ecological sustainability of Tasmania's Forest Management System prior to 1997 as part of the development of the Tasmanian Regional Forest Agreement (Tasmanian Public Land Use Commission 1997a). Its final assessment was informed by outcomes of public meetings and 38 written submissions based on its preliminary assessment (Tasmanian Public Land Use Commission 1996b). Based on the preliminary report (preliminary recommendation 1.11) the Tasmanian Government finalised a 'Maintaining a Permanent Forest Estate' policy in relation to intensive forest management, forest clearing and plantation development on a state-wide basis. Preliminary analysis of Tasmania's Forest Management System and processes identified management gaps associated with conservation management on private forests particularly in terms of implementation of the comprehensive, adequate and representative reserve system on private forests required for the achievement of Ecologically Sustainable Forest Management. As a consequence, the Australian and Tasmanian governments released a discussion paper on achieving conservation management on private forested land (Tasmanian Public Land Use Commission 1996c).

The Independent Expert Advisory Group noted in its final report that assessing Ecologically Sustainable Forest Management 'is not a simple task. There is no established system of weights to be given to the various principles or criteria, nor are there standards against which they can be judged...The only practical approach is to determine the current status of management systems and processes and to recommend actions for their continual improvement.'

The Independent Expert Advisory Group made qualitative assessments of the contemporary Tasmanian Forest Management System against the Ecologically Sustainable Management principles and assessment criteria, and recommended improvements to Tasmania's Forest Management System where necessary.

The recommendations made by the Independent Expert Advisory Group related to the seven specific principles expressed in five components of Tasmania's forest management system, which were:

- the commitment (including legislation) and the policy framework (nine recommendations)
- planning (25 recommendations)
- implementation (nine recommendations)
- monitoring and compliance (13 recommendations)
- review and improvement (five recommendations).

The Independent Expert Advisory Group concluded that Tasmania's Forest Management System in 1997 met many of the expectations of a system designed to achieve Ecologically Sustainable Forest Management (Tasmanian Public Land Use Commission 1997a).

Ecologically Sustainable Forest Management within the Tasmanian Regional Forest Agreement

The Tasmanian Regional Forest Agreement defines Ecologically Sustainable Forest Management as forest management and use in accordance with the specific objectives and policies for ecologically sustainable development as detailed in the 1992 *National Forest Policy Statement* (Commonwealth of Australia 1992a).

Clause 62 of the Tasmanian Regional Forest Agreement notes that Ecologically Sustainable Forest Management 'is an objective which requires a long term commitment to continuous improvement and that the key elements for achieving it are the:

- establishment of the comprehensive, adequate and representative reserve system
- development of internationally competitive forest products industries
- establishment of fully integrated and strategic forest management systems capable of responding to new information' (Commonwealth of Australia & State of Tasmania 1997).

The Tasmanian Government committed to Ecologically Sustainable Forest Management on both public and private land through the ongoing development and implementation of its Forest Management System, in accordance with the Independent Expert Advisory Group's recommendations. The Australian Government subsequently accredited Tasmania's Forest Management System including improvements, and public reporting and consultative mechanisms, as providing for Ecologically Sustainable Forest Management. Many of the Independent Expert Advisory Group's recommendations and insights were considered and incorporated in finalising the text of the Tasmanian Regional Forest Agreement.

Forest Management Systems in Regional Forest Agreements are the State's suite of legislation, policies, codes, plans and management practices (as described in the Comprehensive Regional Assessment report assessing these) and the amendments and improvements to the Forest Management Systems expressed in the Regional Forest Agreement. States, which are parties to a Regional Forest Agreement, agreed that in providing for Ecologically Sustainable Forest Management their Forest Management Systems would be amended to reflect the undertakings made in the agreements and in particular those undertakings specified in an attachment or supporting document. In all Regional Forest Agreements, failure by the state to comply with this is grounds for termination of the agreement by the Commonwealth.

The Tasmanian Forest Management System is that described in the *Tasmanian-Commonwealth Regional Forest Agreement Background Report Part E: Assessment of Ecologically Sustainable Forest Management Systems and Processes: Independent Expert Advisory Group -Preliminary Report* published by the Tasmanian Public Land Use Commission November 1996, and amended by the Agreement. The final report (Background Report Part G) is used to help interpret improvements and amendments to the Forest Management System expressed in the Tasmanian Regional Forest Agreement. Improvements and amendments to the Forest Management System expressed in the Tasmanian Regional Forest Agreement directly relate to the provision for Ecologically Sustainable Forest Management and use of forests in Tasmania. Clause 64 of the current Tasmanian Regional Forest Agreement commits Tasmania to improve the Forest Management System and to provide for Ecologically Sustainable Forest Management.

Amendment and improvements to the system are made in the Agreement and include those specified in Attachment 10.

Commitments related to the system are addressed in and informed by Clauses 26, 30–42, 57–73, 78–83, 88–91, 93, 94 and 96–98 of the current Tasmanian Regional Forest Agreement and their associated Attachments 1, 2 and 4–14. The intent of Part 3 of the Tasmanian Regional Forest Agreement is the creation of legally enforceable rights and obligations. Clauses 93, 94 and 96–98 found in this Part are related to the Forest Management System. Failure of the state to comply with clauses 58, 60, 64, 68 or 73 (including Attachments 2, 8, 9, 10 and 11) are grounds for the Commonwealth to terminate the Tasmanian Regional Forest Agreement (Clause 102).

Clauses 62 and 63 of the current Tasmanian Regional Forest Agreement commit the Parties to Ecologically Sustainable Forest Management and a commitment to continuous improvement based on the key elements of a comprehensive, adequate and representative reserve system, a competitive forest products industry providing social and economic benefit and a fully integrated and strategic Forest Management System covering public and private land. The management and amendment of the comprehensive, adequate and representative reserve system (including prescription components) is an integral component of the Forest Management System (Clauses 24, 51 and 53 and associated Comprehensive, Adequate and Representative Attachments 6 and 7).

Clauses 58 to 60 of the current Tasmanian Regional Forest Agreement cover commitments associated with conservation and management of private lands (Attachment 8) and maintaining a permanent forest estate (Attachment 9). Attachments 8 and 9 resulted from gaps identified during the Independent Expert Advisory Group's assessment of ecologically sustainable forest management systems and processes.

Clauses 65 to 67 of the current Tasmanian Regional Forest Agreement cover Commonwealth accreditation of Tasmania's approach to its Forest Management System and process for determining the sustainable yield of high quality sawlogs from public land. Clause 98 requires the State to review the sustainable high quality sawlog supply levels to coincide with the independent five-yearly reviews of the Tasmanian Regional Forest Agreement. Clauses 74–82, supported by Attachment 12, deal with social and economic development of forest-related industries. Commitments to developing and reporting sustainability indicators are made in Clause 91. Commitments by the state to the publication and making publicly available annual compliance audits of the Forest Practices Code and code of reserve management (Attachment 10) and five year review of the codes are made in clause 94.

Clauses 68 to 71 of the current Tasmanian Regional Forest Agreement cover the systems, processes and prescriptions applying to priority species (Attachment 2) with Clauses 69 and 71 linked to the legally binding clause 96 and 97 in Part 3 of the Agreement. Changes to Priority Species (Attachment 2) including new or altered management prescriptions and the databases and management documents that support these are made in clauses 96 and 97. A requirement in the Tasmanian Regional Forest Agreement was for the State to apply and implement management prescriptions or actions from Recovery Plans or Threat Abatement Plans as a priority (Clause 70). Parties to the RFA recognised that management prescriptions applying to Priority Species would change (Clause 71) due to species status, new information or evolving forest management practices and that any alterations in prescriptions would be in accordance

with processes described in Clause 96. Accordingly such changes would inform the updating of databases and documents referred to in Clause 97. Related to these are the commitments made associated with threatened species and communities, including processes associated with recovery plans (Clauses 30–38).

The purpose of Clauses 68–71, 96 and 97 of the current Tasmanian Regional Forest Agreement were to continually improve management practice and prescriptions in forests subject to harvesting through the Forest Practices System on public and private land. Implicit was the ‘management of risk/uncertainty’ and adequacy of maintenance of populations of Priority Species at acceptable levels in landscapes, regions, intrastate and/or interstate. The meaning of Clauses 68, 70, 96 and 97 of the current Tasmanian Regional Forest Agreement were updated and clarified in a variation to the Tasmanian Regional forest Agreement made 23 February 2007. Continuous improvement of management prescriptions was envisaged through development and review of Recovery Plans and research on species to underpin requirements for Recovery Plans and the effectiveness of these Plans (RFA: Attachment 13 (1)).

In Clause 93 of the current Tasmanian Regional Forest Agreement the state agreed to the development of environmental management systems in accordance with principles outlined in Attachment 5 and that the objective for state forests is system certification comparable with the ISO 14000 series. The precautionary principle is relevant to environmental risk management and forms a component of environmental management systems. Such systems provide a systems-based approach to defining and implementing steps for managing environmental risks. The requirement for forest managers to implement environmental management systems on forest lands helps with management of environmental risk and uncertainty.

The first independent five-yearly review of the Tasmanian Regional Forest Agreement by the Resource Planning and Development Commission (Resource Planning and Development Commission 2002a) provided a comprehensive analysis of commitments in the Agreement. Section 4 of the review provided an analysis of progress of improving the forest management system and ecologically sustainable forest management. In general most of the obligations of amending and improving the system had been met or were being satisfactorily progressed. The Commission stated ‘the primary tools for Ecologically Sustainable Forest Management are the *Forest Practices Act 1985* (Tas) and Forest Practices Code, the use of environmental management systems and the state-wide natural resource management framework. All of these tools require genuine commitment to continuous improvement by all concerned. Substantial further improvement in the short to medium term is still necessary to reflect that level of commitment. Supporting these tools is the policy on maintaining a Permanent Forest Estate. The Commission considers that progress on Ecologically Sustainable Forest Management has met the terms of the Tasmanian Regional Forest Agreement. The commitment of the Parties is clear and unequivocal.’ Many of the 30 recommendations arising from the review were associated with improving aspects of the Forest Management System and Ecologically Sustainable Forest Management (Appendix D).

Except for the Commission’s Recommendation 4.5, the 2005 *Supplementary Tasmanian Regional Forest Agreement* (Tasmanian Community Forest Agreement, 13 May 2005) agreed to fully implement the actions recommended in the Commission’s Final Recommendations Report of the five-yearly review. Additional improvements and amendments to the Forest Management System were also agreed in the *Supplementary Tasmanian Regional Forest Agreement*. Clauses

20–29 dealt with private land reservation, Clauses 30–34 dealt with forest management associated with old growth silviculture and intensive forest management, Clauses 38–41 deal with the use of 1080 and wildlife management, while clauses 45–50 deal with native vegetation clearing and conversion.

Tasmanian Community Forest Agreement

The 2005 *Supplementary Tasmanian Regional Forest Agreement* was developed to implement the commitments arising from the 2005 *Tasmanian Community Forest Agreement*. The 2005 *Supplementary Tasmanian Regional Forest Agreement* committed to adding approximately 141 000 hectares to the comprehensive, adequate and representative reserve system, aimed mainly at old growth forests (Commonwealth of Australia and the State of Tasmania 2005). The 2009–10 agreement implementation report (Commonwealth and the State of Tasmania 2010) confirmed both that the additional area had been added to the comprehensive, adequate and representative reserve system, and that the commitment target to reserve old growth forests on public land had been reached. The area of Regional Forest Agreement old growth forest protected in formal and informal reserves on public land reached 966 860 hectares in 2011. Also, \$43 million had been expended to secure 28 023 hectares of under-reserved forest types on private land; 11 039 hectares of that forest was classified as old growth.

The agreement committed to revising the Permanent Native Forest Estate Policy so that:

- An overall cap was placed on clearing or conversion of native forest on both public and private land to retain 95 per cent of the 1996 area of native forest.
- Broad scale clearing and conversion of native forest on public land was agreed to be phased out by 2010.
- Broad scale clearing and conversion of native forest on private land was to be phased out over a period of ten years from the date of the agreement.
- Assessment criteria for regulating forest clearing and conversion were to be developed to ensure the protection of regional biodiversity and water quality values and to meet salinity objectives.

The revised policy was completed in 2005–06 and amended in 2007 and 2009 (Commonwealth and Tasmanian Governments 2010). The 2009 policy required all broad-scale clearing to end in 2015. A full review of the Tasmanian Permanent Native Forest Estate Policy was recently completed resulting in an amended policy which came into effect on 30 June 2017.

Other agreement initiatives included \$2 million provided towards research into alternatives to clear-felling. The alternatives to clear-felling research was completed in 2010, having enabled the development of variable retention silviculture as an alternative to clear-felling, as described in the Variable Retention Manual (Forestry Tasmania 2009b).

The agreement also supported a component of the Tasmanian Devil Facial Tumour Disease program; this was completed in 2006–07.

Ecologically Sustainable Forest Management in Tasmanian Regional Forest Agreement reviews

The first independent five-yearly review of the Tasmanian Regional Forest Agreement identified 90 specific milestones and commitments in the Tasmanian Regional Forest Agreement that contributed in various ways to Ecologically Sustainable Forest Management. The review found that 78 commitments had been completed or substantially progressed and eight had been started (Resource Development and Planning Commission 2002a). Key elements of Ecologically Sustainable Forest Management achieved in the first five years were found to be establishment of the Natural Resource Management framework for Tasmania, including proclamation of the *Natural Resource Management Act 2002* (Tas), and the establishment of regional natural resource management committees and strategies. Tasmania had completed documenting fire management, nature-based tourism and recreational management, cultural heritage and forest pest and disease management policy frameworks. A *Threatened Species Protection Strategy* was released in 2000, and management plans for all state forest and most National Parks had been completed. Except for Recommendation 4.5, the *Supplementary Tasmanian Regional Forest Agreement* (13 May 2005) agreed to fully implement the actions recommended in the Final Recommendations Report of the five-yearly review.

The second independent five-yearly review (Ramsay 2008) revisited the number of commitments, added the 2002 review recommendations and new commitments within the 2005 *Supplementary Tasmanian Regional Forest Agreement*, which gave a total of 159 commitments and recommendations to be considered. The review found that 41 of those had been completed in the review period (2002–2007), 44 were being implemented, 61 were ongoing commitments that had been met during the review period, eight were no longer required, four were not yet required to commence, and one had not commenced. An interim review of sustainable sawlog supply from public forest, a fundamental component of Ecological Sustainable Forest Management, was published in 2005, and the *Forest Practices Act 1985* (Tas) and Forest Practices Regulations 1997 had been amended as recommended by the first review.

The third independent five-yearly review of the Tasmanian Regional Forest Agreement provided considerable comment about Ecologically Sustainable Forest Management in Tasmania (see pages 21 to 50) (Kile 2015). While the third five-yearly review assessed compliance with the agreement in the third period, 2007–2012, it was undertaken with a focus on the outcomes of the agreement over the first 15 years and a view to the future in terms of improvements to strengthen the Regional Forest Agreement framework in a renewed or extended Regional Forest Agreement. From a compliance perspective, the focus was mainly on the governments' responses to the 2007 Review and any identified areas of non-performance. The review indicates that over 90 per cent of the 231 specific actions, commitments or recommendations then identified had been completed, implemented or superseded. The independent reviewer concluded that commitments in the Tasmanian Regional Forest Agreement relating to Ecologically Sustainable Forest Management had largely been achieved. He determined that important improvements had been made to the Ecologically Sustainable Forest Management framework, such as decision-support tools for the Forest Practices Code, and implementation of a smoke management system, variable retention silviculture, and alternative methods for the control of browsing animals.

Implications of the processes associated with the Tasmanian Forest Agreement and Tasmanian Wilderness World Heritage Area extensions 2011–2013 were not considered in the third five-yearly review of the Tasmanian Regional Forest Agreement. The recommendations by the independent reviewer for the third five-yearly review of the Tasmanian Regional Forest Agreement relating to Ecologically Sustainable Forest Management were considered in the *Joint Australian and Tasmanian Government Response to the Review of Implementation of the Tasmanian Regional Forest Agreement for the Period 2007-2012* (Australian Government and Tasmanian Government 2016), and their status as at 2016 is as follows:

Recommendation 2 – The [Tasmanian Government] considers continuing improvements to transparency in the development of Forest Practice Plans and the accessibility to non-private information for these plans.

The Parties agree that transparency and access to information is important in the management of forests on both public and private land.

Forest Practices Plans are developed by applicants in accordance with the Forest Practices Act 1985 (Tas), the Forest Practices Regulations 2007, the Forest Practices Code and associated planning tools. This information, and the procedures used by forest planners and forest practices officers, are available on the Forest Practices Authority website (Forest Practices Authority 2011b).

The State will continue to provide access to Forest Practices Plans through the Forest Practices Authority, and will continue to refer enquiries on the preparation of draft documents and background material directly to Forest Practices Plan applicants.

The State will continue to seek opportunities to improve transparency in the development of Forest Practices Plans following consultation with the Forest Practices Authority Board and the Forest Practices Advisory Council.

Recommendation 3 – The [Tasmanian Government] reassess the process and timeframe for completing the management plans for Rocky Cape, Mount William and Savage River National Parks with a view to their completion as soon as possible.

The State commits to progressing appropriate management planning arrangements for Rocky Cape National Park, Mount William National Park and Savage River National Park.

The State is working with the Aboriginal Heritage Council to progress an agreed approach to management planning for national parks and reserves, including Rocky Cape National Park and Mount William National Park, which are of significant interest to the Tasmanian Aboriginal community.

The State is committed to finalising the Savage River National Park Management Plan. A draft plan has been prepared (Parks and Wildlife Service Tasmania 2001).

Recommendation 4 – The [Australian and Tasmanian governments] seek opportunities to encourage greater involvement of the Aboriginal community in management planning and forest stewardship during the [Tasmanian Regional Forest Agreement] ... extension process.

The Parties are committed to meaningful consultation on forest management, including consultation with Aboriginal community members who have relevant interests.

Parties invited public comments during the third five-yearly review of the Tasmanian Regional Forest Agreement to inform the extension process. Submissions were sought from the Aboriginal community through advertising in the Koori Mail (22 April 2015) and other media outlets

The State has improved its consultation processes with the Aboriginal community in forest management planning and stewardship since the third five-yearly review reporting period (2007–2012). The Forest Practices Authority released the Resource guide for managing cultural heritage in wood production forests in 2012, and the more recent Procedures for Managing Aboriginal Cultural Heritage when preparing Forest Practices Plans, to provide specific guidance on the process to be undertaken if Aboriginal cultural heritage is discovered or suspected during forest management planning processes. Forest Practices Officer training courses covering Aboriginal cultural awareness and management of Aboriginal cultural heritage have been instigated in 2015, with significant input from Aboriginal Heritage Tasmania and delivery by members of the Aboriginal community.

The establishment of the Interim Aboriginal Heritage Council in 2012 and its expansion as the Aboriginal Heritage Council in 2015 provides a formal mechanism for broad-based consultation with Tasmanian Aboriginal organisations and groups on relevant issues.

Recommendation 5 – The [Tasmanian Government] builds on its existing monitoring framework to develop a long-term forest condition monitoring system across all forest tenures to assess changes in ecosystem health and vitality.

The Parties recognise that a state-wide forest monitoring information system would be a valuable tool to assess and monitor changes in ecosystem health and vitality.

Through the Australian and Tasmanian State of the Forests Report series, the Parties identify the scale and impact on forest health from a variety of processes and agents, both natural and human-induced.

The State's public forest managers have a range of monitoring systems that cover different aspects of the forest estate. The information from these systems is used to inform adaptive management and continuous improvement approaches to the management of Tasmanian forests.

The State agrees to consider implementing a state-wide forest monitoring information system. This would likely require greater integration of existing systems and the development of new tools to assist in the long-term monitoring of forest condition and biodiversity, including threatened species.

Recommendation 6 – The [Australian and Tasmanian governments] continue to improve the mechanisms in place to research, evaluate and communicate outcomes for the protection of threatened species and biodiversity across all forest tenures.

The Parties recognise that improved research, evaluation and communication mechanisms can contribute to improved outcomes for threatened species and biodiversity, and agree to

continue to improve these mechanisms as part of an adaptive management framework. Opportunities for outcomes focused monitoring and reporting will be considered as part of the extension process.

The Parties are committed to protecting and improving the conservation of Tasmania's threatened species and will continue to work together in the development and implementation of conservation advices and recovery plans. In signing the Memorandum of Understanding for the implementation of a common assessment method for the listing of threatened species and ecological communities, the Parties have committed to improving cross-jurisdictional consistency in the assessment of threatened species status.

The Threatened Species Commissioner, appointed by the Commonwealth Government, is also working collaboratively with all levels of government, scientists, the non-profit sector, industry and the community to deliver better outcomes for threatened species across all tenures. The Commissioner is currently focused on achieving the targets set out in Australia's first Threatened Species Strategy (Australian Government 2015).

The State continues to prepare listing statements and notesheets for threatened species, and makes this information widely available through the Threatened Species Link (Department of Primary Industries, Parks, Water and Environment 2017d)—a website designed to provide advice on how to manage threatened species in Tasmania.

The status, extent and required conservation measures for threatened fauna species are regularly reviewed by the State, in accordance with the Agreed Procedures for the Management of Threatened Species under the Forest Practices System (Department of Primary Industries, Parks, Water and Environment and the Forest Practices Authority 2014d). These measures are made available through the Threatened Fauna Adviser (Department of Primary Industries, Parks, Water and Environment and the Forest Practices Authority 2017e)—a decision-support system to advise on the management of threatened fauna in wood production forests in Tasmania. An equivalent adaptive management tool is being developed by the Forest Practices Authority for threatened flora.

Recommendation 7 – The [Australian and Tasmanian governments] consider the development of a resourced and prioritised Research and Development Plan as part of the [Tasmanian Regional Forest Agreement] ... extension.

The Parties support investment in research and development. The need to include a resourced and prioritised Research and Development Plan will be considered as part of the extension process to the Tasmanian Regional Forest Agreement.

The Parties note that investment in Australian forestry and forest product related research and development has reduced in recent years. The Parties consider that the prioritisation and coordination of applied forest and wood product related research and development should be led by industry. Forest and Wood Products Australia is the industry-owned research and development corporation that coordinates private and government investment in the forest and wood products industry, with prioritisation of applied research and development through a consultative process. The Commonwealth provides matching funding to Forest and Wood Products Australia for their spending on eligible research and development activities. In 2014-15, the Commonwealth provided \$3.3 million.

The State's public forest managers have a range of monitoring systems that cover different aspects of the forest estate. The information from these systems, such as effectiveness monitoring of existing management prescriptions, is used to inform adaptive management and continuous improvement approaches to the ecologically sustainable management of Tasmanian forests. The State is reviewing its approaches to forest related research and development as part of its broader forest policy and industry growth planning being undertaken throughout 2016.

Recommendation 8 – The [Australian and Tasmanian governments] ensure any future prescriptions for harvesting non-merchantable biomass from native forest coupes are developed and monitored using the available scientific knowledge.

The Tasmanian Regional Forest Agreement provides for the Ecologically Sustainable Forest Management and use of forests in Tasmania. Ecologically Sustainable Forest Management is implemented through the suite of legislation, policies, codes, plans and management practices in the State's Forest Management System. The system is also underpinned by adaptive management and continuous improvement processes.

The Parties agree the results of monitoring and research will continue to be used by the State to refine and improve the State's Forest Practices Code provisions, guidelines and planning tools. Where new prescriptions are developed in relation to management of forest residues, these will be based on available scientific knowledge. They will provide for regeneration, nutrient preservation and biodiversity, and be incorporated into appropriate Forest Practices planning tools

Recommendation 9 – The [Tasmanian Government] considers matters raised in submissions to this review, in relation [to] the [Permanent Native Forest Estate Policy], as part the 2015 ... [Permanent Native Forest Estate Policy] review and the outcomes be incorporated in any revised [Permanent Native Forest Estate Policy] and recognised in [an] ... extended [Tasmanian Regional Forest Agreement].

The Parties acknowledge that maintaining an extensive and permanent native forest estate is a key conservation goal identified in the 1992 National Forest Policy Statement (Commonwealth of Australia 1992a) and is one of the primary elements to achieve Ecologically Sustainable Forest Management. The Tasmanian Regional Forest Agreement provides for this through the State's Permanent Native Forest Estate Policy (Department of State Growth 2016a), which has been given statutory effect across public and private land under the Forest Practices Act 1985 (Tas).

On 1 August 2015, the State commenced a review of the Permanent Native Forest Estate Policy, with a four week public consultation period. On 23 December 2015, the State announced an extension to the review to explicitly take account of this recommendation. The extension of the Permanent Native Forest Estate Policy review will ensure that matters raised in public submissions to both the Permanent Native Forest Estate Policy and the third five-yearly Tasmanian Regional Forest Agreement reviews are comprehensively considered by the State.

The Parties agree that the maintenance of a permanent native forest estate should continue to be part of the Tasmanian Regional Forest Agreement.

Recommendation 10 – The Parties follow-up on their response to the 2007 Review to ensure that compatibility of the RFA with Commonwealth heritage protection legislation is considered as part of the RFA renewal/ extension process.

The Environment Protection and Biodiversity Conservation Act 1999 (Cth) was amended in 2003 to include ‘national heritage places’ as a matter of national environmental significance. This amendment came into effect on 1 January 2004.

The Parties agree to review the compatibility of the Tasmanian Regional Forest Agreement with current Commonwealth and State legislative frameworks.

Recommendation 11– The Parties continue to include regular reviews of the sustainable sawlog yield as an element of a renewed/extended RFA.

The Parties agree that sustainable yield from the public production forests of Tasmania requires regular reviews to provide confidence to all stakeholders on the reliability of the volumes allocated to wood processing industries to achieve Ecologically Sustainable Forest Management.

The Parties agree that regular reviews of the sustainable yield, taking into account changing biotic and abiotic risk factors, should continue to be part of the Tasmanian Regional Forest Agreement. The most recent review of sustainable yield was published in March 2014 and is available on Forestry Tasmania’s website.

Recommendation 12 – The State ensures matters raised in submissions to this review in relation to the management, supply and marketing of special species timbers be considered through the development of the new State special species timber management plan and the outcomes recognised in a renewed/extended RFA.

The State agrees to consider the matters raised in the submissions to the Independent Review about special species timbers, as part of the development of a special species management plan.

Under the Forestry (Rebuilding the Forest Industry) Act 2014 (Tas) a special species management plan is required to be developed by October 2017. The State has commenced the process of developing this plan and is preparing a draft plan for public consultation in accordance with the legislation. The legislation requires the plan to specify a range of matters, including the species and land to which the plan applies, and established supply levels.

Recommendation 14 – The Parties support an updated socio economic analysis as part of the RFA renewal/ extension process and periodic collection of socio economic data during the term of a renewed/extended RFA.

The Parties recognise the importance of socio economic data and support the periodic collection of robust data. The Parties will consider the need for updated socio economic analyses as part of the Tasmanian Regional Forest Agreement extension process.

The Parties note that they collect and report on socio economic data through the Australian and Tasmanian State of the Forests Report series. Additional economic data are

provided in a range of reports including Australian forest and wood products statistics, Australian plantation statistics, National Wood Processing Survey and the Census of Population and Housing.

The Parties agree that periodic collection of socio economic data should continue throughout the term of the Tasmanian Regional Forest Agreement.

Recommendation 15 – The State considers improved mechanisms for the protection of Aboriginal cultural heritage as part of the RFA renewal/extension.

The State is committed to acknowledging and managing Aboriginal cultural heritage. This includes supporting regulatory and non-regulatory mechanisms for heritage protection, in addition to community engagement and public education. This approach is broad-based and designed to guide land management across all tenures. It will inform mechanisms to protect Aboriginal cultural heritage as part of the Tasmanian Regional Forest Agreement extension.

The State acknowledges that significant efforts to develop contemporary legislative protection mechanisms, arising in part from commitments associated with Tasmanian Regional Forest Agreement five-yearly reviews, failed to gain passage through both Houses of the Tasmanian Parliament in 2013. The State, however, remains committed to ongoing dialogue with the Tasmanian Aboriginal community. In particular the Aboriginal Heritage Council provides a formal mechanism for broad-based consultation with Tasmanian Aboriginal organisations and groups on relevant issues.

The State has improved its consultation processes with the Aboriginal community in forest management planning and stewardship since the third five-yearly review reporting period (2007 – 2012). The Forest Practices Authority released Resource guide for managing cultural heritage in wood production forests in 2012, and the more recent Procedures for Managing Aboriginal Cultural Heritage when preparing Forest Practices Plans, to provide specific guidance on the process to be undertaken if Aboriginal cultural heritage is discovered or suspected during forest management planning processes. Forest practices officer training courses covering Aboriginal cultural awareness and management of Aboriginal cultural heritage have been instigated in 2015, with significant input from Aboriginal Heritage Tasmania and delivery by members of the Aboriginal community.

Hawke’s Review of Regional Forest Agreements and the EPBC Act

The Hawke review (2009) of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) noted that each Regional Forest Agreement provided for accreditation of ecologically sustainable forest management systems, with an emphasis on continuous improvement and adaptive management. It concluded that therefore Regional Forest Agreement reviews should focus on the performance of a state's Ecologically Sustainable Forest Management framework in delivering sustainable forest management systems. The result of the Regional Forest Agreement reviews could then be re-accreditation of the state's Ecologically Sustainable Forest Management framework for the purposes of the EPBC Act. Having assessed the circumstances when agreements could be extended while satisfying the requirements of that EPBC Act, Hawke recommended that the Act should apply, that is, the agreement should not

be extended, if the Environment Minister was satisfied that serious non-performance of the Regional Forest Agreement had occurred. Serious non-performance in this context would be indicated by several criteria including:

- failure to implement and maintain forestry codes of practice
- failure to commit to and implement recovery plans for listed threatened species in RFA areas
- failure to establish management plans for comprehensive, adequate and representative reserves
- failure of the Ecological Sustainable Forest Management framework to protect species (Hawke 2009).

These four criteria are intrinsically linked to implementing Ecologically Sustainable Forest Management in regional forest agreements and the application of Principles of Ecologically Sustainable Management of Forests.

Assessment against the Principles of Ecologically Sustainable Management of Forests

Principles of ecologically sustainable management originated from international agreements associated with international sustainable development initiatives resulting in five international instruments being agreed at the Earth Summit in 1992. These instruments were Agenda 21 (a non-binding international instrument for sustainable development planning), the Rio Declaration on Environment and Development, the Rio Statement of Forest Principles, the United Nations Framework Convention on Climate Change, and the United Nations Convention on Biological Diversity. The World Heritage and RAMSAR Conventions also relate to these principles.

The assessment is based on assessment documentation reported in the Expert Advisory Group draft and final assessment reports of Tasmania's Ecologically Sustainable Forest Management systems and processes (Tasmanian Public Land Use Commission 1997a, 1996b) and the Regional Forest Agreement's three independent five-yearly review reports (1998–2002: Resource Planning and Development Commission 2002a; 2003–2007: Ramsay 2008, and 2008–2012: Kile 2015).

Maintain the full suite of forest values for present and future generations

The time scale over which the principles apply must be considered in relation to intergenerational equity and the capacity of the Forest Management System to meet all principles of Ecologically Sustainable Forest Management in the long term. Intergenerational equity is a key principle of sustainable development. Implicit in the intergenerational equity criterion is that the current generation cannot determine or foreclose options and/or opportunities of future generations incorporated into the definitions of sustainable use and ecologically sustainable use (Table 63). The applications of sustainable yield and the conservation and sustainable use of forest resources for current and future generations are important requirements of this principle. Application of intergenerational equity requires that

the current generation should make sure that the health, diversity and productivity of the environment continues for the benefit of future generations.

The Expert Advisory Group was mindful of this in its consideration of the seven subordinate principles and their application to the full suite of forest values during their assessment of Tasmania's forest management systems and processes in terms of Ecologically Sustainable Forest Management requirements. They highlighted the importance of management plans to enunciate the objectives of management, use of performance criteria, integration of values and the basis for trade-offs between competing demands (Recommendation 2.4). Their consideration translated into the recommendations made and incorporated into finalising the Tasmanian Regional Forest Agreement.

A balanced approach to conservation, industry development and sustainable use of resources was applied in finalising outcomes of the regional forest agreement. Similarly based on the findings of the five-year review and assessment that followed the Tasmanian Regional Forest Agreement was refined in the 2005 *Supplementary Tasmanian Regional Forest Agreement* to a more balanced approach to support sustainable environmental, industry, social and economic outcomes.

Maintain and enhance long-term multiple socio-economic benefits to meet the needs of societies

The Expert Advisory Group analysed and reviewed the legislation, policies and planning systems underpinning the social and economic systems associated with forest products and values and the sustainable and balanced use of these forest products and values. The current system of social and economic assessment applying to major decisions regarding forest land use allocation and management and the trade-offs necessary to be made, having regard to fulfil social, economic and environmental needs, was supported. The need for future comprehensive analysis of net social benefit into non-wood values was also identified. They made several recommendations to improve systems and processes that were incorporated into the regional forest agreement, including a state policy on nature based tourism and recreation management and developing and applying flexible silvicultural systems on public forests to promote the sustainable production of long-rotation speciality timbers (Attachment 10). The Agreement (Clauses 74 and 77) included strategies to ensure a sustainable yield minimum target of 300 000 cubic metres per year of high quality eucalypt sawlogs and veneer logs, and 10 000 cubic metres per year of blackwood sawlogs. Attachment 12 (RFA Forests – Employment and Industries Development Strategy) of the Tasmanian Regional Forest Agreement that supports Clause 74 of the Agreement was developed cognisant of this principal. Clauses 78–82 dealt with the trade-off of mineral exploration and mining and the potential impact on Comprehensive, Adequate and Representative values.

The first independent five-yearly review of the Tasmanian Regional Forest Agreement (Resource Planning and Development Commission 2002a) undertook a detailed analysis and review of wood and wood product industry development, wood resource security in terms of sawlog sustainable yield and special species timbers, and other forest based industries (mining and mineral exploration, tourism and recreation, and apiculture). Recommendations 5.1, 5.2, 6.1, 6.2, 7.1 and 7.2 (Appendix A) were very relevant to the consideration of ecologically

sustainable management of forests under this principle as well as improving the Forest Management System underpinning Ecologically Sustainable Forest Management.

The second independent five-yearly review of the Tasmanian Regional Forest Agreement found that Recommendations 5.1, 5.2, 6.1, 6.2, 7.1 and 7.2 had not adequately been implemented or addressed. As a consequence the reviewer made a number of recommendations (36, 38, 39, 41 and 43) to expedite the recommendations from the first review. With respect to collecting reliable data on social and economic indicators the reviewer called on governments in Recommendation 43 to implement Recommendation 5.1. The reviewer further recommended 'that the Parties commence the process of identifying the key issues relevant to considering the extension of the RFA in advance of the next RFA Review in 2012, so that an assessment of all the factors concerning desirability or otherwise of extending the RFA is available to the Review and is published as part of the next Review process. In particular, the progressive shortening of the period of industry resource security provided by the current RFA should be taken into account, together with operational and policy matters that were not prominent at the commencement of the RFA, such as catchment management and climate change' (Recommendation 37). The reviewer reported that the state had completed a state-wide policy on nature based tourism and recreational management in 2003. The Parties to the Agreement, in their response to the second five-yearly review, agreed with implementing these recommendations.

Protect and maintain biodiversity

This principle in Regional Forest Agreements is actioned through implementation and management of the components of the comprehensive, adequate and representative reserve system together with the components of the forest management system applying to the management and conservation of biodiversity. The components of the comprehensive, adequate and representative reserve system are firmly in legislation (formal reserve component) and the other components are supported by legislation (Resource Planning and Development Commission 2002a). Application of environmental management systems on the production forest and reserve estate and the Forest Practices Code to forest harvesting, conversion and/or clearance provides safeguards in protecting, conserving, maintaining and managing biodiversity. These were incorporated into the clauses and attachments of the Tasmanian Regional Forest Agreement. The application of Ecologically Sustainable Forest Management in the comprehensive, adequate and representative reserve system was through implementation of a new reserve management code of practice, implementation of an environmental management system on reserves, ensuring that management plans applying to comprehensive, adequate and representative reserves identified Comprehensive, Adequate and Representative values and were periodically monitored for performance and a Tasmanian biodiversity strategy was developed and implemented.

Systems and processes applying to the protection and maintaining biodiversity were reviewed by the Expert Advisory Group and they made recommendations on identified gaps; many of which were incorporated into the regional forest agreement. In their analysis of this principle they assessed the legislative, policy and planning instruments applying to biodiversity including the assessment and management of risks to species and ecological communities. They assessed issues of environmental impact assessment, the efficacy of the Forest Practices Code and systems and the Resource Management and Planning System, requirements of a Tasmanian biodiversity conservation strategy, management planning of reserves, state forests and private

forests, recovery plans of threatened species and the monitoring of biodiversity and the outcomes of decisions affecting biodiversity.

The Commission in the first independent five-yearly review of the Tasmanian Regional Forest Agreement (Resource Planning and Development Commission 2002a) undertook a comprehensive analysis of the management systems and processes applying to the protection and maintain biodiversity based on the commitments and obligations in the regional forest agreement. While many commitments had progressed since signing the agreement they made recommendations in expediting completion and implementation of the Nature Conservation Strategy, the Reserve Management Code of Practice, recovery plans of threatened species and environmental management systems for reserves outside of state forests (Recommendations 4.2, 4.3, 4.4 and 4.12, Appendix A). They also made recommendations of improving forest community mapping, the accountability of the Forest Practices System, addressing issues of threatened species and communities and the policy maintain a permanent forest estate (Recommendations 3.1, 4.1, 4.5–4.8, 4.14 and 4.15, Appendix A). The Commission also raised issues of the use of sodium monofluoroacetate (1080), harvesting of old growth and alternative harvesting techniques; matters that were incorporated into the *Supplementary Tasmanian Regional Forest Agreement* in 2005.

By the second five year review (Ramsay 2008) Tasmania's reserve management code of practice for all formal reserves, Tasmania's nature conservation strategy and natural resource management framework were completed and implemented. The Permanent Native Forest Estate Policy had been revised to incorporate commitments in the *Supplementary Tasmanian Regional Forest Agreement* and threatened forest and non-forest communities had statutory protection under new legislation. Nine recovery plans were completed and implemented and adopted for the EPBC Act. Management plans and environmental management systems for formal reserves not in state forests had not been completed and the reviewer consequently made Recommendations 5, 6 and 25. The reviewer found monitoring and compliance of the Forest Practices System to be adequate and comprehensive and made recommendations regarding transparency, independence and integrity of the system (Recommendations 1, 2, 11 and 16). Similarly Recommendation 10 was made to ensure audits of compliance and reporting of the Tasmanian Reserve Management Code of Practice 2003.

The monitoring of Comprehensive, Adequate and Representative values and the performance of the reserve system was identified by the reviewer as not adequately being undertaken, with information and data being insufficient. The reviewer stated that commitments made in Regional Forest Agreement Attachment 10.8 and 10.13 were not being met and that 'there is a need for continuous improvement in the ability to measure and report on these matters' (Ramsay 2008). The requirement to adequately resource the management of the reserve system was recommended in Recommendation 9.

The third independent five-yearly review of the Tasmanian Regional Forest Agreement found that the concerns raised in recommendations by Ramsay in the second independent five-yearly review dealing with the forest practices system had been addressed. A significant and comprehensive review of the biodiversity provisions of the Tasmanian Forest Practices Code had been undertaken (Biodiversity Review Panel 2009) concluding 'that the Tasmanian forest practices system provides the basis for an effective framework for ensuring that forest practices are consistent with the delivery of sustainable management from the perspective of biodiversity

conservation. It is a regulatory system, not a forest management system, but it takes an adaptive management approach to complement other components of the State's biodiversity conservation strategy.' The first Activity Assessment Annual Report on implementation of the Tasmanian Reserve Management Code of Practice for 2012–13 had been published.

Kile (2015) stated 'management plans for forests on all tenures are important elements of the RFA objective of ESFM'. The reviewer at the third five-yearly review reported little progress made on the four recommendations from the second five-yearly review on reserve management. Formal reserve management plans were still not completed and the commitments made in Regional Forest Agreement Attachment 10.8 and 10.13 dealing with performance monitoring and monitoring Comprehensive, Adequate and Representative values remained unmet. Kile reiterated Ramsay's comments (Ramsay 2008), saying 'it is a concern that there is still considerable work to meet the commitments that are many years beyond agreed milestones'. Kile reported that the Performance Monitoring and Reporting System for Tasmania's National Parks and Reserves had been developed however it was unclear how far the system would go towards addressing the matters raised in the second review regarding Attachment 10.8 and 10.13. In the 2016 Joint Government Response, the governments agreed to consider implementing a state-wide forest monitoring information system, noting that this would likely require greater integration of existing systems and the development of new tools to assist in the long-term monitoring of forest condition and biodiversity, including threatened species.

The reviewer at the third independent five-yearly review of the Tasmanian Regional Forest Agreement undertook a comprehensive review of the matters applying to threatened species raised in the second review concluding that substantial progress had been made to reconcile listing statements and implementing recovery plans and addressing matters raised in the second five-yearly review. Kile (2015) reported that the Forest Practices Authority had reviewed its monitoring and assessment protocols including the assessment of compliance with the threatened species provisions contained within the Forest Practices Code and that the Forest Practices Authority had developed an effective monitoring program to monitor the biodiversity provisions of the code; though a comparable program covering reserves was not in place. Kile (2015) also provided discussion of Tasmanian studies on biodiversity and how they relate to the consideration of key matters during the review and extension of Regional Forest Agreements raised in the Hawke review of the EPBC Act (Hawke 2009). Commenting on aspects of these key matters, Kile (2015) states 'at present there seems to be a greater knowledge of biodiversity in production forests than in reserves and there is a need to build knowledge for both to determine the success or otherwise of the integrated land management approach of the RFA.'

Maintain the productive capacity and sustainability of forest ecosystems.

The main elements of this principle is the appropriate use of silvicultural systems, determination and application of sustainable yield of wood products and regulations applying to public and private forests to safeguard productive capacity and sustainability of forest ecosystems. Sustainable yield provisions of the Regional Forest Agreement and 'Maintaining a Permanent Forest Estate RFA' (Attachment 9) underpin the application of this principle in the Agreement. Site and soil protection and adequate regeneration and protection of regeneration are elements of the Forest Practice Code and System supporting this principle as are elements of

the Reserve Management Code of Practice discussed above under the biodiversity principle. Application of best-practice reforestation standards and ongoing monitoring are a requirement of the Forest Practice Code and System (RFA Attachment 10.12). Application of flexible silvicultural system and research into cumulative disturbance, monitoring regeneration success and application of new and alternative silvicultural techniques were identified in the Agreement (RFA Attachments 10.6 and 13.7)

The Expert Advisory Group reviewed the systems and processes applying to this principle and made recommendations that were incorporated into the Regional Forest Agreement or directly into the planning systems of Forestry Tasmania, Private Forests Tasmania and/or the Forest Practice Code and System.

The Permanent Native Forest Estate Policy was a consequence of the Expert Advisory Group's Recommendation 1.7 and formed an important approach to achieving ecologically sustainable forest management in the form of Attachment 9 'Maintaining a Permanent Forest Estate', specifying regional levels of forest community retention and meeting regional conservation and catchment objectives. Monitoring requirements were specified in this Attachment.

The first independent five-yearly review of the Tasmanian Regional Forest Agreement (Resource Planning and Development Commission 2002a) analysed the performance of 'Maintaining a Permanent Forest Estate' (section 4.12) together with the plantations and intensive management initiatives (section 5.9) and development of a state policy on integrated catchment management (section 4.15), making three recommendations (4.14, 4.15 and 4.17) for improvements to maintaining a permanent forest estate. The precautionary principle was a significant consideration that led to the reviewers recommending increasing the level of retention to ensure that no further forest communities become threatened. Governments responded in the 2005 *Supplementary Tasmanian Regional Forest Agreement*, agreeing to revise the Permanent Native Forest Estate Policy by capping the clearance of native forests on public and private land and phasing out broad-scale clearing and conversion of native forests (Clauses 45–51, *Supplementary Tasmanian Regional Forest Agreement*). The third independent five-yearly review of the Tasmanian Regional Forest Agreement indicated that the Permanent Native Forest Estate Policy was performing and operating as envisaged.

The first, second and third independent five-yearly reviews of the Tasmanian Regional Forest Agreement assessed issues of sustainable yield finding that the commitments concerning sustainable yield were being met. Recommendations were made about improving transparency and reporting, continuous improvement of methodology (Resource Planning and Development Commission 2002, Recommendation 6.1), timely public release of reviews (Ramsay 2008, Recommendation 34) and continued regular reviews of sustainable sawlog yield as an element of a renewed/extended Regional Forest Agreement (Kile 2015, Recommendation 11).

Research into the application of new and alternative silvicultural techniques was reported by Forestry Tasmania (2005). Silvicultural targets applying to reducing clear-fell harvesting of old growth forest by promoting and applying alternative silvicultural systems to the harvesting of old growth forests became a requirement in the 2005 *Supplementary Tasmanian Regional Forest Agreement* (Clause 40) with the Commonwealth Government committing \$2 million to the introduction of new silviculture for old growth harvesting (Clause 75). A series of journal papers has been published on this research and application of these new silvicultural

techniques. Baker *et al.* (2017) provides a synopsis of the outcomes of this research and implementation of these new silvicultural techniques and systems in terms of continuous improvement and adaptive management.

Maintain forest ecosystem health and vitality.

The operational aspects of this principle involves maintaining Tasmania's forest ecosystem health and vitality through pest and disease control and fire management. This principle is primarily managed in the Tasmanian Regional Forest Agreement through ensuring management plans for state forests, National Parks and other reserves are implemented (Attachment 10.8), state-wide policies on fire management and pest and disease management are developed and implemented (Attachment 10.7) and strategic research into fire and pest and disease control including reduced chemical use of pesticides is prioritised (Attachment 13.3 and 13.6).

The Expert Advisory Group reviewed the systems and processes associated with pest and disease control and fire management. Fire, pest and disease management components of Recommendation 1.7 became a commitment in Attachment 10.7 of the Agreement. The Group identified a need to establish short-term and long-term monitoring of the effects of fire on biodiversity, and monitor pest and disease status and other aspects of forest health and condition. A recommendation regarding coordinated fire management research was also made (Recommendation 5.3).

The Expert Advisory Group assessment of fire management raised the management dilemma of management's conflict between statutory responsibilities for protecting life and property and the ecologically sustainable management objective of minimising adverse impacts of fire (type, frequency and intensity of fire, or lack of fire) on biodiversity, habitats of flora and fauna and the ecological integrity of forest ecosystems. They identified a lack of information on positive and negative environmental impacts of fire regimes as an impediment for agencies developing optimal strategies with respect to Ecologically Sustainable Forest Management. Environmental impacts of fire regimes and ecological management of fire was an identified priority for research in the regional Forest agreement (Attachment 13.3). The Group recommended a state-wide policy paper on the ecological management of fire covering synthesis of ecological information and provide a strategic planning framework for fire management considering priorities for flora and fauna in broad spatial and temporal contexts across all tenures, taking all forest values into account (Recommendation 1.7).

The legislative and policy framework for pest and disease control was found to be satisfactory on state forest and less so on other tenures. As a consequence the Group recommended the development of a Tasmanian pest and disease management policy (Recommendation 1.7) and implementation strategies for pest and disease management control in reserve management plans (Recommendation 2.20).

The first independent five-yearly review is unclear about progress of the state-wide policy paper on state-wide policies on fire management and pest and disease management outlined in Attachment 10.7 of the Regional Forest Agreement noting that it would be reviewed in the second five-yearly review. State-wide policies on forest pest and disease management and fire management across all tenures was developed and implemented before the second five yearly review. Ramsay (2008) criticised that the fire policy document and related referenced policies

were not publically available resulting in Recommendations 26 and 27 in the second independent five-yearly review. Documentation was made available after the second independent five-yearly review (Kile 2015).

Protect soil and water resources.

The Forest Practices Code and System is an important instrument for the protection of soil and water resources for forests subjected to harvesting, clearing or conversion in Tasmania. The Permanent Forest Estate Policy outlined in Attachment 9 of the Regional Forest Agreement is another instrument to meet catchment management objectives (Clauses 60 and 61). A draft state policy on water quality management was available prior to the signing of the Agreement and finalising this policy became the commitment referred to in Attachment 10.1. Tasmania made a commitment to develop a state policy on integrated catchment management in the Agreement (Attachment 10.2). Soil and water guidelines were included in the reserve management code of practice (Attachment 10.11). Strategic soil and water research were identified in Attachment 13.5 and 13.9 of the Agreement. The 2005 *Supplementary Tasmanian Regional Forest Agreement* required the Permanent Native Forest Estate Policy to be revised to include assessment criteria protection of water quality values and to meet salinity objectives (Clause 45) with the Australian Government contributing \$1 million to a catchment water quality program (Clause 69).

A draft *Reserve Management Code of Practice* was released for public comment in late 2001. Discussion above in the biodiversity principle regarding the reserve management code of practice equally applies to this instrument's protection of soil and water.

The Expert Advisory Group's assessment of the Tasmanian planning systems relating to soil and water management resulted in Recommendations 2.6, 2.11, 2.15, 2.21, 2.25 and 4.7. Recommendations 2.6 and 2.21 translated into commitments Attachment 10.2 and 10.11 in the Agreement. Recommendation 2.11 and 2.15 were recommended improvements to management agencies consideration of soil and water in their management plans and systems while recommendations 2.25 and 4.7 related to improving the soil and water components of the Forest Practices Code and System.

At the first independent five-yearly review of the Tasmanian Regional Forest Agreement (Resource Planning and Development Commission 2002) the Commission noted that there had been significant developments in Tasmanian water management including the amendments to the *Forest Practices Act 1985* (Tas), and two new pieces of legislation the *Water Management Act 1999* (Tas) and the *Natural Resource Management Act 2002* (Tas). The State Policy on Water Quality Management was finalised in 1997 just after the signing of the Agreement and met the commitment Attachment 10.1. An assessment of its implementation was fully discussed in the first five-yearly review of the Agreement. The Expert Advisory Groups recommendations applying to state forest management plans and systems were incorporated into the agencies plans and planning systems. The Group's recommendations applying to the Forest Practices System were also reported to have been implemented. The *Water Management Act 1999* requires statutory water management plans to be developed and are an instrument for integrating priorities for use of water at a catchment scale. The Commission concluded that the interrelationship between forest management, water yields and water management planning at catchment scale remained unresolved and that the state-wide approach to integrated catchment

management (Attachment 10.2) was yet to be completed. Integrated catchment management would be fulfilled once regional natural management strategies were developed and implemented under the *Natural Resource Management Act 2002*. As a consequence the Commission recommended 'that the state moves quickly to enable proclamation of the *Natural Resource Management Act 2002* (Tas) and facilitate regional natural resource management strategies' (Recommendation 4.17). The *Natural Resource Management Act 2002* was proclaimed and regional strategies completed by the second review (Ramsay 2008).

Water resources and catchment management issues increasingly became a concern during the first decade of the Agreement. The concern was the consequence of the rapid expansion of plantations and the impact such expansion had on the quantity and quality of water resources (Ramsay 2008). It was evident that further science and information was required to make informed decisions on the impacts of plantations and plantation development and other land uses in specific catchments. A response to which was the inclusion of requirements for assessment criteria for the protection of water quality values and to meet salinity objectives in the Permanent Forest Estate Policy (Clause 45) with Australian Government providing \$1 million to a catchment water quality program (Clause 69) in the 2005 *Supplementary Tasmanian Regional Forest Agreement*. In June 2005 Tasmania signed the National Water Initiative that contained provisions requiring protecting the integrity of water access entitlements from unregulated growth in interception through land use change (Clause 25) and recognition of the interception of surface and ground water resulting from large-scale plantation forestry (Clause 55) and application of measures in relation to water interception by a range of activities that include plantations by 2011 (Clause 57). The Initiative recognised that plantation forestry was a key large-scale land use change activity which has a potential impact on water availability. Tasmania released an implementation plan for the National Water Initiative in September 2006 that included actions related to plantations and plantation development applying to Tasmania's water catchments.

The second five-yearly review (Ramsay 2008) assessed the above changes and made six recommendations (Recommendations 19 to 24) with the view that these recommendations and commitments be further reviewed in 2012. Recommendations 20 to 23 from Ramsay's review were completed by the third review. Tasks associated with Recommendation 19 were completed and continued to be on going and Recommendation 24 had not proceeded by the third review (Kile 2015) even though in the Governments' joint response in 2010 indicated implementation of the recommendation had commenced.

Maintain forest contribution to global carbon cycles.

The Expert Advisory Group (Tasmanian Public Land Use Commission 1997a) reviewed the systems and processes associated with this principle, finding little information on the prediction or analysis of forest clearing on carbon budgets, how prescribed fire and wildfire affected carbon budgets and how conversion of native forest to plantations affected carbon budgets. The inventory of forest carbon stores in Tasmania is monitored in Australia's National Inventory System as forests contain large stocks of carbon with estimates of their biomass and wood-product stores being a measure of their contribution to global carbon cycles. In the Regional Forest Agreement the issue of forest carbon stocks, flows and budgets were handled through the forest clearing and conversion provisions incorporated into the Permanent Forest Estate Policy that was designed to maintain an extensive and permanent native forest estate (Clauses

60 and 61 and Attachment 9) as well as undertaking strategic research on carbon related issues (Attachment 13.2) based on the findings and recommendations of the Expert Advisory Group (chapter 2 of the report and Recommendation 5.4). Issues of smoke management and climate change mitigation are now linked to this principle.

The first independent five-yearly review reported on the inventory and accounting of carbon budgets, changes in carbon flows attributed to fire, consumption of forest waste for power generation as an alternative to use of fossil fuel and that the net area of forest (plantation and native forest) had increased since the Agreement was signed. Recommendation 4.16 resulted from an assessment of issues associated with smoke management resulting from the use of fire; this recommendation was incorporated into the Governments' response to the first review in the 2005 *Supplementary Tasmanian Regional Forest Agreement*.

By the second five-yearly review (Ramsay 2008) the recommendation regarding smoke management had been implemented through introduction of smoke management guidelines and measures taken to minimise the risk of smoke nuisance, including web-based tools to inform the public of planned burns on public and private forests. Ramsay noted that considerable work and research was continuing in the science of carbon accounting and developing and implementing climate change strategies and reducing greenhouse gas emissions. The reviewer identified 'improved understanding of the contribution that forests and forestry industry play in global carbon cycles is essential to the future forest policies, including any extension of the RFA' (Ramsay 2008), resulting in Recommendation 28. The third five-yearly review reported the publication of substantial research on carbon stocks and flows and climate change scenarios on Tasmanian forests during the third five-year period of the Regional Forest Agreement and provides commentary analysis.

Maintain natural and cultural heritage values.

Matters associated with the sustainable management of natural and cultural heritage sites, Indigenous heritage and values, National Estate values and World Heritage sites, properties and values apply to the assessment of this principle. The Expert Advisory Group reviewed the systems and processes associated with natural and cultural values making recommendations on Commonwealth and state legislation (Recommendations 1.1 and 1.5) and identifying the need for a state-wide policy on heritage management (Recommendation 1.7). They undertook a comprehensive assessment of state agency management and planning documentation about Tasmania's natural heritage and cultural values resulting in Recommendations 2.7, 2.10, 2.13, 2.16, 2.22 and 2.23. These recommendations were about improvements to agency management systems applying to natural and cultural heritage many of which were acted on by the agencies after signing of the Regional Forest Agreement. Recommendations 4.3, 4.4 and 4.12 related to improvements in heritage databases and identifying and monitoring Indigenous heritage in the Forest Practices Code.

Improvements to the Forest Management System covering the principle 'maintain natural and cultural heritage values' include implementing the *Historic Cultural Heritage Act 1995* (Tas) (Attachment 10. 4) and developing new Tasmanian legislation in relation to Indigenous cultural heritage to replace the *Aboriginal Relics Act 1975* (Tas) (Clause 83 and Attachment 10.5). The Regional Forest Agreement in Clause 26 states that the Parties agree to the management of National Estate values as set out in Attachment 1 and that the state will protect in a regional

context the full range of National Estate values on public land through the application of the Forest Management Systems in accordance with the Agreement and that many of the values are protected in the comprehensive, adequate and representative reserve system (Attachment 1.3). National Estate values were to be identified in state forest and reserve management plans based on principles found in Attachment 1.4, and mechanisms described in Table 1 of the Agreement (Attachment 1.5). Such values would have been objectives to be included in management plans and periodically reviewed and reported (Attachment 10.8 and 10.13). Environmental management systems, the Forest Practices Code and System and the code of practice for reserve management are also relevant to maintaining natural and cultural heritage values. Public reporting and consultation mechanisms included changes to the register of the *Historic Cultural Heritage Act 1995* (Tas) listings on the Register of the National Estate and *State of the Forest Tasmania* reports (Attachment 11). Clauses 39 to 42 dealt with World Heritage assessment of Australia-wide themes and matters associated with future nominations. The Parties agreed to full consideration of any social and economic consequences of any future World Heritage nominations. The Parties also agreed that future nominations involving the forest estate would come from the dedicated elements of the comprehensive, adequate and representative reserve system, and that management and funding arrangements would be in place before any nomination is made (Clauses 40 and 41).

The first five-yearly review (Resource Planning and Development Commission 2002a) analysed commitments specified in the Agreement. Tasmania was undertaking a review of the *Aboriginal Relics Act 1975* at the time of the review. Implementation of the *Historic Cultural Heritage Act 1995* was well underway. Progress on matters associated with National Estate had progressed well and the reviewers made a recommendation that outstanding National Estate commitments be completed by the next five-yearly review (Recommendation 4.9).

The Resource Planning and Development Commission reported that one of the six potential World Heritage themes, the *Eucalyptus*-dominated vegetation theme, was assessed by a March 1999 workshop. The Commission stated:

“There has been no decision reported by the Parties on the outcomes of the March 1999 workshop. The Parties have not reported any initiatives to address any of the other five World Heritage themes of relevance to Tasmanian forests. However, the Commission notes that a national approach to identifying areas for potential World Heritage nomination is being developed by the Commonwealth in the context of proposed changes to the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (Environment Australia 2002). It is expected that this will address World Heritage commitments under the Tasmanian Regional Forest Agreement. The Commonwealth enacted the Act subsequent to the signing of the Tasmanian Regional Forest Agreement. The Commonwealth is awaiting the successful passage of amendments to the Act that provide for the establishment of a list of nationally significant places. Future Commonwealth nominations for World Heritage listing will be drawn from the list of nationally significant places. Places will be assessed for inclusion on the national list on the basis of a number of national themes that broadly reflect the Australia-wide themes identified by the World Heritage Expert Panel (Tasmanian Public Land Use Commission 1997e). The Commission was advised by Environment Australia through the Reference Panel that nominated places will be subject to an assessment process that will include a comparative analysis with other national places identified under the same theme(s). Further the Commission was informed

that the Commonwealth has advised the World Heritage Committee that it will examine the applicability of the World Heritage theme of Eucalyptus dominated vegetation in this context. Clauses 40, 41 and 42 have not been invoked as there have been no further World Heritage nominations in forested areas of Tasmania.” (Resource Planning and Development Commission 2002a, p. 25-26)

The 2005 *Supplementary Tasmanian Regional Forest Agreement* recognised that the state had made a large contribution to the protection of the nation’s natural and cultural heritage through the comprehensive, adequate and representative reserve system established under the Tasmanian Regional Forest Agreement and the *Supplementary Tasmanian Regional Forest Agreement* (Supplementary Agreement Clause 35). No other commitments on National Estate values or World Heritage were made in the *Supplementary Tasmanian Regional Forest Agreement* other than acting on Recommendation 4.9 from the first independent five-yearly review.

Ramsay (2008) in the second independent five-yearly review of the Tasmanian Regional Forest Agreement reported a primary factor in the delay of completing new Tasmanian Indigenous heritage legislation and the delays to completing management plans for all national parks (RFA Attachment 10.8) was limited progress in discussions with Indigenous communities. Outstanding commitments raised in the first review had not been well progressed, resulting in Ramsay making six recommendations in relation National Estate and Indigenous heritage (Recommendations 7, 8 and 30–33). Governments responded to these recommendations in 2010 by including Recommendations 7 and 8 in the resolution and completion of reserve management plans by June 2011. In response to Recommendation 30 Parties reconfirmed their commitment to the management of national estate values as set out in Attachment 1 of the agreement. Governments would consider addressing matters raised in Recommendations 31 and 32 and that matters associated with the Forest Practices Archaeological Manual would be amended once new Tasmanian Aboriginal legislation was in place.

Ramsay (2008) provided insights into the new national and international arrangements dealing with World Heritage nominations and that the thematic approach expressed in Clause 39 of the Regional Forest Agreement were superseded by these new arrangements. The Environment Protection and Heritage (Ministerial) Council agreed on 2 June 2007 to support the preparation of a new World Heritage tentative list for Australian heritage places (Australia’s World Heritage Tentative List). Ramsay reported that the Tentative List would be the basis of future nominations and that Clauses 40, 41 and 42 were not triggered during the review period 2002 to 2007.

The third five-yearly review (Kile 2015) reported a boundary modification of the Tasmanian Wilderness World Heritage Area occurred in 2010 with the incorporation of 20 096 hectares of adjacent national park and state park to increase the representation of tall eucalypt forests and cultural sites of significance to the Aboriginal community. Clauses 40, 41 and 42 were not enacted for this modification (Kile 2015). Kile reported concerns raised in submissions of the lack of utilisation or operation of these clauses in a world heritage extension that occurred after the review period.

The introduction of new Tasmanian Indigenous heritage legislation was unsuccessful during the third five year review period, 2008–2012, and the commitment remains outstanding based on

Kile's review report. The unsuccessful introduction of new legislation has consequences for updating Indigenous heritage systems and processes under the Forest Practices System as recommended by Ramsay (2008). Kile reported that commitments for the protection of Aboriginal cultural heritage were not fully met and made a recommendation that the state considers improved mechanisms for the protection of Aboriginal cultural heritage as part of the Regional Forest Agreement renewal extension (Recommendation 15). The state responded to this recommendation by outlining its strategy for taking this matter forward. Kile also made a recommendation regarding the National Estate that Parties follow up on their 2007 review response to ensure compatibility of the Regional Forest Agreement with Commonwealth heritage protection legislation as part of the Regional Forest Agreement renewal/extension process (Recommendation 10). Both Parties agreed to this recommendation in their 2017 joint response to the third five-yearly review.

Utilise the precautionary principle for prevention of environmental degradation.

The precautionary principle and management of risk and uncertainty was accessed during the accreditation of the Forest Management System, as well as through the development of environmental management systems and the priority placed on Recovery Plans. The Precautionary Principle was an important criterion in the assessment of Ecologically Sustainable Forest Management systems and processes. In making recommendations on Tasmania's Forest Management Systems the 'Expert Advisory Group paid particular attention to those Tasmanian processes of forest management dealing with "risk assessment" and "risk management" to minimise environmental impacts and avoid serious or irreversible damage to the environment' (Tasmanian Public Land Use Commission 1997a).

The interplay between 'utilising the precautionary principle' and the principles 'maintain and enhance long-term socio-economic benefits', 'protect and maintain biodiversity', 'maintain the productive capacity and sustainability of forest ecosystems', 'protect soil and water resources' and 'maintain natural and cultural heritage values' was important to consider with respect to the clearing of native forests for plantation development, resulting in the Expert Advisory Group's recommendation 1.7. The Permanent Native Forest Estate Policy discussed above was also a consequence of this recommendation.

The Forest Practices Code and the Tasmanian Reserve Management Code of Practice incorporate the precautionary principle into the decision making documentation associated with these codes.

Hawke (2009) found 'that RFAs provide a solid and effective structure for environmental protection, however, significant gaps exist in implementation, monitoring and compliance auditing, and it is these gaps that present ongoing risks. The aim is to strengthen RFA implementation, reporting and compliance, and to provide for alternative assessment and regulation only where this does not occur.'

Current matters for Ecologically Sustainable Management of Forests

Overview of Tasmania's Forest Management System

In 2017, Tasmania's Forest Management System has developed into a comprehensive system for delivering Ecologically Sustainable Forest Management across all land tenures. All elements of it have been broadly set out in the *Tasmania's Forest Management System: An Overview (2017)* (Department of State Growth 2017).

Tasmania's Forest Management System comprises an overarching legislative and policy framework, which is implemented by associated planning and operational systems. It is complemented by adaptive management and continual improvement processes incorporating research findings and feedback processes associated with compliance and enforcement systems, stakeholder engagement and monitoring and review mechanisms.

This illustrates, at a broad level, the key components, Tasmanian legislation and agencies that are integral to achieve Ecologically Sustainable Forest Management within Tasmania's Forest Management System, and the linkages between them.

As indicated above, the independent five-yearly reviews of the Tasmanian Regional Forest Agreement combined with five-yearly *State of the Forests Tasmania* reports have provided a regular reporting mechanism through which the adaptive management and continual improvement processes for the Tasmanian forest management system are demonstrated. As required under the Tasmanian Regional Forest Agreement, these processes have been implemented by the relevant agencies over the life of the Tasmanian Regional Forest Agreement.

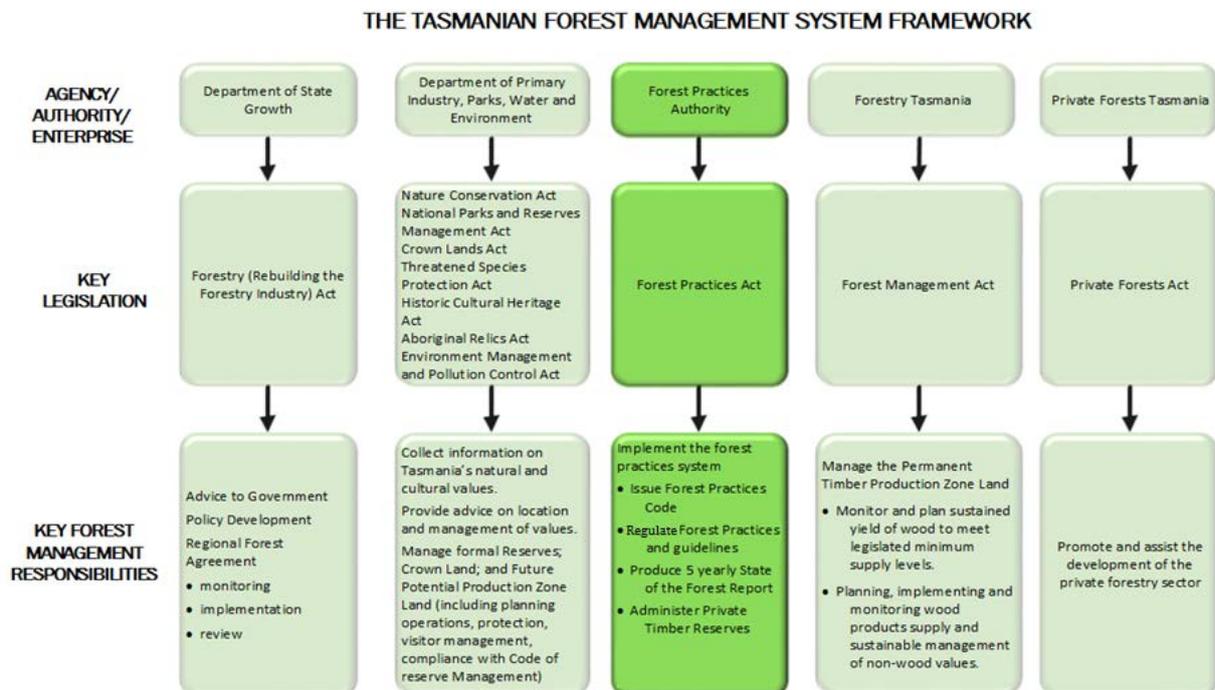
External and voluntary measures, which are independent of the Tasmanian agencies and have the capacity to support and confirm these processes, are forest management certification and environmental management system certification. Since at least 2003, Forestry Tasmania, as the public native forest manager, has been certified to relevant standards for an environmental management system (ISO 14001) and sustainable forest management (AS 4708) by various accredited certification bodies. A number of private forest management companies in Tasmania have also certified native forests or plantations for sustainable forest management (AS 4708) thereby demonstrating their adherence to Ecologically Sustainable Management of forests on private lands.

Certification to ISO 14001 of environmental management systems encourages an organisation adheres to a framework that provides assurance to both the organisation itself and external stakeholders that its environmental impact is being assessed and managed.

Certification to AS 4708 provides an independent assessment of compliance with the requirements of an Australian Standard® which covers the Montréal Process criteria (and by implication the seven specific principles that cover Ecologically Sustainable Management of forests), as well as an organisational forest management system that can substitute for an environmental management system or work in conjunction with a certified environmental management system.

All of this is underpinned by effective legislation with appropriate compliance and enforcement powers, including powers to fine or prosecute for alleged breaches of the *Forest Practices Act 1985* (Tas).

Figure 22 – Tasmania's Forest Management System



Changes in the Tasmanian Forest Management System

The current Forest Management System, as outlined in *Tasmania's Forest Management System: An Overview (2017)* (Department of State Growth 2017), has matured over the life of the Tasmanian Regional Forest Agreement from the framework existing at the signing of the Tasmanian Regional Forest Agreement. Overall, it has provided continual improvement due to changing and sophisticated technology, scientific research and advice, and operational experience, while accounting for adaptive management as a consequence of new information.

In its elemental state, Tasmania's forest management system is comprised of a suite of legislation, policies, codes, plans and management practices. The continual improvement in the forest management system, which ensures consistency with Ecologically Sustainable Forest Management, can be demonstrated through:

- *legislation*—Acts and regulations existing at the signing of the Tasmanian Regional Forest Agreement have been revised and updated or re-drafted; for example, Acts and Regulations after the Regional Forest Agreement signing that directly impact on forest management are the *Forest Management Act 2013* (Tas), the *Nature Conservation Act 2002* (Tas), the *National Parks and Reserves Management Act 2002* (Tas) and the *Forest Practices Regulations 2017*
- *policies*—Tasmania's Permanent Native Forest Estate policy has been periodically reviewed and amended; Forestry Tasmania's Sustainable Forest Management policy; Parks and Wildlife Services' Environmental Management policy within its environmental management system

- *codes* – updating of the 2000 Forest Practices Code to a 2015 version, and the 2003 Tasmanian Reserve Management code of practice
- *plans*—Forestry Tasmania’s Forest Management Plan and associated District forest management plans; forest practice plans under the *Forest Practices Act 1985* (Tas) as required under the Forest Practices code; three-year wood production plans for scheduling harvesting of forest coupes; management plans for Parks and Wildlife Services’ reserves; Forestry Tasmania’s Special Species Management Plan
- *management practices*— forest practices as regulated under the forest practices system e.g. harvesting and regenerating native forest, constructing access roads; use of a range of planning tools such as the Biodiversity Values Database and the Threatened Fauna Adviser prioritised monitoring program to assess effectiveness of forest management prescriptions; and implementation of variable retention silviculture
- *research and monitoring*—monitoring and research programs to underpin management recommendations. Regular updating and review of planning tools and guidelines to reflect new information.

Tasmanian Forest Agreement

The *2011 Tasmanian Forests Intergovernmental Agreement between the Commonwealth of Australia and the State of Tasmania* led to the reservation in the National Reserve System of an additional 430,000 hectares of native forest in 2013 that was considered to have high conservation values, with this reservation occurring under a Conservation Agreement between the State, Forestry Tasmania and the Commonwealth under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (Commonwealth of Australia and the State of Tasmania 2011b). These areas were nominated by non-government environmental organisations and the boundaries were verified through an independent verification process (Independent Verification Group 2012).

Legal, institutional and economic framework for forest conservation and sustainable management

Table 1 (see Method) illustrates how these Ecologically Sustainable Forest Management principles are monitored under the Montréal Process on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests. The majority of indicators for the criteria that are related to these principles have been discussed in considerable detail in the ‘Environmental values’, ‘Indigenous heritage values’, ‘Economic values’ and ‘Social values’ chapters. These earlier chapters have also considered the management arrangements relating to their respective values, and therefore these chapters form part of the assessment of the Principles of Ecologically Sustainable Management of forests. This chapter does not attempt to replicate information already provided in these chapters.

However, there are two exceptions to the information covering the specific principles, which are the indicators associated with Montréal Process Criterion 7 (Legal, institutional and economic framework for forest conservation and sustainable management) and specific Principle 6 (Maintain forests’ contribution to global carbon cycles). Accordingly, a major focus of this chapter, especially in regards to contemporary forest management, will be to provide information on Montréal Process Criterion 7 and Principle 6. Criterion 7 indicators are identified in Table 64.

Table 64 – Criterion 7 indicators relating to Principles of Ecologically Sustainable Management developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests

Criterion 7. Legal, institutional and economic framework for forest conservation and sustainable management
7.1a Extent to which the legal framework supports the conservation and sustainable management of forests
7.1b Extent to which the institutional framework supports the conservation and sustainable management of forests
7.1c Extent to which the economic framework supports the conservation and sustainable management of forests
7.1d Capacity to measure and monitor changes in the conservation and sustainable management of forests
7.1e Capacity to conduct and apply research and development aimed at improving forest management and delivery of forest goods and services

These indicators are used in both the *State of the Forests Tasmania* series and the national *Australia's State of the Forests Report* series.

Montréal Process Criterion 7 and associated indicators collate the aspects contributing to the overall policy framework that guides and directs the conservation and sustainable management of Tasmania's forests. It covers the broader societal conditions and processes which are often external to the forest but which support efforts to conserve, maintain or enhance one or more of the conditions, attributes, functions and benefits captured under Montréal Process Criteria 1–6. A substantive source of information for these indicators was the *State of the Forests Tasmania 2012* report.

Indicator 7.1a – Extent to which the legal framework supports the conservation and sustainable management of forests

The 1997 Tasmanian Regional Forest and the 2005 Tasmanian Community Forest Agreement provide the framework and context for forest management in Tasmania. These are bilateral agreements between the Australian and Tasmanian governments. Their key principles are:

- Ecologically Sustainable Forest Management
- protection of biodiversity at the regional level
- conservation of environmental and heritage values through reservation and
- certainty of resource access for the forest industry.

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) is Australia's main federal environmental legislation. It is designed to protect and manage Matters of National Environmental Significance. Due to the comprehensive nature of the Tasmanian Regional Forest Agreement and the Australian Government fulfilling its duties in relation to the Tasmanian Regional Forest Agreement for assessment of environmental impacts prior to the Tasmanian

Regional Forest Agreement, virtually all forestry operations conducted in accordance with the Tasmanian Regional Forest Agreement are exempt from the assessment and approval requirements of Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Tasmania's *Permanent Native Forest Estate Policy* (Department of State Growth 2016a) was negotiated through the Tasmanian Regional Forest Agreement process and limits broad-scale clearing and conversion of native forests. It is implemented through the *Forest Practices Act 1985* (Tas) via the mechanism of the consideration of Forest Practices Plans.

The *Forest Practices Act 1985* (Tas) ensures that forest operations are conducted in a manner that provides for the reasonable protection for the environment on public and private forest and has compliance and enforcement powers. It forms part of a broader legislative and policy framework that provides a basis for sustainable forest management in Tasmania.

The *National Parks and Reserves Management Act 2002* (Tas) sets out the management objectives for conservation reserves declared under the *Nature Conservation Act 2002*. On nature conservation reserves there are legislated management objectives for reserve classes, statutory management plans that require formal public consultation, adherence to the *Tasmanian Reserve Management Code of Practice* and development applications subject to detailed environmental impact assessment processes.

In addition to the formal legislation, the Tasmanian and Australian governments have a number of regulatory instruments and policies that support sustainable forest management.

For example, the 2015 Forest Practices Code, and associated planning tools, provides a practical set of guidelines and standards for the protection of natural and cultural values, such as biodiversity, soil and water quality and historic and indigenous heritage, during forest operations.

Indicator 7.1b – Extent to which the institutional framework supports the conservation and sustainable management of forests

The Australian and Tasmanian governments have committed to regional assessments, planning, and policy reviews as well as building community awareness, as a basis for continual improvement in the sustainable management of Tasmania's forests.

The comprehensive, adequate and representative reserve system provides for state-wide conservation of forests and non-forest vegetation communities. The Forest Practices System regulates operations in native forests, plantations and threatened non-forest vegetation communities on both Crown and private lands. Both of these systems underpin the institutional framework in Tasmania.

The comprehensive, adequate and representative reserve system for forests meets national agreed criteria to ensure the long-term conservation and protection of Tasmania's forest biodiversity, old growth forest and wilderness values.

The Forest Practices System has evolved over more than thirty years to become a sophisticated, robust system which is applied across all tenures. It is based on a co-regulatory approach,

combining self-management by the forest industry and independent monitoring and enforcement by the Forest Practices Authority.

The maintenance of appropriate levels of human resource skills, the enforcement of laws, regulations and guidelines and the adoption of forest certification are mechanisms that demonstrate commitment to sustainable forest management.

Indicator 7.1c – Extent to which the economic framework supports the conservation and sustainable management of forests

The Australian and Tasmanian governments establish the key economic parameters across the Tasmanian economy through a policy and legislative framework with regard to taxation, regulation of business, competition policy, foreign investment and consumer regulation.

The National Forest Policy Statement and the Tasmanian Regional Forest Agreement continues to provide the basis for management of Tasmania’s forests to achieve economic, social and environmental outcomes.

Specific policies that support the conservation and sustainable management of Tasmanian forests include taxation arrangements for plantation managed investment schemes; the Plantations for Australia 2020 Vision and research and development through the then Cooperative Research Centre for Forestry, CSIRO, and Forests and Wood Products Australia.

More general policies include multilateral trade agreements; bilateral trade agreements; competition policy and foreign investment regulations; the regulation of corporations (*Corporations Act 2001* (Cth)); general taxation, and anti-competition and fair trading regulations (*Competition and Consumer Act 2010* (Cth)).

Government decisions remain critical through the removal of impediments and streamlining decision making processes and, where appropriate, provision of direct financial contributions or policy initiatives to address market failures.

Indicator 7.1d – Capacity to measure and monitor changes in the conservation and sustainable management of forests

A measurement and monitoring program provides the basis for sustainable management of Tasmania’s conservation and production forests.

Public data covering a wide range of forest values is held and maintained for conservation reserves, multiple-use public forests, industrial plantations and private forests by the Tasmanian Government Department of Primary Industries, Parks, Water and Environment, the Forest Practices Authority, Forestry Tasmania and Private Forests Tasmania.

Government agencies and private industrial forest companies have formal and informal forest and/or environmental management systems in place which contribute to the level of knowledge necessary to measure, monitor and report on the sustainability of forests in Tasmania.

A notable program is the state-wide coverage provided by TASVEG – a 1:25 000 scale vegetation maps (Department of Primary Industries, Parks, Water and Environment 2017c). This has been a major enhancement for the mapping of forest vegetation communities since the Tasmanian Regional Forest Agreement mapping.

Indicators reported in the Australian and Tasmanian State of the Forest Report series provide additional information about monitoring systems. Examples of forest values for which data is collected and maintained are area of forest types (Indicator 1.1.a), regeneration surveys (Indicator 2.1.e), forest health surveys (Indicator 3.1.a), water quality (Indicator 4.1.b) and tourism and recreation (Indicators 6.3.a and b).

In addition to broad scale monitoring systems, site specific surveys are required under the 2015 Forest Practices Code to ensure non-wood values are assessed prior to forest disturbance activities. These surveys identify and protect historic and indigenous heritage sites, geomorphic features and threatened species and communities.

At the Warra Long-Term Ecological Research site, soils, biodiversity, carbon, hydrology and their interactions are continually monitored to establish baseline measurements and evaluate the forest management.

Reporting of state trends is achieved by individual agencies or aggregated at a state level through the Stewardship Report (annually), Tasmania Together (biennial), the *State of the Forests Tasmania Report* (five-yearly) and the State of the Environment Report (five-yearly).

Indicator 7.1e – Capacity to conduct and apply research and development aimed at improving forest management and delivery of forest goods and services

Research and development activities are essential to improve forest management and delivery of forest goods and services.

Tasmanian Government agencies involved in research and development activities include the Tasmanian Department of Primary Industries, Parks, Water and Environment, the Forest Practices Authority and Forestry Tasmania.

State government staff comprised approximately half the total number of personnel engaged in forest-related research and development in Tasmania from 2006 to 2011 and accounted for approximately one-third of the total expenditure.

Much of forest-related research effort from 2006 to 2011 occurred through the then Cooperative Research Centre for Forestry. This Cooperative Research Centre was funded for a seven-year period, from July 2005 to June 2012. Its resources included \$26.6 million from the Cooperative Research Centre, \$10.5 million from member participants, and in-kind resources from member participants of \$46.7 million.

The number of researchers employed in private companies underwent a significant reduction over the 2006–11 period. Some of this reduction is attributable to outsourcing of private

company research to CRCs and other external research providers, however, private company forestry research expenditure was low.

A total of 852 forest-related and forestry-related research publications were produced in Tasmania over the 2006–11 period. The majority of these publications contained research specifically relevant to Tasmanian forestry issues as taken from nine priority areas of research listed in Attachment 13 to the Tasmanian Regional Forest Agreement.

Carbon and climate change

The Independent Reviewer's analysis (Ramsay 2008) noted that the interaction between climate change and forests has emerged as a more significant issue since the Regional Forest Agreement was signed in 1997.

The Comprehensive Regional Assessment identified four elements of the approach to maintaining forests' contribution to global carbon cycles. Since that time more information has become available, for example, more research has occurred on carbon dynamics, such as understanding the dynamics of carbon sequestration in older forests and the effects of rotation lengths on carbon sequestration. A range of reporting tools, such as the State National Greenhouse Gas Inventories, have also been developed.

Climate change projections for Tasmania provide an overview of likely impacts on the future climate. In the future, there is a very high confidence of projected higher average temperatures and more hot days and warm spells. There is also high confidence in projected increased intensity of extreme rainfall events and a harsher fire-weather climate. These changes could lead to a number of impacts including the tree species that can be grown, changes to the growth rates of forests, and a range of complex changes to forest communities and the species that live within them.

If the predicted changes occur then it is highly unlikely that forest carbon stocks will be maintained at their current levels. Uncertainty remains whether State forest carbon stocks will increase or decrease based on current predictions. Recent research suggests that active forest management and the storage of carbon in wood product can contribute to the mitigation of greenhouse gas emissions.

Maintenance of forest contribution to global carbon cycles

Forests represent large natural carbon stocks and can emit or sequester carbon. Estimates of their biomass and the rate of carbon sequestration into forests or emissions from forests are a measure of their contribution to global carbon cycles.

In the *National Forest Policy Statement* in 1992 (Commonwealth of Australia 1992a), the Governments acknowledged the need to manage forests so as to maintain or increase their 'carbon sink' capacity and to minimise the net emission of greenhouse gases (mainly carbon dioxide) from forest activities.

The contribution of forests to global carbon cycles also relates to climate change. Future global climate is influenced by both internal and external factors (Commonwealth Scientific and Industrial Research Organisation 2015–2017a). Internal forces include naturally occurring oscillations of the weather through seasonal changes such as El Nino-Southern Oscillation to decadal changes such as the Pacific Decadal Oscillation. External forcing factors such as emissions of greenhouse gases, solar variation, aerosols, ozone and volcanic eruptions are also very influential on the future climate. It is harder to quantify these weather oscillations than to quantify changes in greenhouse gases, which are the major human-induced forcing factor contributing to climate change. A changing climate could have a wide range of complex and

potentially interacting social, economic and environmental implications (including impacts on forestry production, biodiversity and pests and diseases).

Climate change projections for Tasmania

The Bureau of Meteorology provided climate projections for Tasmania (Commonwealth Scientific and Industrial Research Organisation 2015-2017b).

Key messages resulting from these projections were:

- Average temperatures will continue to increase in all seasons (very high confidence).
- More hot days and warm spells are projected with very high confidence. Fewer frosts are projected with high confidence.
- Generally less rainfall in spring (high confidence) and little change or an increase in winter rainfall is projected (medium confidence). Changes to summer and autumn rainfall are possible but less clear.
- Increased intensity of extreme rainfall events is projected, with high confidence.
- Mean sea level will continue to rise and height of extreme sea-level events will also increase (very high confidence).
- A harsher fire-weather climate in the future (high confidence).
- On annual and decadal basis, natural variability in the climate system can act to either mask or enhance any long-term human induced trend, particularly in the next 20 years and for rainfall.

The current forest carbon data are reported based on the indicator listed in Table 65 developed by the Montréal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (Montréal Indicators). Indicators grouped under these criteria allow the presentation of data in a consistent and repeatable format.

Table 65 – Montréal Indicators relating to carbon values in State of the Forests Tasmania reports

<i>Criterion 5: Maintenance of forest contribution to global carbon cycles</i>
5.1 Maintenance of forest contribution to global carbon cycles
Indicator 5.1a – Total forest ecosystem biomass and carbon pool ¹

¹ Indicator 5.1a in the national *Australia's State of the Forests Report* series is entitled 'Contribution of forest ecosystems and forest industries to the global greenhouse gas balance'

The 1997 Comprehensive Regional Assessment

The 1997 Tasmanian Comprehensive Regional Assessment (Tasmanian Public Land Use Commission 1997c), which informed the establishment of the Tasmanian Regional Forest

Agreement, investigated the approach to maintaining forest contributions to global carbon cycles. There were four elements assessed in 1997:

- planning to maintain as much forest cover as possible in Tasmania
- expecting that conversion of mature native forest to regrowth stands will have a minimal effect on carbon storage in Tasmanian forests
- expecting that over time scales of a forest rotation, or longer, carbon release from management burns will be equivalent to that from decomposition plus wildfires
- judgement by land management agencies that their current activities do not have a major impact on carbon budgets.

The Comprehensive Regional Assessment stated that, between 1988 and 1994, the rate of agricultural land clearance was about 5000 hectares a year, with a further approximately 4800 hectares a year of native vegetation cleared and converted to plantations. These activities were predicted to result in a large release of carbon from biomass and soil per hectare cleared and/or converted in the short term. The amount of loss in the longer term was unknown but was assessed as likely still to be large, even in plantations because these would be harvested on relatively short rotations. In many cases, plantation wood would also have a short half-life before sequestered carbon is released as carbon dioxide.

Little information was available at the time of the Comprehensive Regional Assessment to accurately model the scale of changes in carbon storage associated with forest fire, forest harvesting and regeneration. In terms of fire regimes, the main unknown was the effect of management burning and wildfire on forest productivity and long-term soil carbon storage. The effects of management on carbon budgets were also considered small, noting that research was required to determine the validity of this assumption. The Comprehensive Regional Assessment Ecologically Sustainable Forest Management report (Tasmanian Public Land Use Commission 1997a) recommended that data collection and modelling should be initiated to enable the effects of management on the carbon budget of the total Tasmanian forest estate to be reliably estimated. It was considered that the approach to be adopted was required to provide information that could be interpreted by Tasmania and within a national perspective; it was thus seen as a joint Tasmania–Commonwealth responsibility.

Tasmanian State of the Environment Report 2009

Climate change was noted as one of two fundamental and observable pressures on the Tasmanian environment in each chapter of the *Tasmanian State of the Environment Report 2009*. The *Tasmanian State of the Environment Report 2009* reported that it was becoming evident that longer-term climate change is leading to the redistribution of some species and altered ecosystem dynamics. Observable effects of climate change included the inundation and erosion of vulnerable coastal shorelines from more severe storm surges and sea-level rise, and an increase in sea temperature resulting from the warm Eastern Australian Current advancing down the east coast.

The report stated that climate change was a difficult pressure to report on because of its potential for far-reaching effects on all aspects of the environment, and because the majority of changes are projected to occur in the future: it is a problem characterised by uncertainty,

complexity, and urgency. Indicators were being developed to monitor and report on the costs and benefits of management actions in a consistent and comparable manner.

Tasmanian State of the Forests Report 2012

The following is a summary of the indicator relating to carbon values in the *State of the forests Tasmania 2012 report* (covers the period from July 2006 to June 2011) (Forest Practices Authority 2012a):

Criterion 5: Maintenance of forest contribution to global carbon cycles

Indicator 5.1a - Total forest ecosystem biomass and carbon pool

Forests are large stocks of carbon; estimates of their biomass are a measure of their contribution to global carbon cycles. Australia's National Inventory System provides annual national estimates of greenhouse gas emissions, including emissions and sinks in the land sector, largely forest and agricultural activities.

The total estimated living native forest biomass in 2006 was 1157 million tonnes, dropping slightly to 1124 million tonnes in 2010. These values are over-estimates as all forests are assumed to be mature, and therefore do not take account of disturbance events e.g. fire or harvesting, which impact on mature biomass. The dynamic nature of the growth cycle in forests is not reflected in the estimates. Furthermore, the data are derived at a national level (that is, using national calibration factors) and their applicability to Tasmanian forests is untested.

Of the major vegetation types contributing to the living native forest biomass, the Eucalypt forest types (72 per cent) are by far the most significant contributor, followed by Rainforest/Thickets (16 per cent), Other non-Eucalypt forest types (8 per cent) and finally Shrublands and Heath (4 per cent).

Coverage of carbon values and climate change in the third five-yearly RFA review

The Independent Reviewer's Report (Kile 2015) noted that the interaction between climate change and forests has emerged as a more significant issue since the RFA was signed. The RFA only made reference to climate change as an agreed research priority (refined in the 2007 Review of research priorities) including impact on long-term ecological processes, forest health and pest susceptibility and productivity.

Kile also reported that since the 2007 Review there has been further investment in research to improve understanding of carbon stocks and flows in Tasmanian forests, mainly in forests managed by Forestry Tasmania (e.g. Moroni et al. 2010), together with studies such as that of Battaglia et al. (2009) forecasting impact of increasing carbon dioxide levels in the atmosphere and future rainfall and temperature scenarios on plantation productivity. ABARES (2011) undertook a broader analysis of forest growth and yield 44 under different climate change scenarios and the potential consequential downstream socio economic impacts.

The Independent's Reviewer's Report also noted a major study of Tasmanian forest carbon stocks and flows under a range of land use and climate scenarios (Tasmanian Forest Carbon Study: May et al. 2012a). This study developed a Forestry Carbon Modelling Framework for Tasmania, utilising forest growth data and fire and harvesting regime data, combined with spatial data for climate, soil and forest type and other variables. Whilst uncertainties remain and the outcome of individual scenarios are sensitive to small changes in the assumptions made, the study was a considerable advance in terms of modelling carbon stocks and flows for Tasmanian forests. In addition, the Independent Reviewer noted that installation of a carbon flux tower at the Warra Long-Term Ecological Research Site (as part of Terrestrial Ecosystem Research Network infrastructure) shortly after the end of the review period would advance data collection capability and the opportunity to understand the impact of factors such as high-temperature events and drought on carbon sequestration in a major Tasmanian forest type.

The results of the Tasmanian Forest Carbon Study and Maroni *et al* (2010) included updated values for the total carbon stock in Tasmania's forests, and for the carbon densities (mass per hectare) for various forest types. Carbon densities were highest in the more productive and wetter forests, and lower in the drier and alpine forests. Carbon stocks had remained relatively stable from 1990 to 2010.

Under current harvesting patterns, fire regimes and environmental conditions, the total amount of carbon in vegetation and debris in native forests was expected to increase by around 1.0-1.7 per cent by 2050, with additional increases in plantations. Tasmania's forests were predicted to sequester an average net 3-4 million tonnes of carbon dioxide (equivalent) annually between 2010 and 2050. Emissions from regeneration burns in native forests and plantations were predicted to have a relatively small impact on total carbon fluxes as compared with the total amount of carbon sequestered. Storage of carbon in wood products also provided a contribution to total carbon stocks. Changes to the active management of forests had the potential to reduce or increase carbon stocks.

In summary, there has been progress in understanding carbon stocks and flows in Tasmanian forests and the potential effects of harvesting, fire and climate change.

In the third five-yearly review, the Independent Reviewer recognised the need for a forest condition-monitoring framework that can assess the impacts of short-term and longer-term threats to the productivity and sustainability of forest ecosystems, including climate change, across all tenures. One recommendation made by the Independent Reviewer has implications for carbon values and climate change. The Australian and Tasmanian governments agreed to this recommendation, with their responses as follows:

Recommendation 5 – The State builds on its existing monitoring framework to develop a long term forest condition monitoring system across all forest tenures to assess changes in ecosystem health and vitality.

The Australian and Tasmanian governments recognise that a state-wide forest monitoring information system would be a valuable tool to assess and monitor changes in ecosystem health and vitality.

Through the Australian and Tasmanian State of the Forests Report series, the scale and impact on forest health is identified from a variety of processes and agents, both natural and human-induced.

Tasmania's public forest managers have a range of monitoring systems that cover different aspects of the forest estate. The information from these systems is used to inform adaptive management and continuous improvement approaches to the management of Tasmanian forests.

The Tasmanian Government agrees to consider implementing a state-wide forest monitoring information system. This would likely require greater integration of existing systems and the development of new tools to assist in the long-term monitoring of forest condition and biodiversity, including threatened species.

Other online sources of information on carbon values and climate change include State National Greenhouse Gas Inventories (Commonwealth of Australia 2016b).

Conclusion on carbon and climate change

This section draws together the information for carbon and climate change in Tasmanian forests. Where information is available, likely future trends are discussed.

The Independent Reviewer's analysis noted that the interaction between climate change and forests has emerged as a more significant issue since the Regional Forest Agreement was signed in 1997. Recent public consultations with regard to the Tasmanian Regional Forest Agreement have received a number of submissions relating to climate change and forestry in Tasmania.

The Comprehensive Regional Assessment identified four elements of the approach to maintaining forest contributions to global carbon cycles. Since that time more information has become available, for example, more research has occurred on carbon dynamics, the dynamics of carbon sequestration in older forests and the effects of rotation lengths on carbon sequestration. A range of reporting tools, such as the State National Greenhouse Gas Inventories, have also been developed.

Climate change projections for Tasmania provide an overview of likely impacts on the future climate. In the future, there is a very high confidence of projected higher average temperatures and more hot days and warm spells. There is also high confidence in projected increased intensity of extreme rainfall events and a harsher fire-weather climate. These changes could lead to a number of impacts including the tree species that can be grown in plantations, changes to the growth rates of native and plantation forests, and a range of complex changes to forest communities and the species that live within them.

If the predicted changes occur then it is highly unlikely that forest carbon stocks will be maintained at their current levels. Recent research suggests that active forest management and the storage of carbon in wood products can contribute to the mitigation of greenhouse gas emissions.

Summary and future management of the Principles of Ecologically Sustainable Management of forests

The Tasmanian Regional Forest Agreement had regard to an Independent Expert Advisory Group assessment of the Principles of Ecologically Sustainable Management of forests in the development of Tasmania's Forest Management System. This chapter has provided a further assessment of the Principles of Ecologically Sustainable Management of forests.

Assessment of the ecological sustainability of Tasmania's Forest Management System requires evaluation against the seven specific and two general Principles of Ecologically Sustainable Management of forests. The nine Principles of Ecologically Sustainable Management of forests were delivered in the Tasmanian Regional Forest Agreement through the accreditation of Tasmania's Forest Management System. This accreditation ensured there was an extensive Comprehensive, adequate and representative reserve system for the conservation of forest and non-forest vegetation communities in perpetuity. It also ensured that Ecologically Sustainable Forest Management on the public and private forest estate is practiced to provide for wood and non-wood products, as well as ecosystem services and other societal benefits. A varied Tasmanian Regional Forest Agreement will provide for the long-term stability of forests and forest industries, a Comprehensive Adequate and Representative Reserve System and the ongoing ecologically sustainable management and use of forested area in Tasmania.

The implementation of the first general principle '*Maintain the full suite of forest values for present and future generations*' is achieved in the Tasmanian Regional Forest Agreement through the application of a balanced approach to conservation, industry development and sustainable use of resources. This balance has been refined over the years, such as the *2005 Supplementary Tasmanian Regional Forest Agreement* that supported further sustainable environmental, industry, social and economic outcomes. A varied Tasmanian Regional Forest Agreement would commit the Australian and Tasmanian governments to demonstrate through five-yearly reviews that Tasmania's forest estate is obtaining for the community the full range of environmental, economic and social benefits from all forest uses within ecological limits.

The implementation of the first specific principle '*Maintain and enhance long-term multiple socio-economic benefits to meet the needs of societies*' is achieved in the Tasmanian Regional Forest Agreement through the promotion of forest-related economic activity consistent with the maintenance of the environment and satisfaction of the socio-economic requirements for income, employment, goods and services. In recognition of the contribution of forest-based industries to the Tasmanian economy, a varied Tasmanian Regional Forest Agreement would support future growth and development of Tasmanian industries associated with forests and timber products, and other forest uses as appropriate.

The commitment to the second specific principle '*Protect and maintain biodiversity*' is actioned through implementation and management of the components of the comprehensive, adequate and representative reserve system together with the components of Tasmania's Forest

Management System applying to the management and conservation of biodiversity. A varied Tasmanian Regional Forest Agreement would commit the Australian and Tasmanian governments to agree that the comprehensive adequate and representative reserve system, and the application of Tasmania's Forest Management System, protects environment and heritage values, including Matters of National Environmental Significance.

The 'maintaining a permanent forest estate' and 'sustainable yield' provisions of the Tasmanian Regional Forest Agreement underpin the implementation of the third specific principle '*Maintain the productive capacity and sustainability of forest ecosystems*'. Independent reviewers have consistently found that the commitments associated with Maintaining a Permanent Forest Estate and sustainable yield were fulfilled over the 15-year period of the Tasmanian Regional Forest Agreement to 2012 (i.e. the review periods). If extended, the varied Tasmanian Regional Forest Agreement would continue to commit the parties to regular reviews of sustainable yield and to maintain a Permanent Native Forest Estate Policy.

The implementation to the fourth specific principle '*Maintain forest ecosystem health and vitality*' is primarily managed in the Tasmanian Regional Forest Agreement through management plans for state forests, national parks and other reserves, state-wide policies on fire management and pest and disease management and priority strategic research into fire and pest and disease control including reduced chemical use of pesticides. As part of the response to the third five-yearly review of the Tasmanian Regional Forest Agreement, the Tasmanian Government has committed to progress management planning arrangements for three national parks and to consider implementing a state-wide forest monitoring information system.

The implementation of the fifth specific principle "Protect soil and water resources" is achieved through a number of mechanisms, such as the Forest Practices Code, the Permanent Native Forest Estate Policy and the Reserve Management Code of Practice. Tasmania's Forest Management System, together with the Comprehensive, adequate and representative reserve system and the Permanent Native Forest Estate Policy, implemented under a varied Tasmanian Regional Forest Agreement would continue to meet the requirements of the National Forest Policy Statement for the protection of catchment management objectives.

The commitment to the sixth specific principle '*Maintain forests' contribution to global carbon cycles*' is achieved in the Tasmanian Regional Forest Agreement through forest clearing and conversion provisions incorporated into the Permanent Native Forest Estate Policy, as well as strategic research on carbon related issues. A varied Tasmanian Regional Forest Agreement would include a commitment by the Tasmanian Government to manage its forests in accordance with the National Forest Policy Statement objectives and policies as they relate to climate change, adaptation and carbon. This would include an acknowledgement that forests need to be managed to maintain or enhance their contribution to the carbon cycle.

The commitment to the seventh specific principle '*Maintain natural and cultural heritage values*' is achieved through the sustainable management of natural and cultural heritage sites, indigenous heritage and values, national estate values and World Heritage sites, properties and values. A varied Tasmanian Regional Forest Agreement will continue to provide for the protection of environment and heritage values, including World Heritage, National Heritage Values of National Heritage Places and Commonwealth Heritage Values of Commonwealth

Heritage Places, through the comprehensive, adequate and representative reserve system and the application of Tasmania's Forest Management System.

The second general principle '*Utilise the precautionary principle for prevention of environmental degradation*' was implemented through the development of environmental management systems, the Forest Practices Code, the Permanent Native Forest Estate Policy, the Reserve Management Code of Practice and the priority placed on recovery plans. A varied Tasmanian Regional Forest Agreement will ensure that all of these elements will remain key components of Tasmania's Forest Management System into the future. References to recovery plans in the varied Tasmanian Regional Forest Agreement will be updated to refer to statutory conservation planning documents—a term that encompasses conservation advice, recovery plans, threat abatement plans and wildlife conservation plans.

In conclusion, Ecologically Sustainable Forest Management is an objective which requires a long term commitment to continuous improvement. Many of the specific milestones and commitments associated with Ecologically Sustainable Forest Management in the Tasmanian Regional Forest Agreement have now been completed, implemented or superseded (Kile 2015). A varied Tasmanian Regional Forest Agreement will continue to provide for the ecologically sustainable management and use of forests in Tasmania, and commit the Australian and Tasmanian governments to its key elements, including the maintenance of the comprehensive, adequate and representative reserve system and an integrated, complementary and strategic Forest Management System capable of responding to new information.

Conclusion

The Tasmanian Regional Forest Agreement provides an efficient and effective, long-term solution to access and use of Tasmania's forests. It balances competing economic, social and environmental demands on forests by setting obligations and commitments for forest management that have delivered an expanded forest conservation estate, ecologically sustainable management and significantly deregulated resource access and supply to industry.

In 1997, the Tasmanian Regional Forest Agreement was entered into having regard to assessments of the matters listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth) being:

- environmental values, including old growth, wilderness, endangered species, national estate values and world heritage values
- indigenous heritage values
- economic values of forested areas and forest industries
- social values (including community needs)
- the principles of ecologically sustainable management.

Assessments of these matters were undertaken through the Comprehensive Regional Assessment process that preceded the signing of the Agreement. This report has provided a further assessment of the matters listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth), the outcomes of which are summarised below.

Since Tasmanian Comprehensive Regional Assessment processes in 1996, the area of protected old growth forest has increased by 300 000 hectares or 30.5 per cent, and the amount of old growth forests harvested has significantly decreased as a result of further reservation, implementation of adaptive management prescriptions and the requirements for sustainable forest management certification. Wilderness values are now almost entirely protected within the reserve estate, with the area of high quality wilderness reaching 97 per cent; far surpassing the target of 90 per cent reservation (Commonwealth of Australia 1997).

All threatened species are protected through Commonwealth and state environmental legislation, and Tasmania's Forest Practices System—refer to *Tasmania's Forest Management System: An Overview (2017)* (Department of State Growth 2017). In the very few instances where forestry operations have been identified as a possible threat to a listed species, the Forest Practices System has required new management prescriptions to protect that species. *Tasmania's Forest Management System: An Overview (2017)* (Department of State Growth 2017) includes a case study demonstrating how swift parrot management has responded to new information and threats. Tasmania's Forest Management System continues to be reviewed and updated in response to new information.

While the register of National Estate places no longer exists as a mechanism to list and describe places and values, National Estate values (as defined at the signing of the Tasmanian Regional Forest Agreement as those values attributed by the Australian Heritage Commission) continue

to be managed through a range of new management structures including the National Heritage List, the Commonwealth Heritage List, the Tasmanian Heritage Register, local planning schemes and Tasmania's Forest Practices System. Tasmanian places of aesthetic, historic, scientific and social significance are comprehensively managed for current and future generations.

World heritages values are predominantly protected and managed within the Tasmanian Wilderness World Heritage Area. Forestry operations in World Heritage sites are not exempt from the assessment and approval requirements in Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

The comprehensive, adequate and representative reserve system established in accordance with the Tasmanian Regional Forest Agreement provides for the protection of Tasmania's unique biodiversity. The reserve estate is interconnected, healthy, and capable of supporting genetic and species diversity. Tasmania's Permanent Native Forest Estate Policy maintains an extensive and permanent native forest estate while allowing for sustainable agricultural development where appropriate. Tasmania's Forest Management System protects the ecological character of Ramsar wetlands, in accordance with the Ramsar Convention. Potential indirect or offsite impacts to Ramsar wetlands are managed through the soil and water provisions of the Forest Practices Code.

Tasmanian Regional Forest Agreement processes have led to significant improvements in the management and protection of Aboriginal heritage values in Tasmanian forests. Tasmania's Forest Management System provides for the protection of Aboriginal heritage values, including the formal use and right to access forests for Aboriginal people and the protection of sites and relics of cultural significance. Formal management regimes that recognise Aboriginal heritage values have been established under Tasmanian legislation. Informal arrangements are also in place to facilitate Aboriginal cultural activities. The Forest Practices Code provides for the assessment, planning, management and protection of Aboriginal heritage within production forests, and guidelines supporting the relevant parts of the code are revised and updated in response to new information. In multiple-use public forests, known sites and identified new sites are coded with special management zones to identify Aboriginal and cultural heritage sites. Since the signing of the Tasmanian Regional Forest Agreement in 1997, Tasmania's Forest Management System has improved its ability to respond to matters of significance to the Aboriginal community. A varied Tasmanian Regional Forest Agreement will continue to provide the framework for the protection of Aboriginal heritage values and commit the Australian and Tasmanian governments to meaningful consultation on all aspects of forest management with the Aboriginal community.

Tasmania's forested areas and forest industry provide multiple economic benefits to Tasmanian society. Since the signing of the Tasmanian Regional Forest Agreement in 1997 there has been significant change in the structure and management of the production forest estate. Successive forest agreements (subsequent to the 1997 Tasmanian Regional Forest Agreement) have reduced the area of public native forest available for wood production while providing investment in initiatives to improve the productivity of remaining forests. The management, size and structure of the Tasmanian plantation estate has also changed, largely as a result of the significant investment in hardwood plantations from tax incentives through Managed Investment Schemes and investment in industrial-scale plantations managed for pulpwood. In addition, a limited area of public native forests was converted to hardwood plantations in the

early period of the Tasmanian Regional Forest Agreement for productivity improvements to offset the substantially increased protections for old growth forest and specific forest communities. In response, industry structure has evolved to adapt to changes in production forests, maintaining a sustainable balance between economic, social and environmental objectives. It is likely that the plantation estate has now reached its maximum area. Consolidation of the plantation estate will likely occur in the next few decades as land is converted to other uses.

Reserved forests and areas managed for wood production are becoming increasingly important elements of the tourism and the visitor economy. Investment and expenditure in forest management is ongoing with responsibility for forest management dispersed between public and private land owners and managers; it has been strongly influenced by market conditions. A varied Tasmanian Regional Forest Agreement will continue to ensure Tasmania's public forests remain available for multiple uses, such as forestry operations, tourism, apiculture and the collection of non-timber forest products. It will also continue to support an internationally competitive wood production and wood products industry that is capable of responding to market demands for new innovative wood products, such as wood pellets for bioenergy. The governments' microeconomic reforms of innovation, increased productivity and industry deregulation will continue to be implemented under a varied Tasmanian Regional Forest Agreement.

Tasmanians hold a variety of views in relation to the use and management of Tasmania's forest resources. Tasmanian communities have strong social and cultural connections to forests, including for provision of wood and non-wood forest products, direct and indirect employment and nature-based recreation. Divergent community views about the role of forests emphasises the ongoing importance of forests to people, whether it be for income, recreation or environmental benefits. Amendments to the *National Parks and Wildlife Act 1970* (Tas) in 1999 as a result of the Tasmanian Regional Forest Agreement led to the overwhelming majority of reserved forested land being made available for recreation and tourism. Almost all public forested land in Tasmania, including wilderness, is now available for recreation and tourism. The long-term trend has been for visitor numbers to increase, however, there have been periods of growth and decline. The significant decline in employment in the forestry industry over the last 20 years, and since 2008 in particular, has had a considerable impact on regional communities. The Tasmanian forest industry remains a major employer in non-urban and regional communities in Tasmania. In 2016, 3125 people were directly employed in the industry (Australian Bureau of Statistics 2016); 1.55 per cent of the workforce in Tasmania. In 2013, it supported an additional 8 780 full-time equivalent jobs in other sectors of the economy (O'Hara et al. 2013). Increased spending from wages also creates and supports jobs in other sectors, including in retail, hospitality, education and health. Without these indirect benefits, many regional communities would be disadvantaged. Over the term of the Tasmanian Regional Forest Agreement, the Tasmanian forest industry has undergone significant structural change, reflecting challenging trading conditions and the development of a significant hardwood plantation estate. Existing businesses are now in a position to capitalise on the improved trading conditions that have emerged over the last two years. This is expected to have material long-term benefits for the regional communities that still have a large dependency on the forestry industry. A varied Tasmanian Regional Forest Agreement will maintain the extent and

proportion of forests available for recreation or tourism, and provide additional certainty to the Tasmanian forest industry and the community.

The Tasmanian Regional Forest Agreement is a long-term strategic and holistic plan that implements the principles of ecologically sustainable management for Tasmania forests. It provides for ecologically sustainable management through:

- the maintenance of the comprehensive, adequate and representative reserve system
- complementary off-reserve management
- an integrated, complementary and strategic Forest Management System capable of responding to new information
- internationally competitive forest product industries which are economically sustainable and provide social and economic benefits
- monitoring through performance indicators.

The applications of sustainable yield and the conservation and sustainable use of forest resources for current and future generations has ensured that the health, diversity and productivity of the environment has been maintained for the benefit of future generations. Ecological sustainable management under the Tasmanian Regional Forest Agreement has provided the framework within which the Commonwealth and Tasmanian governments have systematically provided sustainable outcomes for forests and people in a responsive and adaptable manner. A varied Tasmanian Regional Forest Agreement will provide for the long-term stability of forests and forest industries, a comprehensive, adequate and representative reserve system and the ongoing ecologically sustainable management and use of forested area in Tasmania.

Independent five-yearly reviews of the Tasmanian Regional Forest Agreement report on the matters listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth). Independent reviewers consider environmental values, indigenous heritage values, economic values of forested areas and forest industries, social values and the principles of ecologically sustainable management within the Tasmanian Regional Forest Agreement region. Review reports are tabled in the Australian Parliament and the Commonwealth and Tasmanian governments respond to any recommendations through joint government responses. Should the Tasmanian Regional Forest Agreement be varied, subsequent five-yearly extensions would be contingent on successful completion of these independent five-yearly reviews.

Five-yearly *State of the Forests Tasmania* reports have provided a regular reporting mechanism through which the adaptive management and continual improvement processes for the Tasmanian forest management system are demonstrated. As required under the Tasmanian Regional Forest Agreement, these processes have been implemented by the relevant agencies over the life of the Tasmanian Regional Forest Agreement.

This report has demonstrated that the Australian and Tasmanian governments have, through a comprehensive and diverse range of processes, formally had ongoing regard to the matters listed in para (a) of the definition of 'RFA' in the *Regional Forest Agreements Act 2002* (Cth) relevant to the Tasmanian region. Given the commitments of both governments to continue implementing the ongoing obligations and commitments of the Tasmanian Regional Forest

Agreement, while allowing for the framework and implementation mechanisms to be responsive to new information consistent with adaptive management and continual improvement principles, it could be expected that the recognised world-class management of Tasmanian forests (see McDermott, et al. 2007) would continue within this framework.

Appendices

Appendix A – Listings of Priority Species from the 1997 Tasmanian Regional Forest Agreement Attachment 2, in the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) and *Threatened Species Protection Act 2002* (Tas)

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 <i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cth) listed	2017 <i>Threatened Species Protection Act 2002</i> (Tas) listed
Fauna species		
Species with recovery action committed or under way		
<i>Astacopsis gouldi</i> (Giant freshwater lobster)*	Vulnerable	Vulnerable
<i>Galaxias fontanus</i> (Swan galaxias)*	Endangered	Endangered
<i>Galaxias johnstoni</i> (Clarence galaxias)*	Endangered	Endangered
<i>Galaxias tanycephalus</i> (Saddled galaxias)*	Vulnerable	Vulnerable
<i>Lathamus discolor</i> (Swift parrot)*	Critically Endangered	Endangered
Species requiring recovery action		

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Beddomeia krybetes</i> (Hydrobiid snail), north-east Tasmania #	Not Listed	Vulnerable
<i>Beddomeia tumida</i> (Hydrobiid snail) #	Not Listed	Endangered
<i>Dasyurus maculatus</i> (Spotted-tailed quoll) *	<i>Dasyurus maculatus maculatus</i> (Tasmanian population)—Vulnerable	<i>Dasyurus maculatus maculatus</i> (Tasmanian population)—Rare
<i>Dasyurus viverrinus</i> (Eastern quoll) *	Endangered	Not Listed
<i>Engaeus orramakunna</i> (Mt Arthur burrowing crayfish) #	Vulnerable	Vulnerable
<i>Engaeus spinicaudatus</i> (Scottsdale burrowing crayfish) #	Endangered	Endangered
<i>Engaeus yabbimunna</i> (Burnie burrowing crayfish) #	Vulnerable	Vulnerable
<i>Geodetrechus mendumae</i> (Cave carabid beetle) #	Not Listed	Vulnerable
<i>Geodetrechus parallelus</i> (Cave carabid beetle) #	Not Listed	Vulnerable
<i>Hoplogonus simsoni</i> (Simson's stag beetle) #	Vulnerable	Vulnerable
<i>Lissotes latidens</i> (Broadtoothed stag beetle) #	Endangered	Endangered
<i>Lissotes menalcas</i> (Mt Mangana stag beetle) #	Not Listed	Rare
<i>Prototroctes maraena</i> (Australian grayling) *	Vulnerable	Vulnerable
<i>Tasmanipatus anophthalmus</i> (Blind velvet worm) #	Endangered	Endangered
<i>Tasmanipatus barretti</i> (Giant velvet worm) #	Not Listed	Rare
<i>Tasmanotrechus cockerilli</i> (Cave beetle) #	Not Listed	Rare

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 <i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cth) listed	2017 <i>Threatened Species Protection Act 2002</i> (Tas) listed
Species with recovery plans needing revision		
<i>Aquila audax fleayi</i> (Wedge-tailed eagle) #	Endangered	Endangered
<i>Pardalotus quadragintus</i> (Forty-spotted pardalote) *	Endangered	Endangered
Species requiring further research		
<i>Accipiter novaehollandiae</i> (Grey goshawk) #	Not Listed	Endangered
<i>Anoglypta launcestonensis</i> (North-east forest snail) #	Not Listed	Not Listed
<i>Antipodia chaostola</i> (Skipper) #	<i>Antipodia chaostola leucophaea</i> — Endangered	<i>Antipodia chaostola leucophaea</i> — Endangered
<i>Beddomeia</i> spp. (snails) #	Not Listed	Various species—Vulnerable to Endangered
<i>Fraus latistria</i> (moth) #	Not Listed	Not Listed
<i>Migas plomleyi</i> (spider) #	Not Listed	Endangered
<i>Miselaoma weldi</i> (Stanley snail) #	Not Listed	Endangered
<i>Oreixeneca ptunnara</i> (brown butterfly) #	Endangered	Vulnerable
<i>Phrantela</i> spp. (snails) #	Not Listed	Rare
<i>Roblinella agnewi</i> (Land snail) #	Not Listed	Rare
<i>Schayeria bailus</i> (Schayer's grasshopper) #	Not Listed	Endangered

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Trichopteran</i> spp. (caddis flies) #	Not Listed	Not Listed
Further priority species requiring protection		
<i>Galaxiella pusilla</i> (Dwarf galaxias) #	Vulnerable	Vulnerable
<i>Ooperipatellus</i> 'cryptus' (North-west peripatus) #	Not Listed	Not Listed
Flora species		
Species with recovery action committed or under way		
<i>Acacia axillaris</i> *	Vulnerable	Vulnerable
<i>Barbarea australis</i> *	Endangered	Endangered
<i>Caladenia caudata</i> *	Vulnerable	Vulnerable
<i>Epacris acuminata</i> *	Not Listed	Not Listed
<i>Epacris apsleyensis</i> *	Endangered	Endangered
<i>Epacris barbata</i> #	Endangered	Endangered
<i>Epacris glabella</i> *	Endangered	Endangered
<i>Epacris grandis</i> *	Endangered	Endangered
<i>Epacris limbata</i> *	Critically Endangered	Endangered
<i>Epacris virgata</i> *	Endangered	Vulnerable

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Epacris virgata</i> sens. strict 'Beaconsfield' *	Listed as Endangered under <i>Epacris virgata</i>	Listed as Vulnerable under <i>Epacris virgata</i>
<i>Eucalyptus morrisbyi</i> *	Endangered	Endangered
<i>Glycine latrobeana</i> *	Vulnerable	Vulnerable
<i>Lasiopetalum micranthum</i> *	Not Listed	Rare
<i>Lepidium hyssopifolium</i> *	Endangered	Endangered
<i>Phebalium daviesii</i> *	Critically Endangered	Endangered
<i>Pultenaea selaginoides</i> *	<i>Stonesiella selaginoides</i> —Endangered	<i>Stonesiella selaginoides</i> —Endangered
<i>Tetratheca gunnii</i> *	Critically Endangered	Endangered
Species requiring recovery action		
<i>Amphibromus macrorhinus</i> #	Not Listed	Endangered
<i>Anogramma leptophylla</i> #	Not Listed	Vulnerable
<i>Asplenium hookerianum</i> *	Vulnerable	Endangered
<i>Bertya rosmarinifolia</i> #	<i>Bertya tasmanica</i> subsp. <i>tasmanica</i> — Endangered	<i>Bertya tasmanica</i> subsp. <i>tasmanica</i> — Endangered
<i>Blechnum cartilagineum</i> #	Not listed	Vulnerable
<i>Brachyscome rigidula</i> #	Not listed	Vulnerable
<i>Brunonia australis</i> #	Not listed	Rare

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Caladenia pallida</i> #	Critically Endangered	Endangered
<i>Cheilanthes distans</i> #	Not Listed	Endangered
<i>Discaria pubescens</i> #	Not Listed	Endangered
<i>Doodia caudata</i> #	<i>Blechnum rupestre</i> —Not Listed	<i>Blechnum rupestre</i> —Endangered
<i>Epacris exserta</i> #	Endangered	Endangered
<i>Epacris graniticola</i> #	Critically Endangered	Vulnerable
<i>Eryngium ovium</i> #	Not Listed	Vulnerable
<i>Euphrasia scabra</i> #	Not Listed	Endangered
<i>Gratiola pubescens</i> #	Not Listed	Vulnerable
<i>Haloragis aspera</i> #	Not Listed	Vulnerable
<i>Hibbertia obtusifolia</i> #	Not Listed	Extinct
<i>Hyalosperma demissum</i> #	Not Listed	Endangered
<i>Hydrocotyle laxifolia</i> #	<i>Hydrocotyle laxiflora</i> —Not Listed	<i>Hydrocotyle laxiflora</i> —Endangered
<i>Hypolepis distans</i> #	Endangered	Endangered
<i>Lobelia pratioides</i> #	Not Listed	Vulnerable
<i>Pneumatopteris pennigera</i> #	Not Listed	Endangered

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Pomaderris elachophylla</i> #	Not Listed	Vulnerable
<i>Prasophyllum milfordense</i> #	Critically Endangered	Endangered
<i>Prostanthera rotundifolia</i> #	Not Listed	Vulnerable
<i>Pultenaea hibbertioides</i> #	<i>Pultenaea mollis</i> —Not Listed	Vulnerable
<i>Scaevola aemula</i> #	Not Listed	Endangered
<i>Schoenus latelaminatus</i> #	Not Listed	Endangered
<i>Scleranthus diander</i> #	Not Listed	Vulnerable
<i>Scleranthus fasciculatus</i> #	Not Listed	Vulnerable
<i>Spyridium microphyllum</i> *	<i>Spyridium lawrencei</i> —Endangered	<i>Spyridium lawrencei</i> —Vulnerable
<i>Tricoryne elatior</i> #	Not Listed	Vulnerable
<i>Velleia paradoxa</i> #	Not Listed	Vulnerable
<i>Xanthorrhoea bracteata</i> *	Endangered	Vulnerable
Species with recovery plans needing revision		
<i>Callitris aff. oblonga</i> *	<i>Callitris oblonga</i> subsp. <i>oblonga</i> — Endangered	<i>Callitris oblonga</i> subsp. <i>oblonga</i> —Vulnerable
<i>Spyridium obcordatum</i> *	Vulnerable	Vulnerable
<i>Stenanthemum pimelioides</i> *	Vulnerable	Vulnerable

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 <i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cth) listed	2017 <i>Threatened Species Protection Act 2002</i> (Tas) listed
Species requiring further research (species presumed extinct are marked ')		
<i>Alternanthera denticulata</i> #	Not Listed	Endangered
<i>Argentipallium spiceri</i> # '	Not Listed as now considered a hybrid	Not Listed as now considered a hybrid
<i>Ballantinia antipoda</i> # '	Endangered	Extinct
<i>Brachyscome sieberi</i> var. <i>gunnii</i> #	Not Listed	Not Listed
<i>Brachyscome tenuiscapa</i> var. <i>pubescens</i> #	Not Listed	Not Listed
<i>Caladenia lindleyana</i> #	Critically Endangered	Endangered
<i>Cyathea X marcescens</i> #	Not Listed	Endangered
<i>Deyeuxia lawrencei</i> # '	Extinct	Extinct
<i>Hypoxis vaginata</i> #	<i>Pauridia vaginata</i> —Not Listed	
<i>Isolepis stellata</i> #	Not Listed	Rare
<i>Podotheca angustifolia</i> # '	Not Listed	Extinct
<i>Polyscias sambucifolia</i> #	<i>Polyscias</i> sp. Douglas-Denison—Not Listed	<i>Polyscias</i> sp. Douglas-Denison—Endangered
<i>Prostanthera cuneata</i> # '	Not Listed	Extinct
<i>Thesium australe</i> # '	Vulnerable	Extinct
<i>Thismia rodwayi</i> #	Not Listed	Rare

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Veronica notabilis</i> #	Not Listed	Extinct
<i>Wurmbea latifolia</i> #	<i>Wurmbea latifolia</i> subsp. <i>vanessae</i> —Not Listed	<i>Wurmbea latifolia</i> subsp. <i>vanessae</i> —Endangered
Further priority species requiring protection		
<i>Acacia pataczekii</i> #	Not Listed	Rare
<i>Agrostis aemula</i> var. <i>setifolia</i> #	<i>Lachnagrostis punicea</i> spp. <i>punicea</i> —Not Listed	<i>Lachnagrostis punicea</i> spp. <i>punicea</i> —Rare
<i>Allocasuarina duncanii</i> #	Not Listed	Rare
<i>Aphelia gracilis</i> #	Not Listed	Rare
<i>Aphelia pumilio</i> #	Not Listed	Rare
<i>Arthrochilus huntianus</i> #	<i>Arthrochilus huntianus</i> spp. <i>huntianus</i> now <i>Thynninorchis huntiana</i> —Not Listed <i>Arthrochilus huntianus</i> spp. <i>nothofagicola</i> now <i>Thynninorchis nothofagicola</i> —Critically Endangered	<i>Thynninorchis huntiana</i> —Extinct <i>Thynninorchis nothofagicola</i> —Endangered
<i>Asperula subsimplex</i> #	Not Listed	Rare
<i>Austrofestuca hookeriana</i> #	<i>Hookerchloa hookeriana</i> —Not Listed	<i>Hookerchloa hookeriana</i> —Not Listed
<i>Banksia serrata</i> #	Not Listed	Rare
<i>Baumea gunnii</i> #	Not Listed	Rare

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Bolboschoenus medianus</i> #	Not Listed	Rare
<i>Bossiaea obcordata</i> #	<i>Bossiaea tasmanica</i> —Not Listed	<i>Bossiaea tasmanica</i> —Rare
<i>Brachyglottis brunonis</i> #	Not Listed	Rare
<i>Brachyscome radicata</i> #	Not Listed	Rare
<i>Caesia calliantha</i> #	Not Listed	Rare
<i>Calocephalus citreus</i> #	Not Listed	Rare
<i>Carex gunniana</i> #	Not Listed	Rare
<i>Carex longebrachiata</i> #	Not Listed	Rare
<i>Centipedia cunninghamii</i> #	Not Listed	Rare
<i>Chiloglottis trapeziformis</i> #	Not Listed	Endangered
<i>Colobanthus curtisiae</i> #	Vulnerable	Rare
<i>Cryptandra amara</i> #	Not Listed	Endangered
<i>Danthonia popinensis</i> #	<i>Rytidosperma fulvum</i> —Not Listed	<i>Rytidosperma fulvum</i> —Not Listed
<i>Danthonia procera</i> #	<i>Rytidosperma indutum</i> —Not Listed	<i>Rytidosperma indutum</i> —Rare
<i>Desmodium gunnii</i> #	Not Listed	Vulnerable
<i>Deyeuxia minor</i> #	Not Listed	Rare

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Dianella longifolia</i> var. <i>longifolia</i> #	<i>Dianella amoena</i> —Endangered	<i>Dianella amoena</i> —Rare
<i>Dryopoa dives</i> #	Not Listed	Rare
<i>Ehrharta juncea</i> #	<i>Tetrarrhena juncea</i> —Not Listed	<i>Tetrarrhena juncea</i> —Not Listed
<i>Epacris</i> aff. <i>exserta</i> 'Union Bridge' #	<i>Epacris exserta</i> —Endangered	<i>Epacris exserta</i> —Endangered
<i>Epacris curtisiae</i> #	Not Listed	Rare
<i>Epacris stuartii</i> #	Critically Endangered	Endangered
<i>Epacris virgata</i> 'Kettering' *	<i>Epacris virgata</i> Endangered	<i>Epacris virgata</i> Vulnerable
<i>Eucalyptus perriniana</i> -#	Not Listed	Rare
<i>Eucalyptus radiata</i> ssp. <i>robertsonii</i> #	<i>Eucalyptus radiata</i> subsp. <i>radiata</i> —Not Listed	<i>Eucalyptus radiata</i> subsp. <i>radiata</i> —Rare
<i>Eucalyptus risdonii</i> #	Not Listed	Rare
<i>Euphrasia fragosa</i> 'Southport' #	<i>Euphrasia fragosa</i> —Critically Endangered	<i>Euphrasia fragosa</i> —Endangered
<i>Euphrasia semipicta</i> #	Endangered	Endangered
<i>Gahnia sieberiana</i> #	Not Listed	Not Listed
<i>Grevillea australis</i> var. <i>tenuifolia</i> #	Not Listed	Not Listed
<i>Gynatrix pulchella</i> #	Not Listed	Rare
<i>Haloragis heterophylla</i> #	Not Listed	Rare

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Hibbertia calycina</i> #	Not Listed	Vulnerable
<i>Isoetopsis graminifolia</i> #	Not Listed	Vulnerable
<i>Isolepis habra</i> #	Not Listed	Rare
<i>Isolepis setacea</i> #	Not Listed	Not Listed
<i>Juncus amabilis</i> #	Not Listed	Rare
<i>Juncus vaginatus</i> #	Not Listed	Rare
<i>Lepidium pseudotasmanicum</i> #	Not Listed	Not Listed
<i>Lepidosperma tortuosum</i> #	Not Listed	Rare
<i>Leptorhynchos elongatus</i> #	Not Listed	Endangered
<i>Leucopogon lanceolatus</i> #	<i>Leucopogon affinis</i> —Not Listed	<i>Leucopogon affinis</i> —Rare
<i>Lobelia rhombifolia</i> #	Not Listed	Rare
<i>Lomatia tasmanica</i> #	Critically Endangered	Endangered
<i>Melaleuca pustulata</i> #	Not Listed	Rare
<i>Micrantheum serpentinum</i> #	Not Listed	Rare
<i>Odixia achlaena</i> #	Not Listed	Rare
<i>Pentachondra ericaefolia</i> #	Not Listed	Rare

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Pimelea curviflora</i> var. <i>Gracilis</i> #	Not Listed	Rare
<i>Pimelea filiformis</i> #	Not Listed	Not Listed
<i>Pimelea pauciflora</i> #	Not Listed	Not Listed
<i>Poa mollis</i> #	Not Listed	Rare
<i>Pomaderris oraria</i> #	<i>Pomaderris oraria</i> subsp. <i>oraria</i> —Rare	<i>Pomaderris oraria</i> subsp. <i>oraria</i> —Not Listed
<i>Pomaderris phyllicifolia</i> #	Both spp. <i>Ericoides</i> and spp. <i>Phyllicifolia</i> —Not Listed	Both spp. <i>Ericoides</i> and spp. <i>Phyllicifolia</i> —Rare
<i>Prasophyllum</i> aff. <i>fitzgeraldii</i> 'Knocklofty' #	Presume now <i>Prasophyllum perangustum</i> (Knocklofty Leek-orchid)—Endangered	Presume now <i>Prasophyllum perangustum</i> (Knocklofty Leek-orchid)—Critically Endangered
<i>Prasophyllum robustum</i> #	Critically Endangered	Endangered
<i>Pultenaea humilis</i> #	Not Listed	Vulnerable
<i>Rutidosia multiflora</i> #	<i>Siloxerus multiflorus</i> —Not Listed	<i>Siloxerus multiflorus</i> —Rare
<i>Schoenoplectus validus</i> #	<i>Schoenoplectus tabernaemontani</i> —Not Listed	<i>Schoenoplectus tabernaemontani</i> —Rare
<i>Senecio squarrosus</i> #	Not Listed	Rare
<i>Stipa bigeniculata</i> #	<i>Austrostipa blackii</i> —Not Listed	<i>Austrostipa blackii</i> —Rare
<i>Stipa scabra</i> #	<i>Austrostipa scabra</i> —Not Listed	<i>Austrostipa scabra</i> —Rare
<i>Thryptomene micrantha</i> #	Not Listed	Vulnerable

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Vittadinia cuneata</i> #	<i>Vittadinia cuneata</i> var. <i>cuneata</i> —Not Listed	<i>Vittadinia cuneata</i> var. <i>cuneata</i> —Rare
<i>Vittadinia gracilis</i> #	Not Listed	Rare
<i>Vittadinia muelleri</i> #	Not Listed	Rare
Species with existing protection by management prescription and/or reservation		
<i>Bettongia gaimardi</i> (Tasmanian bettong)	Not Listed	Not Listed
<i>Helicarion rubicundus</i> (Burgundy snail)	Not Listed	Not Listed
<i>Tasmaphena lamproides</i> (Wet forest snail)	Not Listed	Rare
Other species protected through existing mechanisms (e.g. Forest Practices Code and/or reservation)		
Hollow dependent species	-	-
Karst species	-	-
OTHER IDENTIFIED SPECIES REQUIRING FURTHER RESEARCH TO DETERMINE REQUIREMENT FOR PROTECTION OR LISTING		
Species included in the Management Prescriptions Database are marked (E)		
Fauna species		
<i>Accipiter cirrocephalus</i> (Collared sparrowhawk) (E)	Not Listed	Not Listed
<i>Archipetalia auriculata</i> (Alpine dragonfly) (E)	Not Listed	Not Listed
<i>Ceyx azure</i> (Azure kingfisher) (E)	<i>Ceyx azureus diemenensis</i> (Tasmanian Azure Kingfisher)—Endangered	<i>Ceyx azureus diemenensis</i> (Tasmanian Azure Kingfisher)—Endangered

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Cryptops n. sp.</i> (undescribed centipede)	Not Listed	Not Listed
<i>Galaxias auratus</i> (Golden galaxias) (E)	Endangered	Rare
<i>Haliaeetus leucogaster</i> (White-bellied sea-eagle) (E)	Not Listed	Vulnerable
<i>Lackrana carbo</i> (Geometrid moth)	Not Listed	Not Listed
<i>Limnodynastes peroni</i> (Perons marsh frog) (E)	Not Listed	Endangered
<i>Myiagra cyanoleuca</i> (Satin flycatcher) (E)	Not Listed	Not Listed
<i>Neiboissoperla n. sp.</i> (Stonefly) (E)	Not Listed	Not Listed
<i>Neopseudogarypus scutellatus</i> (Pseudoscorpion)	Not Listed	Not Listed
<i>Nicteria macrocosma</i> (Geometrid moth)	Not Listed	Not Listed
<i>Paragalaxias mesotes</i> (Arthurs paragalaxias) (E)	Endangered	Endangered
<i>Paralamyctes n. sp.</i> (undescribed centipede)	Not Listed	Not Listed
<i>Reikoperla n. sp.</i> (Stonefly) (E)	Not Listed	Not Listed
<i>Tasmanophilus n. sp.</i> (undescribed centipede)	Not Listed	Not Listed
Undescribed Charopid snail	Not Listed	Not Listed
Flora species		
<i>Arthropodium minus</i>	Not Listed	Not Listed

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 Environmental Protection and Biodiversity Conservation Act 1999 (Cth) listed	2017 Threatened Species Protection Act 2002 (Tas) listed
<i>Asplenium trichomanes</i> ssp. <i>trichomanes</i>	Not Listed	Vulnerable
<i>Boronia rhomboidea</i>	Not Listed	Not Listed
<i>Caladenia</i> aff. <i>carnea</i> 'Latrobe' (E)	Not Listed	Not Listed
<i>Caladenia</i> aff. <i>catenata</i> (E)	Not Listed	Not Listed
<i>Caladenia</i> aff. <i>venusta</i> (E)	<i>Caladenia saggicola</i> —Critically Endangered	<i>Caladenia saggicola</i> —Endangered
<i>Carex bichenoviana</i>	Not Listed	Not Listed
<i>Cyathea cunninghamii</i>	Not Listed	Endangered
<i>Cyrtostylis robusta</i>	Not Listed	Rare
<i>Danthonia nitens</i>	<i>Rytidosperma nitens</i> —Not listed	<i>Rytidosperma nitens</i> —Not listed
<i>Epacris graniticola</i>	Critically Endangered	Vulnerable
<i>Epacris marginata</i>	Not Listed	Not Listed
<i>Epacris virgata</i> var. 'autumnalis' (Sandspit)*	<i>Epacris virgata</i> - Endangered	<i>Epacris virgata</i> - Vulnerable
<i>Eucalyptus archeri</i>	Not Listed	Not Listed
<i>Eucalyptus cordata</i> (E)	Not Listed	Not Listed
<i>Euphrasia gibbsiae</i> spp. <i>psilantherea</i>	Critically Endangered	Endangered
<i>Festuca plebeia</i>	Not Listed	Not Listed

Tasmanian Regional Forest Agreement 'Priority Species' * Cth listed in 1997 # Tas listed in 1997	2017 <i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cth) listed	2017 <i>Threatened Species Protection Act 2002</i> (Tas) listed
<i>Mitrasacme divergens</i>	<i>Phyllangium divergens</i> —Not Listed	<i>Phyllangium divergens</i> —Vulnerable
<i>Prasophyllum aff. odoratum</i> 'Ben Lomond' (E)	Not Listed	Not Listed
<i>Prasophyllum milfordense</i>	Critically Endangered	Endangered
<i>Pultenaea hibbertioides</i>	<i>Pultenaea mollis</i> —Not Listed	<i>Pultenaea mollis</i> —Vulnerable

Sources: For Commonwealth listed species: Department of the Environment and Energy (n.d.). For Tasmanian listed species: Department of Primary Industries, Parks, Water and Environment (2015). For references to the current taxonomic name: Atlas of Living Australia (n.d).

Appendix B – *Environment Protection and Biodiversity Conservation Act 1999* Listed Species and Ecological Communities known or likely to occur in Tasmanian Regional Forest Agreement region

Table 66 – *Environment Protection and Biodiversity Conservation Act 1999* Listed Species known or likely to occur in Tasmanian Regional Forest Agreement region

Scientific name	Common name	EPBC Act Listing Status
<i>Acacia axillaris</i>	Midlands Mimosa, Midlands Wattle	Vulnerable
<i>Acanthiza pusilla archibaldi</i>	King Island Brown Thornbill, Brown Thornbill (King Island)	Endangered
<i>Acanthornis magna greeniana</i>	King Island Scrubtit, Scrubtit (King Island)	Critically Endangered
<i>Actitis hypoleucos</i>	Common Sandpiper	Migratory
<i>Antipodia chaostola leucophaea</i>	Tasmanian Chaostola Skipper, Heath-sand Skipper	Endangered
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory
<i>Aquila audax fleayi</i>	Tasmanian Wedge-tailed Eagle, Wedge-tailed Eagle (Tasmanian)	Endangered
<i>Ardenna carneipes</i>	Flesh-footed Shearwater, Fleshy-footed Shearwater	Marine; Migratory
<i>Arenaria interpres</i>	Ruddy Turnstone	Migratory
<i>Argyrotegium nitidulum</i>	Shining Cudweed	Vulnerable
<i>Asplenium hookerianum</i>	Maidenhair Spleenwort	Vulnerable
<i>Astacopsis gouldi</i>	Giant Freshwater Crayfish, Tasmanian Giant Freshwater Lobster	Vulnerable
<i>Barbarea australis</i>	Native Wintercress, Riverbed Wintercress	Endangered
<i>Bertya tasmanica</i> subsp. <i>tasmanica</i>	Tasmanian Bertya	Endangered

Scientific name	Common name	EPBC Act Listing Status
<i>Boronia gunnii</i>	Gunn's Boronia, Cataract Gorge Boronia	Vulnerable
<i>Boronia hemichiton</i>	Mt Arthur Boronia	Vulnerable
<i>Boronia hippopala</i>	Velvet Boronia	Vulnerable
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered
<i>Brachionichthys hirsutus</i>	Spotted Handfish	Critically Endangered
<i>Brachiopsilus ziebelli</i>	Ziebell's Handfish, Waterfall Bay Handfish	Vulnerable
<i>Bracteantha palustris</i>	Swamp Everlasting	Vulnerable
<i>Caladenia anthracina</i>	Black-tipped Spider-orchid	Critically Endangered
<i>Caladenia campbellii</i>	Thick-stem Caladenia	Critically Endangered
<i>Caladenia caudata</i>	Tailed Spider-orchid	Vulnerable
<i>Caladenia dienema</i>	Windswept Spider-orchid	Endangered
<i>Caladenia lindleyana</i>	Lindley's Spider-orchid	Critically Endangered
<i>Caladenia pallida</i>	Rosy Spider-orchid, Pale Spider-orchid, Summer Spider-orchid	Critically Endangered
<i>Caladenia saggicola</i>	Sagg Spider-orchid	Critically Endangered
<i>Caladenia sylvicola</i>	Forest Fingers	Critically Endangered
<i>Caladenia tonellii</i>	Robust Fingers	Critically Endangered
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Migratory
<i>Calidris alba</i>	Sanderling	Migratory
<i>Calidris canutus</i>	Red Knot, Knot	Endangered
<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically Endangered
<i>Calidris melanotos</i>	Pectoral Sandpiper	Migratory
<i>Calidris ruficollis</i>	Red-necked Stint	Migratory

Scientific name	Common name	EPBC Act Listing Status
<i>Calidris tenuirostris</i>	Great Knot	Critically Endangered
<i>Callitris oblonga</i>	Pygmy Cypress-pine, Pigmy Cypress-pine, Dwarf Cypress-pine	Vulnerable
<i>Callitris oblonga subsp. oblonga</i>	South Esk Pine	Endangered
<i>Cassinia rugata</i>	Wrinkled Cassinia, Wrinkled Dollybush	Vulnerable
<i>Centrolepis pedderensis</i>	Pedder Centrolepis, Pedder Bristlewort	Endangered
<i>Ceyx azureus diemenensis</i>	Tasmanian Azure Kingfisher	Endangered
<i>Charadrius bicinctus</i>	Double-banded Plover	Migratory
<i>Charadrius leschenaultii</i>	Greater Sand Plover, Large Sand Plover	Vulnerable
<i>Charadrius mongolus</i>	Lesser Sand Plover, Mongolian Plover	Endangered
<i>Charadrius ruficapillus</i>	Red-capped Plover	Marine
<i>Charadrius veredus</i>	Oriental Plover, Oriental Dotterel	Migratory
<i>Chionohebe ciliolata</i>	Ciliolate Hebe	Vulnerable
<i>Colobanthus curtisiae</i>	Curtis' Colobanth	Vulnerable
<i>Conospermum hookeri</i>	Variable Smoke-bush	Vulnerable
<i>Craspedia preminghana</i>	Preminghana Billybutton	Endangered
<i>Dasyurus maculatus maculatus (sensu lato)</i>	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (south-east mainland and Tasmanian subspecies)	Vulnerable
<i>Dasyurus maculatus maculatus (Tasmanian population)</i>	Spotted-tail Quoll, Spot-tailed Quoll, Tiger Quoll (Tasmanian population)	Vulnerable
<i>Dasyurus viverrinus</i>	Eastern Quoll, Luaner	Endangered
<i>Dianella amoena</i>	Matted Flax-lily	Endangered
<i>Diomedea antipodensis</i>	Antipodean Albatross	Vulnerable
<i>Diomedea epomophora (sensu stricto)</i>	Southern Royal Albatross	Vulnerable
<i>Diomedea exulans</i>	Wandering Albatross	Vulnerable
<i>Diomedea gibsoni</i>	Gibson's Albatross	Vulnerable
<i>Diomedea sanfordi</i>	Northern Royal Albatross	Endangered

Scientific name	Common name	EPBC Act Listing Status
<i>Diporochaeta pedderensis</i>	Lake Pedder Earthworm	Extinct
<i>Discocharopa vigens</i>	Ammonite Snail	Critically Endangered
<i>Diuris lanceolata</i>	Snake Orchid	Endangered
<i>Engaeus granulatus</i>	Central North Burrowing Crayfish	Endangered
<i>Engaeus martigener</i>	Furneaux Burrowing Crayfish	Endangered
<i>Engaeus orramakunna</i>	Mount Arthur Burrowing Crayfish	Vulnerable
<i>Engaeus spinicaudatus</i>	Scottsdale Burrowing Crayfish	Endangered
<i>Engaeus yabbimunna</i>	Burnie Burrowing Crayfish	Vulnerable
<i>Epacris apsleyensis</i>	Apsley Heath	Endangered
<i>Epacris barbata</i>	Bearded Heath, Freycinet Heath	Endangered
<i>Epacris exserta</i>	South Esk Heath	Endangered
<i>Epacris glabella</i>	Funnel Heath, Smooth Heath	Endangered
<i>Epacris grandis</i>	Grand Heath, Tall Heath	Endangered
<i>Epacris limbata</i>	Border Heath, Bordered Heath	Critically Endangered
<i>Epacris sp. aff. virgata graniticola</i>	Mt Cameron Heath	Critically Endangered
<i>Epacris stuartii</i>	Stuart's Heath, Southport Heath	Critically Endangered
<i>Epacris virgata</i>	Pretty Heath, Dan Hill Heath	Endangered
<i>Eucalyptus gunnii subsp. divaricata</i>	Miena Cider Gum	Endangered
<i>Eucalyptus morrisbyi</i>	Morrisby's Gum, Morrisbys Gum	Endangered
<i>Euphrasia amphisysepala</i>	Shiny Cliff Eyebright	Vulnerable
<i>Euphrasia fragosa</i>	Shy Eyebright, Southport Eyebright	Critically Endangered
<i>Euphrasia gibbsiae subsp. psilantherea</i>	Swamp Eyebright	Critically Endangered
<i>Euphrasia phragmostoma</i>	Buftons Eyebright, Hairy Cliff Eyebright	Vulnerable

Scientific name	Common name	EPBC Act Listing Status
<i>Euphrasia semipicta</i>	Peninsula Eyebright	Endangered
<i>Euphrasia</i> sp. <i>Bivouac Bay</i> (<i>W.R.Barker 7626 et al.</i>)	Masked Eyebright, Masked Cliff Eyebright	Endangered
<i>Fregatta grallaria grallaria</i>	White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian)	Vulnerable
<i>Galaxias auratus</i>	Golden Galaxias	Endangered
<i>Galaxias fontanus</i>	Swan Galaxias	Endangered
<i>Galaxias johnstoni</i>	Clarence Galaxias	Endangered
<i>Galaxias parvus</i>	Swamp Galaxias	Vulnerable
<i>Galaxias pedderensis</i>	Pedder Galaxias	Extinct in the wild
<i>Galaxias tanycephalus</i>	Saddled Galaxias	Vulnerable
<i>Galaxiella pusilla</i>	Eastern Dwarf Galaxias, Dwarf Galaxias	Vulnerable
<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe	Migratory
<i>Gallinago megala</i>	Swinhoe's Snipe	Migratory
<i>Gallinago stenura</i>	Pin-tailed Snipe	Migratory
<i>Genoplesium brachystachyum</i>	Short-spiked Midge-orchid	Endangered
<i>Genoplesium firthii</i>	Firth's Midge-orchid	Critically Endangered
<i>Glycine latrobeana</i>	Clover Glycine, Purple Clover	Vulnerable
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Marine
<i>Heteroscelus brevipes</i>	Grey-tailed Tattler	Marine; Migratory
<i>Hibbertia basaltica</i>	Basalt Guinea-flower	Endangered
<i>Himantopus himantopus</i>	Black-winged Stilt	Marine
<i>Hirundapus caudacutus</i>	White-throated Needletail	Migratory
<i>Hoplogonus bornemisszai</i>	Bornemissza's Stag Beetle	Critically Endangered
<i>Hoplogonus simsoni</i>	Simson's Stag Beetle	Vulnerable
<i>Hoplogonus vanderschoori</i>	Vanderschoor's Stag Beetle	Vulnerable
<i>Hypolepis distans</i>	Scrambling Ground-fern	Endangered

Scientific name	Common name	EPBC Act Listing Status
<i>Larus dominicanus</i>	Kelp Gull	Marine
<i>Larus pacificus</i>	Pacific Gull	Marine
<i>Lathamus discolor</i>	Swift Parrot	Critically Endangered
<i>Lepidium hyssopifolium</i>	Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed	Endangered
<i>Leucochrysum albicans</i> var. <i>tricolor</i>	Hoary Sunray, Grassland Paper-daisy	Endangered
<i>Limnodromus semipalmatus</i>	Asian Dowitcher	Migratory
<i>Limonium baudinii</i>	Baudin's Sea-lavender	Vulnerable
<i>Limosa lapponica</i>	Bar-tailed Godwit	Migratory
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit (<i>baueri</i>), Western Alaskan Bar-tailed Godwit	Vulnerable
<i>Limosa limosa</i>	Black-tailed Godwit	Migratory
<i>Lissotes latidens</i>	Broad-toothed Stag Beetle, Wielangta Stag Beetle	Endangered
<i>Litoria raniformis</i>	Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog	Vulnerable
<i>Lomatia tasmanica</i>	King's Lomatia	Critically Endangered
<i>Macronectes giganteus</i>	Southern Giant-Petrel, Southern Giant Petrel	Endangered
<i>Marginaster littoralis</i>	Derwent River Seastar	Critically Endangered
<i>Micropathus kiernani</i>	Francistown Cave Cricket, Southern sandstone cave cricket	Critically Endangered
<i>Morus serrator</i>	Australasian Gannet	Marine
<i>Motacilla flava</i>	Yellow Wagtail	Migratory
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Migratory
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	Critically Endangered
<i>Niveoscincus palfreymani</i>	Pedra Branca Skink, Red-throated Skink	Vulnerable

Scientific name	Common name	EPBC Act Listing Status
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	Critically Endangered
<i>Numenius minutus</i>	Little Curlew, Little Whimbrel	Migratory
<i>Numenius phaeopus</i>	Whimbrel	Migratory
<i>Onychoprion fuscata</i>	Sooty Tern	Marine
<i>Oreisplanus munionga larana</i>	Marrawah Skipper, Alpine Sedge Skipper, Alpine Skipper	Vulnerable
<i>Oreixenica ptunarra</i>	Ptunarra Brown, Ptunarra Brown Butterfly, Ptunarra Xenica	Endangered
<i>Oreoporanthera petalifera</i>		Vulnerable
<i>Ozothamnus reflexifolius</i>	Reflexed Everlasting	Vulnerable
<i>Ozothamnus selaginoides</i>	Clubmoss Everlasting, Table Mountain Daisy Bush	Extinct
<i>Pachyptila turtur</i>	Fairy Prion	Marine
<i>Pachyptila turtur subantarctica</i>	Fairy Prion (southern)	Vulnerable
<i>Paragalaxias dissimilis</i>	Shannon Paragalaxias	Vulnerable
<i>Paragalaxias eleotroides</i>	Great Lake Paragalaxias	Vulnerable
<i>Paragalaxias mesotes</i>	Arthurs Paragalaxias	Endangered
<i>Pardalotus quadragintus</i>	Forty-spotted Pardalote	Endangered
<i>Patiriella vivipara</i>	Tasmanian Live-bearing Seastar	Vulnerable
<i>Pelagodroma marina</i>	White-faced Storm-Petrel	Marine
<i>Pelecanoides urinatrix</i>	Common Diving-Petrel	Marine
<i>Perameles gunnii gunnii</i>	Eastern Barred Bandicoot (Tasmania)	Vulnerable
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant	Marine
<i>Phebalium daviesii</i>	Davies' Waxflower, St Helens Waxflower	Critically Endangered
<i>Philomachus pugnax</i>	Ruff (Reeve)	Migratory
<i>Philothea freyciana</i>	Freycinet Waxflower	Endangered
<i>Phoebetria fusca</i>	Sooty Albatross	Vulnerable

Scientific name	Common name	EPBC Act Listing Status
<i>Platycercus caledonicus brownii</i>	Green Rosella (King Island)	Vulnerable
<i>Pluvialis fulva</i>	Pacific Golden Plover	Migratory
<i>Pluvialis squatarola</i>	Grey Plover	Migratory
<i>Pomaderris pilifera subsp. talpicutica</i>	Moleskin Dogwood	Vulnerable
<i>Prasophyllum amoenum</i>	Dainty Leek-orchid	Endangered
<i>Prasophyllum apoxychilum</i>	Tapered Leek-orchid	Endangered
<i>Prasophyllum atratum</i>	Three Hummock Leek-orchid	Critically Endangered
<i>Prasophyllum castaneum</i>	Chestnut Leek-orchid	Critically Endangered
<i>Prasophyllum crebriflorum</i>	Crowded Leek-Orchid	Endangered
<i>Prasophyllum favonium</i>	Western Leek-orchid	Critically Endangered
<i>Prasophyllum incorrectum</i>	Golfers Leek-orchid	Critically Endangered
<i>Prasophyllum limnetes</i>	Marsh Leek-orchid	Critically Endangered
<i>Prasophyllum milfordense</i>	Milford Leek-orchid	Critically Endangered
<i>Prasophyllum olidum</i>	Pungent Leek-orchid	Critically Endangered
<i>Prasophyllum perangustum</i>	Knocklofty Leek-orchid	Critically Endangered
<i>Prasophyllum pulchellum</i>	Pretty Leek-orchid	Critically Endangered
<i>Prasophyllum robustum</i>	Robust Leek-orchid	Critically Endangered
<i>Prasophyllum secutum</i>	Northern Leek-orchid	Endangered
<i>Prasophyllum stellatum</i>	Ben Lomond Leek-orchid	Critically Endangered
<i>Prasophyllum taphanyx</i>	Graveside Leek-orchid	Critically Endangered

Scientific name	Common name	EPBC Act Listing Status
<i>Prasophyllum tunbridgense</i>	Tunbridge Leek-orchid	Endangered
<i>Prototroctes maraena</i>	Australian Grayling	Vulnerable
<i>Pseudocephalozia paludicola</i>	Alpine Leafy Liverwort	Vulnerable
<i>Pseudomys novaehollandiae</i>	New Holland Mouse, Pookila	Vulnerable
<i>Pterodroma mollis</i>	Soft-plumaged Petrel	Vulnerable
<i>Pterostylis commutata</i>	Midland Greenhood	Critically Endangered
<i>Pterostylis cucullata</i>	Leafy Greenhood	Vulnerable
<i>Pterostylis pratensis</i>	Liawenee Greenhood	Vulnerable
<i>Pterostylis rubenachii</i>	Arthur River Greenhood	Endangered
<i>Pterostylis wapstrarum</i>	Fleshy Greenhood	Critically Endangered
<i>Pterostylis ziegeleri</i>	Grassland Greenhood, Cape Portland Greenhood	Vulnerable
<i>Puffinus carneipes eastern Australian population</i>	Flesh-footed Shearwater (eastern Australian population)	Marine; Migratory
<i>Puffinus griseus</i>	Sooty Shearwater	Marine; Migratory
<i>Puffinus tenuirostris</i>	Short-tailed Shearwater	Marine; Migratory
<i>Pultenaea selaginoides</i>	Clubmoss Bush-pea	Endangered
<i>Ranunculus prasinus</i>	Midlands Buttercup, Tunbridge Buttercup	Endangered
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet	Marine
<i>Sagina diemensis</i>	Pearlwort	Endangered
<i>Sarcophilus harrisi</i>	Tasmanian Devil	Endangered
<i>Senecio psilocarpus</i>	Swamp Fireweed, Smooth-fruited Groundsel	Vulnerable
<i>Spyridium microphyllum</i>		Endangered
<i>Spyridium obcordatum</i>	Creeping Dusty Miller	Vulnerable
<i>Stenanthemum pimeleoides</i>	Spreading Stenanthemum, Propellor Plant	Vulnerable
<i>Sterna caspia</i>	Caspian Tern	Marine; Migratory
<i>Sterna nereis</i>	Fairy Tern	Marine

Scientific name	Common name	EPBC Act Listing Status
<i>Sterna striata</i>	White-fronted Tern	Marine
<i>Sternula albifrons</i>	Little Tern	Marine; Migratory
<i>Sternula nereis nereis</i>	Australian Fairy Tern	Vulnerable
<i>Strepera fuliginosa colei</i>	Black Currawong (King Island)	Vulnerable
<i>Tasmanipatus anophthalmus</i>	Blind Velvet Worm	Endangered
<i>Tetratheca gunnii</i>	Shy Pinkbells, Shy Susan	Critically Endangered
<i>Thalassarche bulleri</i>	Buller's Albatross, Pacific Albatross	Vulnerable
<i>Thalassarche bulleri platei</i>	Northern Buller's Albatross, Pacific Albatross	Vulnerable
<i>Thalassarche cauta (sensu stricto)</i>	Shy Albatross, Tasmanian Shy Albatross	Vulnerable
<i>Thalassarche eremita</i>	Chatham Albatross	Endangered
<i>Thalassarche impavida</i>	Campbell Albatross, Campbell Black-browed Albatross	Vulnerable
<i>Thalassarche melanophris</i>	Black-browed Albatross	Vulnerable
<i>Thalassarche salvini</i>	Salvin's Albatross	Vulnerable
<i>Thalassarche steadi</i>	White-capped Albatross	Vulnerable
<i>Thalasseus bergii</i>	Crested Tern	Migratory
<i>Thelymitra jonesii</i>	Sky-blue Sun-orchid	Endangered
<i>Thinornis rubricollis</i>	Hooded Plover	Marine
<i>Thinornis rubricollis rubricollis</i>	Hooded Plover (eastern)	Vulnerable
<i>Thymichthys politus</i>	Red Handfish	Critically Endangered
<i>Thynniorchis nothofagicola</i>	Myrtle Elbow Orchid	Critically Endangered
<i>Tringa nebularia</i>	Common Greenshank, Greenshank	Migratory
<i>Tringa stagnatilis</i>	Marsh Sandpiper, Little Greenshank	Migratory
<i>Tyto novaehollandiae castanops (Tasmanian population)</i>	Masked Owl (Tasmanian)	Vulnerable

Scientific name	Common name	EPBC Act Listing Status
<i>Vombatus ursinus ursinus</i>	Common Wombat (Bass Strait)	Vulnerable
<i>Xanthorrhoea arenaria</i>	Sand Grasstree	Vulnerable
<i>Xanthorrhoea bracteata</i>	Shiny Grasstree	Endangered
<i>Xenus cinereus</i>	Terek Sandpiper	Migratory
<i>Zearaja maugeana</i>	Maugean Skate, Port Davey Skate	Endangered

Table 67 – Environment Protection and Biodiversity Conservation Act 1999 Listed Ecological Communities known or likely to occur in Tasmanian Regional Forest Agreement region

Ecological community	EPBC Act Listing Status
Alpine Sphagnum Bogs and Associated Fens	Endangered
Eucalyptus ovata - Callitris oblonga Forest	Vulnerable
Lowland Native Grasslands of Tasmania	Critically Endangered
Subtropical and Temperate Coastal Saltmarsh	Vulnerable

Appendix C – Principles for Ecologically Sustainable Forest Management

Principle 1

The basis of Principle 1 is the promotion of forest-related economic activity that is consistent with maintenance of the environment whilst satisfying socio-economic requirements for income, employment, goods and services. Implicit in this is the optimum use of the forest economy's capital stock (human, made by humans and natural resources) so that it is managed in such a way as to maximise the long-term welfare of or benefit to society in terms of the goods and services it requires. The forest economy covers timber, other forest products and uses, water supply, minerals, grazing, recreation and tourism.

Principle 2

Maintenance of biodiversity is a fundamental goal of conservation management and a prerequisite for achieving Ecologically Sustainable Forest Management. In the *National Forest Policy Statement 1992* biodiversity is defined as the variety of all life forms, the plants, animals and micro-organisms, the genes they constitute, and the ecosystems they inhabit. Incorporated in the concept is variation occurring at three levels: ecosystem, species and genetic.

Principle 3

Productive capacity refers to the ability of a forest to produce biomass. Sustainability of forest ecosystems' biomass production (whether the biomass is used by humans or as part of nutrient and energy cycles) is essential to the well-being of all living things. Implicit in the term 'sustainability' is the notion that irreversible damage not be imposed on the capacity of the forest to supply goods or services to present and future generations. As part of the Comprehensive Regional Assessment, the Independent Expert Advisory Group considered both sustainability (defined as the capacity for continued productivity where the primary requirement is for site and soil protection and for adequate regeneration and protection) and sustainable yield (defined as the capacity to maintain relatively consistent levels of production or products over an extended period).

Principle 4

Incorporated in Principle 4 is the concept of ecological integrity, whereby the health and vitality of an ecosystem are maintained under changing environmental conditions. Structural and functional changes can occur in ecosystems as a result of threatening processes such as land clearing, fire, pollution, pests and diseases. This can cause major changes in species composition, loss of vital biological components such as decomposers, pollinators and food-chain relationships, and degradation of ecosystem processes (soil formation, energy flows and the carbon, nutrient and water cycles). Thus, the concept of ecological integrity can be of use in determining thresholds of environmental change whereby each threshold results in a reorganisation of the ecosystem to a different level. Within Ecologically Sustainable Forest

Management, the properties and processes of forest ecosystems over management periods become important considerations in the maintenance of ecological integrity.

Principle 5

Forests contribute to the maintenance and conservation of the soil resource, they afford water catchment protection, and they maintain the quality and quantity of water. Disturbance to forests can affect soil and water values. Ecologically Sustainable Forest Management ensures that these resources are protected and maintained in the long term.

Principle 6

Carbon is stored in Tasmanian forests as living plant and animal biomass and dead organic matter in the form of debris. As a general rule, carbon is accumulated and stored in forests that are growing, and so these forests contribute to carbon storage. Forests that are carbon neutral are those where carbon is accumulated through photosynthesis but the accumulation is offset by the loss of carbon resulting from biomass decomposition or death.

Principle 7

Heritage encompasses archaeological sites, historic places and customs (cultural heritage) and natural values or objects (natural heritage) that are of aesthetic and social value and are passed down to the present generation from past generations. These factors can be used to monitor changes in the forest ecosystem.

Appendix D – Commission’s recommendations at the first five-yearly review

From Tasmanian Public Land Use Commission (2002a)

Recommendation 3.1 That the State continues to improve forest community mapping. Particular attention needs to be given to improving the mapping of forest communities in reserves through additional field survey.

Recommendation 3.2 That the State reserves areas currently vested in the Hydro-Electric Corporation and identified in the RFA as indicative reserves by 30 June 2004.

Recommendation 3.3 That the Parties commit to designing a program that provides for the long term future of the Private Forest Reserve Program and in particular provides for the future financial resources for management, monitoring and reporting of properties conserved under the RFA Private Forest Reserve Program.

Recommendation 3.4 That the State reinforces and makes more effective the mechanism for providing the RFA Private Forest Reserve Program with basic forest type and coverage information for areas being assessed under the Private Timber Reserve approval process.

Recommendation 3.5 That the Parties clarify the commitment in Clause 39 of the RFA and make publicly available information on progress to date and how they intend to pursue the implementation of this commitment including the timelines.

Recommendation 3.6 That the State makes known its decision on future access to the deep red myrtle resource in the Savage River Pipeline Corridor by February 2003.

Recommendation 4.1 That the State improves the accountability of the Forest Practices System. Issues to consider include:

- improving transparency and communications, in particular, public access to information on Forest Practices Plans, through a central access point designed to improve industry consultation with neighbours and local communities;
- improving on ground implementation of Forest Practices Plans by introducing minimum standards of training, education and accreditation of forest operatives, and introducing systems to convey the detail of the Forest Practices Code and Forest Practices Plans in a form readily available and understandable to forest operatives;
- improving public understanding of the Forest Practices System including the Forest Practices Code, the role of the Forest Practices Board and, in particular, the public and legal policy framework in which the Forest Practices Board operates;
- providing for a specific position on the Forest Practices Board for a person with ecological and/or conservation expertise;

- reviewing the efficacy of the self-regulatory aspects of the Forest Practices System in the next five year review of the Forest Practices System; and
- ensuring provision of additional funding, including from industry, to support the communication and research functions of the Forest Practices System.

Recommendation 4.2 That the State completes the Nature Conservation Strategy and commences implementation of the Strategy by 30 June 2003.

Recommendation 4.3 That the State completes the Reserve Management Code of Practice and commences implementation of the Code by 30 June 2003. That the State undertakes annual reporting on compliance with the Reserve Management Code of Practice.

Recommendation 4.4 That the Parties complete the preparation of Recovery Plans for all endangered forest-related threatened species within the next five years. Where species listed under the Tasmanian Act meet the criteria for listing under the Commonwealth Act, both Parties should contribute funding.

Recommendation 4.5 That the Parties accredit Threatened Species Listing Statements as an alternative to Recovery Plans for listed threatened species, and as providing for adequate management of listed threatened species under the RFA.

Recommendation 4.6 That the State provide for the protection of threatened Forest Communities through an appropriate statutory framework.

Recommendation 4.7 That the State provide sufficient resources, including financial resources to be allocated in the 2003-04 Budget, to ensure that the implementation of the Threatened Species Strategy for Tasmania is carried out in an effective and timely manner.

Recommendation 4.8 That the State subject future substantive changes to management prescriptions for Priority Species to public consultation and take note of public comment.

Recommendation 4.9 That the Parties deliver on the outstanding National Estate commitments contained in Clause 6 and Table 1, Category 3 of Attachment 1 to the RFA, prior to commencement of the next five year review.

Recommendation 4.10 That the Parties prepare a list of relevant research reports at future five yearly reviews.

Recommendation 4.11 That the list of priority research areas in Attachment 13 should be reviewed by the Parties, in consultation with relevant stakeholders, at future five yearly reviews to determine if priorities have changed.

Recommendation 4.12 That the State develops an environmental management system for reserves and other public lands consistent with Attachment 5 of the RFA prior to the next five yearly review.

Recommendation 4.13 That the Parties encourage the development of environmental management systems in the private forest sector.

Recommendation 4.14 That the State completes the review of the policy on maintaining a Permanent Forest Estate taking into account public comment. That, subsequent to the review

and before the end of May 2003, the State amends the policy to increase the levels of retention of native forest, and specifically to ensure that no further forest communities become threatened and that there is no deterioration in the status of any existing threatened forest community.

Recommendation 4.15 That, subsequent to the review of the policy on maintaining a Permanent Forest Estate, the State implements the policy through a legislative framework.

Recommendation 4.16 That the Forest Practices Board considers, during the next review of the Forest Practices Code, the issue of smoke management from forestry operations, including giving effect to the smoke management guidelines.

Recommendation 4.17 That the State moves quickly to enable proclamation of the *Natural Resource Management Act 2002* (Tas) and facilitate regional natural resource management strategies.

Recommendation 5.1 That the Parties, as a priority, develop a process to obtain reliable data to inform social and economic indicators for the community and the performance of the forest based industries relevant to Attachment 12 of the RFA. The sustainability indicators relevant to the social and economic aspects of the industry need to be reviewed when such reliable data becomes available.

Recommendation 5.2 That the Parties clarify the intent of Attachment 12 by 30 June 2003 and that the State prepares an industry development strategy, in consultation with the Commonwealth and the Forests and Forest Industry Council, by 30 June 2004, based on that intent and providing an industry vision and an action plan to achieve it. Table 5.1 provides an incomplete list of issues that should be covered by the industry development plan.

Table 5.1 Issues to be considered to clarify the intent of Attachment 12

Issue	Aspects for consideration of further action
Increased domestic downstream processing	Introduction of the Log Supply Charter, improved training and accreditation throughout the production chain, assistance to smaller sectors including special species and furniture industries, Commonwealth assistance to industry development including continuation of Forest Industry Client Manager position, Forest Industry Structural Adjustment Package funding.
Industry information	Improve information about the industry and its regional impact, improve social and economic indicator data.
Public education	Improve public information about the RFA, industry value, sustainability of forest management and wood.
Market information	Provide of up to date market information for the industry including supply and demand information from both public and private forests.
Industry training	Accreditation and training to support Log Supply Charter.
Research and development	Using existing and new research and development opportunities to prepare for the future changes in resource.

Forest and product certification	Support for development and implementation of certification schemes and facilitation of international recognition of the Australian Forestry Standard.
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Recommendation 6.1 That the State continues to improve transparency in reporting, and continuously improves the methodology as identified in previous sustainable yield reviews, with the aim of increasing public understanding of, and confidence in, the sustainable yield reviews of high quality sawlogs from public lands.

Recommendation 6.2 That the State develops a strategy for ongoing supply of special species timbers from public lands. The State needs to provide information to the market to clarify the future resource.

Recommendation 7.1 That the State finalises its nature based tourism and recreational management policy by 31 March 2003.

Recommendation 7.2 That the State continues to work with the apiary industry to resolve the issues on public land for bee keeping and the leatherwood resource. That the State and the Tasmanian Beekeepers Association jointly prepare a plan for management of the leatherwood resource in the southern forests by 30 June 2003.

Recommendation 9.1 That the Parties support ongoing research and development for sustainability indicators including, where appropriate, consideration of benchmarks and interpretation to guide performance outcomes.

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⁵ Additional resources recommended by respondents to the December 2016 consultation survey regarding the potential extension of the Tasmanian Regional Forest Agreement.