Australian Government

Tasmanian Government

Tasmanian Regional Forest Agreement Outcomes Report 2017–2022

Prepared by the Tasmanian and Australian governments
for the 5-yearly review of the Tasmanian Regional Forest Agreement

Citation

This publication (and any material sourced from it) should be attributed as:

DNRE & DAFF 2024, *Tasmanian Regional Forest Agreement outcomes report 2017–2022: Prepared by the Tasmanian and Australian governments for the 5-yearly review of the Tasmanian Regional Forest Agreement*, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra; Department of Natural Resources and Environment, Tasmania.

Cover image: Eucalyptus Rainforest in mist, Tasmania, Australia. Photo: Stefan Gruetzmacher/Adobestock

Acknowledgement of Country

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

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Abbreviations

CAR	comprehensive, adequate and representative (reserve system)
CFPO	Chief Forest Practices Officer
CFV	Australian Research Council Centre for Forest Value
Cth	Commonwealth
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ESFM	ecologically sustainable forest management
FPA	Forest Practices Authority (Tas)
FP Act	*Forest Practices Act 1985* (Tas)
FPO	Forest Practices Officer
FPP	forest practices plan
FPPF	Future Potential Production Forest
FSC	Forest Stewardship Council
FTE	full-time equivalent
HQSL	high-quality sawlog
LiDAR	light detection and ranging
LULUCF	land use, land use change and forestry
MNES	matters of national environmental significance
NC Act	*Nature Conservation Act 2002* (Tas)
NIFPI	National Institute for Forest Products Innovation
NRE Tas	Department of Natural Resources and Environment Tasmania
PFT	Private Forests Tasmania
PNFEP	Permanent Native Forest Estate Policy
PTPZ	permanent timber production zone
PTR	private timber reserves
PWS	Tasmania Parks and Wildlife Service
RFA	Tasmanian Regional Forest Agreement
SoFR	State of the Forest Report
STT	Sustainable Timber Tasmania
SY5	fifth sustainable yield review
SY6	sixth sustainable yield review
Tas	Tasmania
TERN	Terrestrial Ecosystem Research Network
TSP Act	*Threatened Species Protection Act 1995* (Tas)
TWWHA	Tasmanian Wilderness World Heritage Area (also known as the Tasmanian Wilderness)

Executive summary

The Tasmanian Regional Forest Agreement (RFA) provides a framework for sustainable management of Tasmania's public and privately owned forests. The RFA is reviewed on a 5-yearly basis to ensure that the framework continues to achieve this objective. The RFA establishes 5 reporting criteria to demonstrate ecologically sustainable forest management.

This document informs the 5-yearly review of the RFA. It reports on the changes that have been implemented and outcomes that have been achieved over the 5-year period from 2017 to 2022, using the 5 RFA reporting criteria. Together with *Tasmania's forest management system: an overview* (2021 update) and the *State of the forests Tasmania 2022 data report*, this document shows how Tasmania's forest management system demonstrates adaptive and continually improving ecologically sustainable forest management. This package collectively satisfies the RFA reporting requirements, and the reporting obligations against *The Montréal Process criteria and indicators for the conservation and sustainable management of temperate and boreal forests*.

Key progress made against each of the 5 RFA reporting criteria is outlined below.

Criterion a: Demonstrate adaptive forest management in accordance with the RFA framework

Tasmania's forest practices system is a co-regulatory system, combining self-management by the industry with oversight by an independent authority. Tasmania's forest management system provides an overarching legislative and regulatory framework that sets up the research, monitoring and compliance actions that are required of responsible parties. The outcomes of these actions then inform any required management responses, including updates to the legislative and regulatory framework as necessary. In this way the system responds and adapts to ensure continual improvement. Adaptive forest management is described in further detail in Section 2.

Several key outcomes were achieved in this reporting period:

- Changes were made to key legislation and policy – the *Forest Practices Act 1985* (Tas), the *Forest Practices Code* and the *Policy for Maintaining a Permanent Native Forest Estate*.
- Improvements were made to key planning tools, including the release of a new version of the Biodiversity Values Database, the incorporation of threatened flora management provisions in the Threatened Species Adviser, updates to Forest Practices Authority (FPA) technical notes, and the release of a Special Species Management Plan.
- Forest managers demonstrated a high degree of compliance with management regulations.
- Management practices were improved based on research into the effectiveness of current management strategies. Several examples are detailed within this report.

Criterion b: Demonstrate how the Parties have provided for the protection of Matters of National Environmental Significance, including trends and the status of Matters of National Environmental Significance or other environmental values, which may be impacted by Forestry Operations

The forest practices system provides for protection of matters of national environmental significance (MNES). This includes monitoring forest practice activities and changes to the listing status of threatened species and ecological communities, and how these flow through to updated forest management practices. It also includes reporting on how management practices are implemented to ensure appropriate protection of MNES. Further detail on how protection of MNES is provided for within the forest practices system is provided in Section 3.

Several actions of note occurred during the reporting period:

- Landscape-scale monitoring and targeted monitoring were undertaken for key species. Monitoring was prioritised with consideration of the category of species listing and the information required.
- Management of threatened species continued at the operational scale in accordance with the Agreed Procedures (developed jointly by the FPA and the Department of Natural Resources and Environment Tasmania). These involve delivery through online planning tools or through the provision of case- or site-specific advice through the FPA.
- Two certified harvest operations and one incident of unauthorised clearing occurred within 1 km of a Ramsar wetland. The authorised clearing occurred in consultation with the FPA and included management actions, such as buffers, to mitigate impact to the wetland. The unauthorised clearing was investigated by Tasmanian and Australian government agencies, and penalties were applied.
- The update to the Forest Practices Code led to the establishment of the *Procedures for managing Aboriginal cultural heritage when preparing forest practices plans*, which improved the identification and protection of both Aboriginal and non-Indigenous cultural heritage sites. As a result, 40 new Aboriginal heritage sites and 140 new non-Indigenous cultural heritage sites were identified.

Forest operations did not directly impact the Tasmanian Wilderness World Heritage Area, and forest operations that border the World Heritage Area operated with the required buffer to mitigate any indirect impact.

Criterion c: Demonstrate how relevant Statutory Conservation Planning Documents have been implemented as part of the Forest Management System

Recommendations made in statutory conservation planning documents are considered when developing management recommendations delivered by the FPA, either through endorsed planning tools or through the provision of site-specific advice.

Statutory conservation planning documents for threatened species and ecological communities that were revised or delivered during the reporting period are reported on in Section 4. These include threatened orchids, the giant freshwater crayfish, the broad-toothed stag beetle, Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata*/*E. brookeriana*), threatened eagles and the Tasman Peninsula dusky antechinus.

Examples of how statutory conservation planning documents were considered in management recommendations include:

- recognition of the minimum patch size for identification and management of Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (*E. ovata*/*E. brookeriana*)
- inclusion of survey and management recommendations for threatened orchids in the Threatened Species Adviser decision support tool
- updated habitat descriptions for threatened orchids
- inclusions of range boundary, habitat description and management recommendations for the Tasman Peninsula dusky antechinus.

Criterion d: Demonstrate how social and economic benefits of forestry and other forest uses are being achieved

Tasmania's forests are managed for multiple uses to the benefit of all of Tasmania. Some of the key benefits include employment within Tasmania, the production of timber-derived products, recreational activities and the support of associated industries such as tree fern harvesting and apiary. Details are outlined in Section 5.

On key metrics, the industry continues to perform well:

- The volume of timber produced from the public forest estate has been consistent over the 5 years of the reporting period, and the value of logs harvested from the estate has increased by 10.7% during the period.
- The forest industry continues to benefit Tasmania by providing access to forests for other forest users and industries, such as for apiary, tourism, recreation and visiting of cultural heritage sites. Active management of Tasmania's forests continues to provide environmental benefits such as fire protection, training and response capacity, carbon sequestration and climate change mitigation.

Criterion e: Assess the extent to which key findings and/or recommendations from the preceding 5-yearly reviews have been addressed

Progress has been made on most of the recommendations from the preceding 5-yearly reviews. Of the 16 current recommendations, 6 are complete, 6 are partially complete, 3 are ongoing and 1 is yet to be completed. Details on the response to each recommendation are provided in Section 6, including progress and responses to recommendations for which work is incomplete.

1 Scope and context

Tasmania's forests are maintained for multiple uses to the benefit of all of Tasmania. As part of Tasmania's forest management system, the Tasmanian Regional Forest Agreement (RFA) provides a framework for ecologically sustainable forest management (ESFM). Performance against ESFM is reviewed every 5 years.

This report is for the period 2017–2022. It should be read in conjunction with *Tasmania's forest management system: an overview (2021 update)* and the *State of the forests Tasmania 2022 data report* (SoFR). Collectively, these 3 reports satisfy the requirements for reporting against the state's RFA obligations and also satisfy reporting obligations against *The Montréal Process criteria and indicators for the conservation and sustainable management of temperate and boreal forests*.

1.1 Tasmania's forests

Tasmania is richly forested, with a diversity of temperate forest ecosystems mirroring the exceptional diversity of the island's environments (Wilkinson, Schofield & Kanowski 2014). Tasmania's forests are home to the world's largest eucalypts and the smallest, and range from rainforests receiving more than 3,200 mm annual rainfall to dry eucalypt forests receiving less than 500 mm annually (Harris & Kitchener 2005; Jackson 1968; Wilkinson, Schofield & Kanowski 2014).

Tasmania has extensive areas of forested land located within a formal reserve network. The total Tasmanian Reserve Estate, as at 30 June 2021, includes a total terrestrial reserved area of 3.427 million ha (50.3% of the area of Tasmania); about half of this is forested (NRE Tas 2023b). As at June 2021, Tasmania had around 3.045 million ha of native forest, 202,000 ha of hardwood (eucalypt) plantation and 79,000 ha of softwood (radiata pine) plantation (FPA 2022).

Over half (58.7%), or 1.786 million ha, of Tasmania's native forest is protected in formal and informal comprehensive, adequate and representative (CAR) reserves on public and private land. About 94% of protected forest is on public land; 70% in formal reserves and 24% in informal reserves. The remaining 6% of protected forest is in private forest CAR reserves. Almost all (99%) of the wilderness identified as high quality under the RFA and 88% of old-growth forests are protected in CAR reserves – well exceeding the nationally agreed targets of 90% of high-quality wilderness and 80% of old-growth forest types (FPA 2022).

Tasmania's forest sector is an important contributor to Tasmania's social and economic wellbeing, and Tasmania's forests continue to be maintained for multiple uses to the benefit of all of Tasmania.

Both public and private forests are important for wood production. The area of public land harvested annually has remained relatively stable over the reporting period. The majority of forest products produced by the state by volume are now from the private forest estate lands (PFT 2022). Forest operations in Tasmania are typically undertaken by forestry contractors, who operate as independent small businesses, under the direction of the forest owner and subject to the forest practices system and other relevant legislation (Wilkinson, Schofield & Kanowski 2014).

1.2 Tasmania's forest management system

Tasmania's forest management system has, at its core, 3 primary elements:

- the policy for maintaining a permanent native forest estate
- a CAR reserve system that securely protects forest conservation values
- a system for managing forests outside reserves in a manner that contributes to sustainable environmental, social and economic outcomes.

Tasmania's forest management system is a comprehensive system for delivering ecologically sustainable forest management across all land tenures. The system comprises an overarching legislative and policy framework, and associated planning and operational systems. It is complemented by an adaptive management and continuous improvement process incorporating research findings and feedback processes associated with compliance and enforcement systems, stakeholder engagement and monitoring and review mechanisms.

As part the forest management system, forest practices refer to activities such as harvesting, regenerating and planting forests, clearing forests for other purposes, and harvesting tree ferns. It applies to public and private native and plantation forests. Tasmania's forest practices system is given legislative power through the *Forest Practices Act 1985* (Tas) (FP Act). The objective of Tasmania's forest practices system, as specified in Schedule 7 of the FP Act, is to achieve sustainable management of crown and private forests with due care for the environment, and taking into account social, economic and environmental outcomes in a way that is as far as possible self-funding.

A unique feature of the forest practices system is its co-regulatory nature. It combines self-regulation by the industry with oversight by an independent regulator – the Forest Practices Authority (FPA), established under the FP Act. Authorised officers work across the state with independent oversight by the FPA. The overarching regulatory and legislative framework of the system sets up the research, monitoring and compliance actions that are required of responsible parties within the forest practices system, including the FPA and those undertaking forestry operations. These actions then inform any required management responses, including updates to the legislative and regulatory framework as necessary. In this way the system responds and adapts as new information is gathered and the effectiveness of the management tools and responses is measured, to ensure continual improvement (see Section 2 for further details).

1.3 Tasmanian Regional Forest Agreement

In 1997, the Australian and Tasmanian governments signed the RFA to provide a framework for sustainable management of Tasmania's public and privately owned forests. The parties are committed to ensuring the RFA delivers positive economic, social and conservation outcomes through ecologically sustainable forest management (ESFM).

The parties agreed that the objective of ESFM requires a long-term commitment to continuous improvement and that the key elements for achieving it are:

- the maintenance of the CAR reserve system, providing certainty for the conservation of environment and heritage values
- supported, internationally competitive forest products industries that are economically sustainable and provide for social and economic benefit
- an integrated, complementary, and strategic forest management system capable of responding to new information and managing Tasmania's forests for multiple uses and benefits.

In 2017, the Australian and Tasmanian governments agreed to a variation that extended the RFA by 20 years. The governments also introduced a rolling life for the RFA, whereby it will be automatically extended by 5 years if it is found to be successfully sustaining Tasmania's forests and delivering on the key elements of ESFM at each of its 5-yearly reviews (see *High-level Tasmanian RFA review and extension process*).

1.4 Five-yearly review

In accordance with clause 9B of the RFA, a 5-yearly review of the performance of the RFA is to be conducted by a person or body jointly appointed by the Tasmanian and Australian governments.

1.4.1 Purpose

The purpose of the 5-yearly review (State of Tasmania & Commonwealth of Australia 2017) is to:

> examine Tasmania's forest management to demonstrate ESFM, including to:
>
> (a) demonstrate adaptive forest management in accordance with the RFA framework;
>
> (b) demonstrate how the Parties have provided for the protection of Matters of National Environmental Significance, including trends and the status of Matters of National Environmental Significance or other environmental values, which may be impacted by Forestry Operations;
>
> (c) demonstrate how relevant Statutory Conservation Planning Documents have been implemented as part of the Forest Management System;
>
> (d) demonstrate how social and economic benefits of forestry and other forest uses are being achieved; and
>
> (e) assess the extent to which key findings and/or recommendations for preceding 5 yearly reviews have been addressed.

1.4.2 The 2017–2022 review

The first 5-yearly review since the 2017 variation is required to cover the timeframe of August 2017 to August 2022. As the first of such reviews, it seeks to demonstrate progress towards commitments made by the parties under the varied Tasmanian RFA. It is anticipated that during this initial 5-year period the parties will have established or maintained systems and frameworks that can respond and adapt to new information, issues or opportunities in an appropriate manner, ensuring that the longer-term objectives of the RFA are met.

1.4.3 Reports that constitute the 5-yearly review

Three reports form a package that collectively satisfies the reporting requirements for the RFA 5-yearly review and the reporting obligations against the Montréal process. Appendix 1 maps the RFA review assessment criteria (that the 5-yearly review must address) and indicators against the Montréal Process criteria.

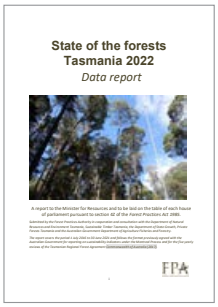
Figure 1 outlines the information that can be found in each document relevant to the 5 RFA review assessment criteria.

State of the forests report	Tasmania's forest management system: an overview	Tasmanian Regional Forest Agreement outcomes report
incorporates 2016–2021 data	updated in 2021	incorporates 2017–2022 data
• Presents data on achievement of the sustainability indicators under the Montréal Process • Presents data to demonstrate how MNES that may be impacted by forestry operations have been protected • Presents data to demonstrate how social and economic benefits of forestry and other forest uses are being achieved • Describes elements of the adaptive management framework	• Describes Tasmania's forest management system • Describes elements of the adaptive management framework • Outlines the regulatory and legislative frameworks that support the Tasmanian forest management system	• Describes the adaptive management framework and how it has been applied • Presents data to demonstrate how relevant statutory conservation planning documents have been implemented as part of the forest management system • Documents the extent to which key findings and/or recommendations from preceding 5-yearly reviews have been addressed

MNES: matters of national environmental significance

Figure 1: The 3 reports relevant to the 2017–2022 RFA review

State of the forests report



The SoFR is established under section 4Z of the *Forest Practices Act 1985* (Tas) (FP Act) as an ongoing mechanism to monitor and report on ESFM, including key environmental, social and economic indicators. As such, SoFRs are a key source of information in the 5-yearly reviews under the RFA. Completion of the 5-yearly outcomes report follows the completion of the SoFR.

The SoFR is based on data collected in relation to 42 sustainability indicators for assessing the sustainability of forest management in Tasmania. The sustainability indicators were developed as a requirement of the RFA and are based on the Montréal Process criteria. The indicators used in the SoFR were agreed by both the Tasmanian and Australian governments with stakeholder input.

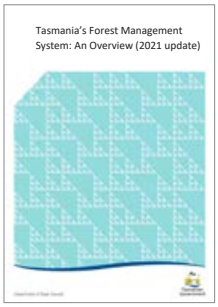
The SoFR is organised under a framework of 7 criteria for ESFM and its associated sustainability indicators. The criteria address the following aspects of ESFM:

1. conservation of biological diversity
2. maintenance of productive capacity of forest ecosystems
3. maintenance of ecosystem health and vitality

4. conservation and maintenance of soil and water resources
5. maintenance of forest contributions to global carbon cycles
6. maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies
7. maintenance and enhancement of a legal, institutional and economic framework for forest conservation and sustainable management.

By using this methodology, the SoFR satisfies the reporting requirements under the Montréal Process – an initiative that arose from a resolution at the 1992 United Nations Conference on Environment and Development (the Earth Summit) calling for sustainable management of forests – and provides a significant input to the 5-yearly review of the RFA.

Tasmania's forest management system: an overview



This document was first published in 2017 as part of the RFA extension process.

It provides an overview of Tasmania's forest management system as at December 2021, including its various components and the legislation that regulates it. This document also addresses the management of Tasmania's forest reserves and the production forest estate on both public and private land, including the management of Australian Government matters of national environmental significance (MNES).

This report

Clause 9 of the RFA outlines that the 5-yearly review will include outcomes-based reporting on the performance against the RFA commitments and will consider the current 'Tasmania's forest management system: an overview' document and the relevant SoFR This outcomes report should be read in conjunction with *Tasmania's forest management system: an overview (2021 update)* and the *State of the forests Tasmania 2022 data report*, which collectively satisfy the requirements for reporting against the state's RFA obligations and also satisfy reporting obligations against The Montréal Process criteria and indicators for the conservation and sustainable management of temperate and boreal forests.

2 Adaptive forest management

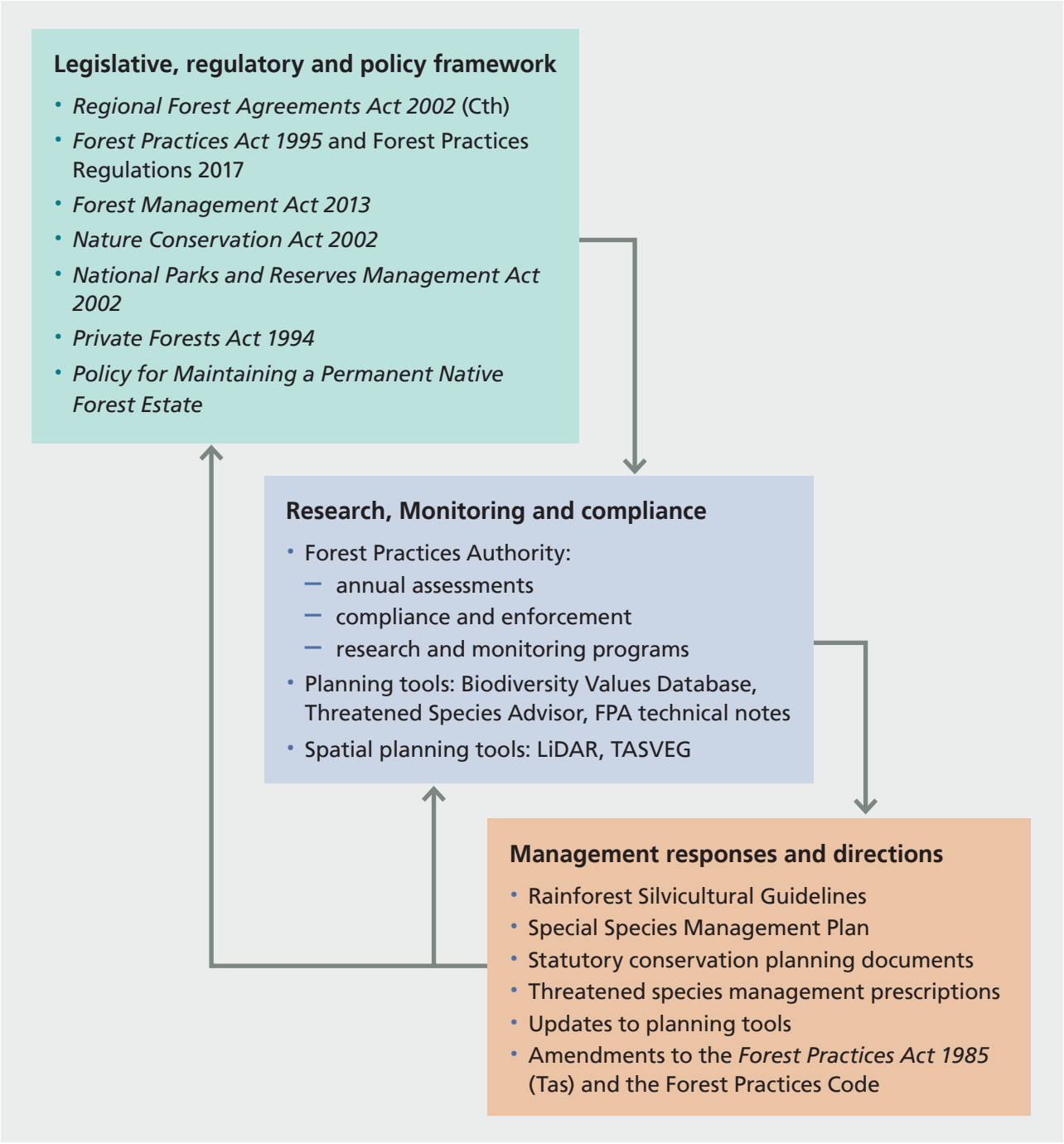
This section of the report addresses criterion a: 'demonstrate adaptive forest management in accordance with the RFA framework'.

Adaptive forest management occurs when management approaches are adjusted over time based on new information, changing conditions and evolving knowledge. In the context of the Tasmanian RFA, the new information comes primarily from research, monitoring and compliance auditing. This information is used to review and update legislation, policy, planning tools and management approaches as appropriate, with the aim of continuously improving forest practices.

The adaptive forest management framework used to deliver ESFM consists of 3 main elements:

1. **Legislative, regulatory and policy frameworks** – Australia's 1992 National Forest Policy Statement sets out a shared vision for the ecologically sustainable management of Australia's forests and establishes RFAs as the overarching instrument to deliver ESFM. Tasmania's forest management system is underpinned by several legislative and policy frameworks. The Forest Practices Code is issued under the FP Act; the Forest Practices Code is intended to ensure that all forest practices are conducted in accordance with the FP Act and the Forest Practices Regulations 2017.
2. **Research, monitoring and compliance** – Systems enable environmental conditions and threatened flora and fauna to be monitored at both landscape and individual coupe levels. The data collected enable the effectiveness of current management provisions to be assessed. Research and monitoring are undertaken by a range of different organisations, focusing on various areas of forestry or forest science, including, but not limited to, biodiversity and threatened species, and Earth sciences. The FP Act provides for the Forest Practices Authority (FPA), an independent regulator tasked with oversight of forest practices. Forest practices require a certified forest practices plan (FPP) before action. The FPA conducts assessments of FPPs under the RFA to evaluate compliance of forestry operations, and whether the agreed management approach for a special value, such as a threatened species, has been implemented. The outcomes of the auditing program are used to improve practices as necessary.
3. **Management responses and directions** – Updates and amendments to the legislative and regulatory frameworks, such as the Forest Practices Code, and updates to the planning tools and management prescriptions within FPPs are made as necessary. The effectiveness of management practices is reviewed and practices are adjusted as necessary, based on ongoing monitoring and evaluation of data.

The adaptive forest management system is summarised in Figure 2.



FPA: Forest Practices Authority; LiDAR: light detection and ranging; TASVEG: digital vegetation map of Tasmania

Figure 2: Adaptive forest management system

2.1 Legislative, regulatory and policy framework

As outlined above, Tasmania's forest management system is underpinned by several legislative, regulatory and policy frameworks. These are reviewed and updated periodically as new information becomes available to ensure that they remain fit for purpose in delivering ESFM.

Key legislative and regulatory changes to core forest practices system legislation and policy during the reporting period include:

- FP Act – the FP Act was amended in 2019 and 2021
- Forest Practices Code – in 2017 the FPA commenced a review of the Code, which was delivered in 2020; the revision clarified the scope and applicability of the Code, as well as numerous technical details
- Permanent Native Forest Estate Policy (PNFEP) – the PNFEP was reviewed in 2017, and a further review commenced in 2022 in line with the preparation of this outcomes report. Further discussion of the role of the PNFEP is provided in Section 2.1.1.

Other legislative reviews of relevance during the reporting period include:

- the commencement of the *Biosecurity Act 2019* (Tas) on 1 January 2020; further provisions commenced on 31 March 2021
- the amendment of the *Climate Change (State Action) Act 2008* (Tas) in 2022.

The specifics of the legislative and regulatory amendments are set out in Appendix 4.

2.1.1 Permanent Native Forest Estate Policy

The intention of the PNFEP, first issued in 1996, is to ensure that Tasmania maintains a permanent forest estate that comprises areas of native forest managed on a sustainable basis both within formal reserves and within multiple-use forests across public and private land. The PNFEP is implemented by the FPA in accordance with the FP Act in the consideration of applications for certification of FPPs that propose clearance and conversion of native forest to an alternative land use, such as agriculture.

The Policy is reviewed in conjunction with the 5-yearly review cycle of the Tasmanian RFA. The PNFEP was modified in 2017 to move from a threshold-based approach to a prohibition on broadscale clearing and conversion of native forest, other than in limited prescribed circumstances. These circumstances are set out in Appendix 4. The 2022 SoFR report indicated that the extent of native forest in Tasmania was 94.9% of the 1996 level.

A further review of the policy was initiated in 2022 and is expected to be completed by the end of 2024. This review will clarify whether the policy continues to meet its objectives and make recommendations to address any implementation issues identified.

2.1.2 Legal challenges

Two legal actions against the FPA concerning the construction management of the forest practices system were commenced during the reporting period. The details of these are set out in Appendix 4.

2.2 Research, monitoring and compliance

Monitoring, assessment and compliance are critical for adaptive forest management – they provide a systematic way to track implementation and outcomes of forest practices.

2.2.1 FPA annual assessment program

FPPs are the legal instrument for undertaking forest practices, such as timber harvesting and regeneration. Under legislation, FPPs must comply with the Forest Practices Code. Each year the FPA examines FPPs to independently assess the level of compliance from planning to implementation of forest practices on both public and private land. These assessments may identify compliance issues, the need for remedial actions or areas for improvement in the forest practices system.

Historically, the FPPs were selected by stratified random sampling to incorporate all aspects of forest planning and operational practices undertaken by companies and agencies, and individual forest owners or managers. In 2017, the FPA introduced a risk-based approach designed to target high-risk activities, while maintaining a representative sample to monitor general trends.

Since 2018–19, more than 90% of all assessed forest operations across all tenures met or exceeded the required minimum standards of the Forest Practices Code (Table 1).

Table 1: FPPs due, lodged and fully complied, by year over the reporting period, all tenures

Year	Due	Lodged	Fully complied
2020–2021	1,609	1,464 (91%)	1,352 (92%)
2019–2020	1,311	1,192 (91%)	1,092 (92%)
2018–2019	1,340	1,107 (83%)	1,006 (91%)
2017–2018	607	454 (75%)	401 (88%)
2016–2017	1,269	1,139 (90%)	926 (81%)
2015–2016	1,609	1,371 (85%)	1,240 (83%)

2.2.2 Compliance and enforcement

The FPA has powers under the FP Act to enforce standards, including issuing prescribed fines or prosecution for noncompliance. The results of the annual assessments are published in the FPA annual reports.

Every FPP requires that the compliance of the operation be assessed and that a certificate of compliance be lodged by an FPO within 30 days of the expiry of the FPP. For the reporting period, an average lodgement rate of 86% was achieved, of which 89% had full compliance. Lodgement and full compliance increased to 91% and 92%, respectively, for the last 2 years of the reporting period (Table 1).

The level of lodgement of certificates of compliance by non-industrial private forest owners is low (below 50% over the last 2 years of the reporting period). The low lodgement rate may be attributed to factors such as the expense for a private landowner to engage an FPO to complete the work or being unaware of the requirement. The absence of certificates means that the FPA has lower

confidence in compliance on non-industrial private land. Consequently, the annual assessment program, as described in Section 2.2.1, has targeted private land as part of the new risk-based review and has confirmed there are problems with compliance. The FPA is reviewing options to improve the awareness of the requirement for FPPs on private land, including options such as automatic advisory letters to landowners informing them of their legal obligations under the FP Act. During the reporting period, the FPA released an online tool, 'Check before you chop', aimed at increasing awareness of the forest practices system across the community (see Table 2).

The FPA's compliance program investigates detected instances of noncompliance. Possible breaches of the Forest Practices Code are reported by FPOs or forest industry supervisors, local government and members of the public. The FPA assesses all complaints relating to alleged breaches or poor practice. Corrective action is mandated when required and penalties are imposed for serious breaches. Most breaches of the Forest Practices Code are dealt with by corrective action, and by reviewing and improving systems to ensure that similar situations do not recur. The most common reasons for breaches are human error or lack of knowledge about the forest practices system, particularly in the agricultural sector when clearing trees. This highlights the importance of continuing promotion, education and training about the system and associated obligations.

2.2.3 Forest research and monitoring

Research and development in the Tasmanian forestry sector focuses on the impacts of forestry on the environment, effects of climate change on forests, improvements in biodiversity, soil and water protection measures, and the social and economic impacts of forestry. Research into plantations, harvesting, haulage and wood processing has expanded in the past 5 years.

Australia has gained a good level of scientific understanding of the characteristics and functions of its unique forest ecosystems, based on more than 100 years of research in a broad range of forest areas. This knowledge is required to underpin sustainable forest management. However, since 2007, Australia's capacity to conduct and apply research and development to improve the scientific understanding of forests and delivery of forest products has progressively decreased. Tasmania has also experienced a decline in research capacity. The capacity to conduct and apply research and development can be measured by the number of personnel engaged in this activity and related expenditure. In 2020–21, Tasmania reported a total of 4.5 full-time equivalent (FTE) forest researchers in government entities. This is a substantial reduction from the 43.6 FTE forest researchers in government reported for 2010–11 and a halving of research capacity since 2015–16 (FPA 2022). It should be noted, however, that there has been a change in the research model over the previous decade that has seen a reduction in government research and an increase in research done by other organisations, including universities and Tasmania's Regional Forestry Hub. Tasmania's Regional Forestry Hub was established as part of the Australian Government's national forest industries plan *Growing a better Australia: A billion trees for jobs and growth*. The Launceston National Institute for Forest Products Innovation (NIFPI) is another example of this change in research structure.

Several types of stakeholder are involved in research that informs adaptive management of the forest practices system. This includes university academics and students, staff from FPA, Sustainable Timber Tasmania (STT), private companies and NRE Tas. The research is incorporated into the various aspects of the forest management system as detailed below.

Biodiversity (including threatened species)

Each year, the Biodiversity Program of the FPA publishes an overview of any known research relevant to assessing the effectiveness of the biodiversity provisions of the Forest Practices Code (Koch 2019; 2020; 2021; Koch & Gardner 2022; Turner & Munks 2018). The research covered includes work done by FPA,

industry, government, natural resource managers and university staff and students. These reports are available on the FPA website. Example case studies are provided in Boxes 1–3 in the following sections.

The FPA has an active and strong research program. Staff from the Biodiversity Program initiate and are involved with numerous projects at any one time. Priorities include:

- monitoring the implementation of the Forest Practices Code provisions
- monitoring the effectiveness of the Forest Practices Code provisions
- research on the occurrence and conservation status of natural and cultural values and the potential and actual impact of forest management on these values.

The FPA has undergone a process to prioritise projects (FPA 2012; Koch et al. 2022) but the choice of projects implemented depends on available funds, logistic considerations, environmental risk and staff/student availability. FPA research is typically done in collaboration with researchers, students and staff from universities, government departments, private consultants and companies.

Several private forest companies undertake annual monitoring programs to identify significant changes or disturbance events that may have impacted the natural estate; for example, Forico's annual monitoring of ptunarra brown butterfly (*Oreixenica ptunarra*) at Surrey Hills.

STT's forest management branch undertakes and collaborates in research into native forest silviculture, plantation silviculture and plantation wood properties, biology and conservation (including forest health surveillance), and, together with the Tasmania Parks and Wildlife Service (PWS), manages the Warra Long-term Ecological Research Site in southern Tasmania. See Box 1 for more information.

The FPA uses new information from research or other sources to review management practices as appropriate and, since 2021, FPA's effectiveness monitoring report has included a section outlining how the results of research have been used to improve management practices (Koch 2021; Koch & Gardner 2022).

More information on the threatened species monitoring that occurred over the reporting period is presented in Section 3.

Box 1: Warra Long-term Ecological Research Site

Warra is a complete land observatory within Australia's Terrestrial Ecosystem Research Network (TERN), monitoring the environment at all 3 of the spatial scales at which TERN infrastructure operates. At the finest scale is the Warra Supersite, consisting of an 80-m instrumented tower and adjoining 1-ha plot, which provides the intensive measurements needed to monitor ecosystem processes. At the intermediate ecosystem landscapes scale, Warra hosts four 1-ha plots in the AusPlots Forest Monitoring Network, which are used to characterise and detect changes in soil characteristics and in the composition and structure of the vegetation. At the widest scale, Warra operates as a calibration and validation site for the TERN Landscape Monitoring platform, which provides TERN's remote-sensing capability to monitor changes at the continental scale. All measurements in the TERN platforms at Warra are done using nationally consistent methods and all data are quality checked before being lodged on TERN's data portal for free access and use by stakeholders.

In January 2019, much of the southern and eastern sections of the Warra site were burned by bushfire. All of the 'Icon' studies and TERN infrastructure were damaged by the fire. Monitoring equipment on the 80-m tower was quickly reinstated (by May 2019), the four burnt 1-ha plots were remeasured, and new light detection and ranging (LiDAR) and hyperspectral datasets were

acquired for the 5 × 5-km calibration and validation plot for the TERN Landscapes Monitoring platform. A severe windstorm in September 2021 caused a large tree to fall across cables supporting the instrumented tower at Warra, causing it to collapse and destroying all instruments. Efforts are under way to reinstate an instrumented tower at Warra.

Despite these setbacks, Warra continues to support research activity. More than 220 research projects have now been conducted at Warra and many are ongoing. This research has generated 430 reports and publications – more than 140 of these in international peer-reviewed journals. Forty publications using data obtained from Warra were produced in the current 5-year reporting period. The drivers of the research carried out at Warra have changed. Questions relating to the management of the forests for wood production now drive much less of the research and the focus has shifted much more towards understanding disturbances from fire and from climate change in ecosystems at Warra, particularly the *Eucalyptus obliqua* tall forest ecosystem, and how risks of adverse effects from these disturbances may be managed.

Earth sciences

Although there is no standalone publication providing an annual overview of Earth sciences and cultural heritage research relevant to the RFA, a summary of relevant FPA research is provided each year in the FPA annual report. In the reporting period, the FPA Earth sciences and cultural heritage program conducted research as summarised in Appendix 2. The research allows forest planners to identify areas of higher risk and highlights the importance of establishing wide streamside reserves to prevent soil loss.

Climate change

Considerable research is being undertaken by university researchers, sometimes in collaboration with industry partners, to explore the expected impacts and adaptation strategies associated with climate change (Koch 2022). One key area being explored is the location and viability of climatically adapted seed sources.

The FPA reviewed the potential impacts of climate change on Tasmania's production forests and potential adaptation strategies (Koch 2022). Some of the key results were communicated to the industry and the public at a symposium held in September 2022. This was followed by a practitioner workshop to discuss how some of the adaptation strategies could be implemented by the FPA and the industry (Koch 2023). Recommendations arising from this process included:

- development of new policy for the forest industry to respond to failed regeneration or forest death events not associated with harvest operations, in preparation for climate change threats
- adjustments to the Forest Practices Code, including greater emphasis on managing forests for climate change and carbon
- development of new planning tools to help manage forest values at risk of adverse change under a changing climate.

These recommendations are being considered by government.

In addition to this recent broad review of climate change (which should be consulted directly for details on related research occurring in Tasmania; Koch 2022), there have been several initiatives of note:

- In 2018, a review of climate impact change work undertaken, research gaps and opportunities was released (Bindoff 2018).
- In 2020, a report was released that provided a strategic assessment of how climate change and Australia's carbon policy impacts upon the current state of Tasmania's forestry sector and identified opportunities for growth and barriers to expansion of the sector (Keenan, Ryan & Stewart 2020).
- In 2018, an assessment of the viability of prescribed burning as a management tool under a changing climate was released (Harris et al. 2018).
- A project initiated in 2022 will explore various uses of forest products and the impact of 3 different forest management scenarios on the net carbon balance. The carbon modelling will include Tasmanian forestry.
- *Tasmania's Climate Change Action Plan 2023–25* includes forestry commitments to make Emissions Reduction and Resilience Plans for the transport, energy, waste, farming, factory and forestry sectors. Government will work with businesses, industry and the community to make these plans.

Sustainable Timber Tasmania

As part of their certification requirements, STT and other major forest managers in Tasmania are required to have comprehensive monitoring systems in place. STT also undertakes monitoring to confirm other forest values are being maintained (for example, health, biodiversity, freshwater systems).

STT models the sustainable yield (further information on STT's sustainable yield reports can be found in Section 5.1) from permanent timber production zone (PTPZ) land and monitors production to ensure that harvesting of native forest and eucalypt plantations is consistent with its statutory obligations and with its objectives for sustainable forest management. The RFA requires a 5-yearly review of the sustainable yield of eucalypt high-quality sawlogs (HQSL) from PTPZ land. Previous reviews in 1998, 2002, 2007, 2014, 2017 and 2022 incorporated the effects of successive changes in the resource base over that period (Sustainable Yield reports).

Forest production and innovation

In the current reporting period, much of Tasmanian forest-related research effort occurred through the Australian Research Council Centre for Forest Value (CFV), based in the University of Tasmania. The research themes of the CFV span the forest supply chain: sustainable forest production and certification; product and manufacturing and supply chain integration; information management; and socio-economics. Some of these projects are ongoing (University of Tasmania 2022).

The NIFPI was established in Launceston in 2017. NIFPI aimed to grow Australia's forest and forest products industry by exploring and facilitating innovation in the forest products sector in areas such as forest management, timber processing, wood fibre recovery, value adding, advanced manufacturing and the bioeconomy. Most projects delivered under NIFPI have focused on timber processing. Other projects have focused on areas such as forest operations, natural capital assessment, biodiversity monitoring and pest management.

The outcomes of forest research and how the outputs contribute to adaptive forest management are outlined in Appendix 3.

Socio-economic

Over most of the reporting period, the Tasmanian Government employed a forest economist to improve understanding of the socio-economic impacts of decisions made by the FPA. The broad functions of the socio-economic program were to:

- improve the collection, analysis and consideration of forestry economic and related social data to facilitate greater cost–benefit analysis in environmental decision-making within the forest practices system, consistent with the objectives of the FP Act and the roles and functions of the FPA
- develop strategic economic and related social advice to the FPA to augment existing environmental advisory services and, in this context, manage the planning, resourcing and delivery of strategic initiatives relevant to the provision and consideration of economic and related social data.

Some of the socio-economic research projects conducted during the reporting period are outlined below (see FPA annual reports for further details):

- development of a socio-economic decision-making framework
- development of a baseline for the cost of compliance with the forest practices system
- investigation of the viability of incorporating natural capital accounting in the State of the Forests reporting system – this project identified data gaps and other barriers that limit the application of natural capital accounting and tried to fill these gaps in the context of the Tasmanian forest sector
- exploration of the willingness to pay for sustainable firewood in Tasmania
- analysis and reporting of the impacts of introducing new strategic management prescriptions for the Clarence galaxias fish – the project found that historical management advice has been appropriate to manage the species in most cases, but was delivered on a case-by-case basis (NRE Tas 2022)
- research on the value of informal reserves on public and private land – the focus of the research was on the value of the protection and enhancement of biodiverse ecosystems, cultural heritage, water resources and visual amenity, which is provided by protection within production forests
- investigation of public willingness to pay and forester willingness to accept compensation for the outcome of alternative management of forest residues – the project investigated how smoke, health impacts, biodiversity outcomes and employment within the supply chain impact upon public and forester preferences for alternative management of forest residues in Tasmania.

2.3 Management responses and directions – adaptive forest management in practice

The forest practices system is based on an adaptive management and continuous improvement framework. During the reporting period, changes were made to the forest management system and forest management practices and approaches. This section covers changes to legislation, policies and planning tools. Changes in management approaches over the reporting period can be found in Tables 2, 3 and 4. Case study examples outlining adaptive management in practice are provided in Boxes 2 and 3.

A major change in the forest management practices over the reporting period was the increasing adoption of partial harvesting silviculture over clearfell harvesting. STT's annual reports over the reporting period show a decrease in clearfell harvest. In 2016–17, STT's annual report indicated that 2,277 ha was clearfelled; in 2021–22, the annual report indicated that 1,467 ha was harvested by clearfell. The shift from clearfell harvesting regimes occurred primarily to better manage biodiversity values and threatened species. An example of this is in wildlife habitat clumps (see Table 2).

Table 2: Adaptive management in practice: actions delivered through the forest practices system

Value/policy	Description	New information	Actions taken	Conservation implication/ outcomes
Wildlife habitat clumps (mature tree retention) technical note	Guidelines for implementation of the provisions of the Forest Practices Code for the retention and distribution of mature trees in native forest at the operational scale	FPA annual assessment program indicated that improvement was required in awareness of how to implement the provision correctly	Fauna Technical Note No. 7 (Wildlife habitat clumps) revised with expert and stakeholder input FPA is implementing a targeted training program for industry	Expected improvement in the implementation of the provision and mature tree retention at the operational scale
Biodiversity Values Database	Publicly available online tool enabling users to identify threatened species that need to be considered when planning and conducting a forest practice Provides information on locality data for threatened flora and fauna species, range boundaries and habitat descriptions	New information on threatened species listings, localities or range boundaries updated periodically from the Tasmanian Natural Values Atlas	New version released in 2020, providing improved user experience and increased access to spatial information to assist with planning	Improved access to latest information for threatened species, including predictive habitat maps and range boundaries
Threatened Species Adviser	Online decision support tool delivering species-specific management recommendations that are developed and agreed between the FPA and NRE Tas and are designed to mitigate potential impacts of forest operations	Gap in the delivery of management actions via an online platform – historically, this tool delivered advice for fauna species only (then known as the Threatened Fauna Adviser) and flora was managed on a case-by-case basis with input from specialists as required	Tool expanded in 2021 to deliver management actions for flora and subsequently renamed the Threatened Species Adviser Subsequent process completed for threatened flora to prioritise research and monitoring based on knowledge gaps	Improved and streamlined planning standards for threatened flora species that are measurable and enforceable Prioritisation process led by FPA to recognise that disease management is a key priority for threatened flora as the likelihood and consequence (e.g. dieback) is changing with the impacts of climate change; subsequently, the guidelines for managing *Phytopthora cinnamomi* in production forests were reviewed and updated to include the latest information on disease identification and management

Continues

Table 2 *continued*

Value/policy	Description	New information	Actions taken	Conservation implication/ outcomes
Wedge-tailed eagle and white-bellied sea eagle technical note	Technical note provides information to planners to help assess risks to species	Requests to FPA for advice relating to eagles contained inadequate information to assess the risks to the species because some key information was not provided to planners in an easily accessible format Research increased the understanding of factors that influence disturbance to eagles	Fauna Technical Note No. 1 (Eagle nest searching, activity checking and nest management) revised: • new section outlining the factors that influence how sensitive eagles are likely to be to an activity • clarification on nest searches • new section on management of nest reserves • more detail on nest activity assessments • new section on conducting nest condition assessments • new section on guidelines for planting operations and management of planned burns	Greater clarity and new sections of the technical note will help ensure that management around eagle nests minimises disturbance to breeding eagles, thereby improving conservation of the species
***Phytophthora cinnamomi* technical note**	FPA technical note on how to identify *P. cinnamomi* in forests and how to minimise the risk of spreading the pathogen	FPA flora prioritisation process highlighted disease management as a priority for threatened flora FPA became aware of new information on *P. cinnamomi*	Flora Technical Note No. 8 (Management of *P. cinnamomi* in production forests) updated to incorporate current research and knowledge	Forest planners will have better access to up-to-date information about the risks of spread of *P. cinnamomi* in forestry operations
Flora habitat suitability models	Flora habitat suitability models aid on-ground flora surveys during the development of FPPs	Updated threatened flora habitat descriptions used to develop spatial predictive maps for identifying potential habitat within areas subject to forestry operations	Habitat models built and released in 2021	Improved and targeted survey effort for threatened flora species
Awareness of forest practices system on private land	Non-industrial forest operations on private land generally have lower compliance compared with forest operations on public land and industrial forest operations on private land, partially due to lower awareness of legal obligations	FPA annual assessment program records lower levels of compliance on non-industrial private land compared with forest operations on public land and industrial forest operations on private land	FPA undertook a 'Check before you chop' campaign and released an online tool to raise public awareness of planning requirements under the forest practices system	Expected improvement in the awareness of the legal requirements when undertaking forest practices, and thus improvements in compliance

FPA: Forest Practices Authority; FPP: forest practices plan; NRE Tas: Department of Natural Resources and Environment Tasmania

Table 3: Adaptive management in practice: actions delivered through the forest practices system – threatened species and ecological communities

Species	New information	Actions taken	Conservation implication/outcomes
Ptunarra brown butterfly	Long-term monitoring at Surrey Hills grasslands by Forico	Strategic burning program to maintain habitat, and practices to reduce wasp populations	Greater likelihood of maintaining a healthy population in this landscape Monitoring results likely to be available over the next reporting period
Swift parrot	New information in summer 2020–21 suggested *Eucalyptus brookeriana* was probably an important foraging resource in the Eastern Tiers area	In June 2022: • definition of potential swift parrot foraging habitat was revised to include *E. brookeriana* • management approach was adjusted so that in the Eastern Tiers patches of *E. brookeriana*–dominated forest and larger *E. brookeriana* trees (>60 cm dbh) must be retained (larger *E. brookeriana* trees have the potential to contribute a more substantial foraging resource)	Expected improvements in conservation outcomes by retaining more foraging resource throughout the breeding range
Swift parrot	In 2021–22, a significant number of additional nests and sightings in the Lonnavale area were added to the NVA (before this, only 17 records were recorded for this area)	NRE Tas commenced a review of swift parrot habitat management in areas subject to forestry operations In December 2021, FPA issued an instruction that the standard habitat management recommendations could no longer be used for planning coupes within the Lonnavale forest area and that advice should be sought from the FPA on a case-by-case basis	The rapid response to new information meant that each harvest operation was given case-specific consideration to ensure conservation outcomes for the species were being achieved, in consideration of the increase in breeding activity in the area Increased levels of swift parrot habitat retention in the Lonnavale area
Wedge-tailed eagle and white-bellied sea eagle	FPA conducted an expert elicitation process to identify eagle nests that are unlikely to ever be used for breeding	A technical note and management approach for 'derelict nests' was developed and released	Efficient, effective management will increase practitioner engagement, helping ensure management practices are implemented adequately in areas most important for species conservation
Tasman Peninsula dusky antechinus	Species newly listed under the TSP Act in 2019	FPA conducted a series of expert workshops to review literature, assimilate species knowledge and design management recommendations, and a range boundary and habitat description for the species (released 2022)	Delivery of management approach via the Biodiversity Values Database and Threatened Species Adviser helps ensure this species is considered when conducting forest operations, thereby helping conserve the species throughout its range

Continues

Table 3 *continued*

Species	New information	Actions taken	Conservation implication/outcomes
New Holland mouse	A 2018 research paper outlined the recent decline in distribution and abundance of the Tasmanian population	FPA reviewed the management approach and updated the habitat description	Management will be considered across a broader geographic range, helping to maintain habitat
Clarence galaxias	In 2020, a review was completed of data, historical management advice, expert opinion, survey effort and research	Workshops were held to develop a strategic approach to management, including: • identification of a core range • development of management recommendations for the species within this range • socio-economic analysis of the change in management	Standard management approach focused on key populations replaced case-by-case approach, providing increased certainty for the industry while delivering expert-derived management approach to assist with maintaining the species throughout its range
Giant freshwater crayfish	New Recovery Plan released in 2017, triggering a review of management for the species	Management approach adjusted to better reflect the risk of different operations on potential habitat for the species, including: • refinement of the potential range boundary • creation of a core range • modifications to the survey requirements for plantation operations	Recognition of priorities for management through additional range categories Increased capacity for plantation operations to focus on priority areas Efficient, effective management approach expected to increase practitioner engagement, thereby helping ensure management practices are implemented adequately in areas most important for species conservation
Stag beetles	NRE Tas identified that the management of planned burns within the range of threatened Tasmanian stag beetles did not adequately manage the risk to the species	In 2019, the recommended timing of burning was adjusted to avoid overlap with periods when the species is active	Reduced risk that these species are impacted by planned burns, thereby improving conservation management
Marrawah skipper butterfly	An FPA-supported project increased the known extent of the species 2018 report recommended modifying the management approach across a broader range	Management pathway changed in 2020 so that all native forest operations must seek advice in response to range extension surveys	Consideration of this species across a broader area, effectively retaining more potential habitat across the landscape

Continues

Table 3 *continued*

Species	New information	Actions taken	Conservation implication/outcomes
Tussock skink	A gap was identified in the management pathways for managing the risk in plantation operations	A management recommendation specific to plantation operations was added to the Threatened Species Adviser, only requiring management for the species within plantation areas if a known site is present, as plantation trees do not provide habitat for this species	Efficient, effective management will help increase practitioner engagement, helping ensure management practices are implemented adequately in areas most important for species conservation
Tasmanian devil	Research project exploring health impacts and habitat use associated with forestry areas	Changes to management of plantations windrows that are potential habitat for the Tasmanian devil	Improved windrow management
Threatened flora	Four flora species newly listed as threatened: • *Chiloglottis valida* (large bird-orchid) • *Senecio extensus* (subalpine fireweed) • *Senecio longipilus* (longhair fireweed) • *Senecio tasmanicus* (Tasmanian fireweed)	In consultation with experts, habitat descriptions and management recommendations were developed for each species, reflecting the risk of forestry operations impacting on the species and its habitat	These species are now considered in planning for forestry operations, which will increase awareness and improve conservation outcomes

dbh: diameter at breast height; FPA: Forest Practices Authority; NRE Tas: Department of Natural Resources and Environment Tasmania; NVA: Natural Values Atlas; TSP Act: T*hreatened Species Protection Act 1995* (Tas)

Table 4: Adaptive management in practice: actions delivered through the forest practices system – Earth sciences

Value	New information	Actions taken	Conservation implication/outcomes
Swamps and lakes	Field visits to King Island indicated that there was confusion distinguishing between swamps and lakes	In 2020, the Forest Practices Code was amended to include new definitions of swamps and lakes	The clearer definitions mean that swamps are likely to be identified correctly, and therefore appropriately managed if in proximity to forest operations
Headwater streams	McIntosh and Laffan (2005) led to development of FPA's class 4 stream guidelines, which have been implemented for 15 years and found to be an effective mechanism for limiting erosion in headwater streams	In 2020, the Forest Practices Code was amended to include the class 4 stream guidelines, thereby raising these guidelines to be a provision of the Code	Management of class 4 streams has been required for many years, but including this management approach in the Forest Practices Code as a standard that is enforceable is a process that recognises the importance of managing these areas
Items or places of Aboriginal or historic cultural heritage	The procedure for managing Aboriginal cultural heritage and the procedure for managing historic cultural heritage when preparing FPPs were prepared after a long period of consultation with stakeholders and are now accepted as 'Agreed procedures' between FPA and NRE Tas	The Code was amended to refer to the procedure for managing Aboriginal cultural heritage and the procedure for managing historic cultural heritage, meaning these instruments must be applied when doing forest practices	Clear guidelines for planners and contractors in relation to the protection and management of Aboriginal cultural heritage and historic cultural heritage are expected to result in better protection of these areas
Erosion and siltation	Technological advances in operational harvesting systems have changed the impacts of silvicultural practices on soil erosion	Table 4 of the Forest Practices Code, which provides a guide to harvesting systems in relation to soil erodibilities and slopes, was amended to reflect the impact of different silvicultural systems given recent technological advances	The soil erosion measures of the Code reflect new practices

NRE Tas: Department of Natural Resources and Environment Tasmania; FPA: Forest Practices Authority; FPP: Forest practices plan

Box 2: Case study: Using new information to refine management of the threatened swift parrot

The swift parrot (*Lathamus discolor*) is a small migratory bird endemic to south-eastern Australia. It has an extensive foraging habitat across all tenures while on the mainland, returning to Tasmania to breed over summer. When in Tasmania, its distribution is determined primarily by the availability of suitable foraging habitat (largely flowering Tasmanian blue gum, *Eucalyptus globulus*, and swamp gum, *E. ovata*), which varies spatially between years. The species requires nesting hollows in proximity to the foraging habitat to breed. Several threats have been identified for the birds, including predation from sugar gliders, habitat loss (particularly nesting hollows), habitat alteration from wildfire, collision mortality, competition and disease (TSSC 2016). A paper published during the reporting period suggests the species forms a single nomadic population at high risk of extinction and should be managed as a single unit (Stojanovic et al. 2018).

Management for this species focuses on the retention of key potential foraging and nesting trees, and retention of known nest sites.

In the summer of 2020, the FPA became aware of new information that suggested that Brooker's gum, *E. brookeriana*, was likely to constitute an important foraging resource for swift parrots in the Eastern Tiers area. The FPA, in consultation with NRE Tas, evaluated the new information and modified the management approach for swift parrot habitat. Harvesting of *E. brookeriana* trees is now limited within the potential range of the swift parrot. This means that in the region where *E. brookeriana* is important to swift parrots (the Lake Leake swift parrot important breeding area), all patches of forest dominated by *E. brookeriana* and all individual trees greater or equal to 60 cm diameter at breast height should be retained if practicable.

This revised approach was endorsed by the FPA and NRE Tas as being in accordance with the 2014 *Procedures for the management of threatened species under the forest practices system* (FPA and NRE Tas 2014), and was delivered via the FPA Threatened Species Adviser.

While the addition of *E. brookeriana* has increased the protection of foraging habitat for the swift parrot, the effect on the population remains unclear due to the complex ecology of the swift parrot and number of threats it faces.

The Tasmanian Government recognises that the swift parrot faces a variety of threats throughout its migratory range, and is committed to continuing to work collaboratively to protect this critically endangered species using a coordinated and adaptive approach. Two new swift parrot conservation management projects were initiated by NRE Tas in 2022:

- The Swift Parrot Recovery Project is the result of a $1 million Tasmanian Government funding commitment and is implementing a range of swift parrot conservation management activities.
- The NRE Tas Swift Parrot Forestry Management Project is reviewing the effectiveness of the current swift parrot habitat management approach within wood production areas to identify if, and how, the current approach can be improved.

Box 3: Case study: Wedge-tailed eagle

The wedge-tailed eagle subspecies *Aquila audax fleayi* occurs only in Tasmania. The Tasmanian wedge-tailed eagle is listed as endangered under Schedule 1 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and Schedule 3.1 of the TSP Act. This became effective in July 2000 after monitoring efforts reported declines in breeding success and habitat.

Eagle habitat covers lowland, highland and coastal regions across the state. Wedge-tailed eagles have been recorded in dry sclerophyll forest, temperate rainforest, subalpine forest, dry woodland, coastal heathland, small wetlands, riparian vegetation, sedgeland, grassland and farmland. Though ranging habitat is varied, nesting is restricted to old-growth forest on sheltered sites (Threatened Species Section 2006).

No changes to the population estimate for the wedge-tailed eagle have been made in this reporting period; however, a project is scheduled to commence in 2024 that will aim to produce a current estimate of the population. The most recent estimate was 1,000 to 1,500 birds (Threatened Species Section 2006), derived from an estimated 426 territories of which approximately 50% were occupied each year.

Adaptive management over the reporting period

The FPA Eagle Research and Monitoring Program was initiated in 2007, and revised in 2015, with the aim of monitoring the rate of nest success and the timing of breeding season events (Koch, Wiersma & Munks 2013). Nests are identified as active (for breeding) if the nest contains a young chick, an egg or an adult in an assumed incubation pose. Typically, most observed nests are inactive.

Eagle management constraints are applied to forestry operations from the beginning of July to January (February in years when breeding is found to be occurring later) to capture the most sensitive stages of the breeding/nesting period. Exposing breeding eagles to disturbance could lead to a range of perverse outcomes including:

- failure to breed
- permanent abandonment of a nest
- flushing from the nest, leaving nest contents open to predation and exposure
- effects on a nest later in the chick's developmental stage.

The forest practices system takes a risk-based approach to eagle management that includes risk assessment activities that must be undertaken before a forestry operation can occur in identified eagle habitat. Searching for nests outside the breeding season and prior to harvesting enables early identification and management of nest trees and nesting habitat, and so minimises the risk of disturbing breeding birds. A nest search must be undertaken in areas that have not been searched in the past 2 years. Nest searches are not done annually due to the high fidelity of eagles to their existing nests and the short window available to do nest surveys (outside the management constraint period when birds are breeding). Pre-operational searches should be timed as close as possible to the planned operation commencement date. If a nest is found, it is documented and a nest reserve is established and managed where relevant to forestry activities. As eagles are very selective in the areas where they will build nests, once a nest reserve has been established, it is maintained even if the nest is not used. Eagles maintain multiple nests, which are substantial, long-lasting structures that take some time to construct; therefore, conducting nest searches at a 2-year interval is considered adequate for locating new nests while minimising impacts on industry.

Significant habitat for wedge-tailed eagles is all native forest and native non-forest vegetation within 500 m of known nest sites, or 1 km of known nest sites when in direct line of sight.

There is some standard advice for eagles:

- Nest reserves should be protected from high-intensity and extensive regeneration burns. A low-intensity burn for fuel-reduction purposes may enter the nest reserve outside the eagle management constraint period, provided there is a low risk of the nest tree being deleteriously affected.
- Machinery should not enter the nest reserve network and no trees should be felled in or out of the nest reserve. New roads and tracks should not be built through the reserve and nest reserves should be protected from other forms of disturbance.

Ongoing adaptive management

In 2020, the FPA collaborated with a University of Tasmania researcher to understand what factors influence eagle behaviour. The project attached transmitters to 50 adult eagles. The research aims to provide guidance on how to manage threats such as windfarms, powerlines and forestry operations. Detailed data on the activity of birds and machinery during harvest operation will be used to assess the types of activities and distances from the nest that disturb breeding eagles, and thereby assess the effectiveness of current management.

Researchers have developed a citizen-science project ('Where? Where? Wedgie!') to monitor wedge-tailed eagle population changes (Nature Trackers 2022). An ARC-funded project will combine the citizen-science data with eagle tracking and genetics to estimate the abundance and distribution of the population, which will facilitate ongoing monitoring.

The project will:

- develop behavioural models to predict risk of wedge-tailed eagle collisions with wind turbines
- measure the effects of disturbance on breeding wedge-tailed eagles and the effectiveness of current management
- rigorously estimate the abundance and distribution of the wedge-tailed eagle population
- build a spatially explicit demographic model to define conservation priorities for the wedge-tailed eagle population.

2.2.1 Reserve estate

Under the RFA, the Tasmanian Government has agreed to establish and progressively add to the CAR reserve system for the purpose of ensuring the long-term conservation and protection of environmental, cultural and heritage values, including state- and Commonwealth-listed species and communities. In the CAR reserve system, 'comprehensive' means the full range of recognised forest communities should be included, 'adequate' means that sufficient area is reserved to maintain the ecological viability and integrity of populations, species and communities, and 'representative' means that areas reserved should reasonably reflect the biotic diversity of the communities (Commonwealth of Australia 1995).

The area covered by the CAR reserve system in Tasmania has increased by 13,000 ha since 2016, with 8,700 ha of that increase being forested land, and now comprises 3.428 million ha of land; 1.047 million ha is old-growth forest. CAR reserves now cover an area equivalent to 50.3% of the total

land area of Tasmania. Approximately half of the total CAR reserve area contains forest. Public land reserves comprise 3.266 million ha and private land reserves cover 162,000 ha (FPA 2022).

The increase in reserved land since 2016 is largely due to new conservation covenants on private land (approximately 13,000 ha) and Stewardship Agreements created through the Midlands Conservation Fund (>7,000 ha; FPA 2022). There was a slight decrease in the reserved extent of non-eucalypt forest between 2016 and 2021 due to a decrease (~520 ha) in the area of fixed-term reserves on private land (FPA 2022).

Old-growth forests

The spread of age-classes across forest communities is a measure of ecosystem diversity, because the age structure and species composition of a forest change as it grows older. Sustainable forest management requires the maintenance of a full range of age-classes across the forest estate.

The total area of mapped old-growth forest in Tasmania as at 2022 was 1,196,000 ha (FPA 2022), a decrease of 10,000 ha since 2016 (decreases are 3,000 ha in dry eucalypt forest, 4,000 ha in wet eucalypt forest, 1,000 ha in subalpine forest and 2,000 ha in non-eucalypt forest). The loss of old growth can be explained by a combination of harvesting, fire, heat-induced tree death, pests and diseases. Fire was the most significant influence in the decrease.

Since the signing of the revised RFA (2017), harvesting of old-growth forest on public land has been significantly reduced. The Tasmanian Government has committed to publicly report on the area of public old-growth forest harvested, by silvicultural technique, each year. Further statistics and trends on this are found in Section 5.

Over the reporting period, the average area of old growth harvested has declined to 608 ha per year from 1,710 ha per year in the previous RFA implementation reporting period (2007–12). This harvesting is done via a range of silvicultural techniques.

Since 1996, the area of old growth in the CAR reserve system has increased by 365,400 ha (32.8%) (FPA 2022).

Land tenures

Tasmania has a total of 812,000 ha of public PTPZ land that is managed for multiple uses, including to produce timber products (STT 2021). There is also more than 100,000 ha of hardwood and softwood plantations on this land tenure, managed by STT and third-party forest managers.

There is 356,000 ha of Future Potential Production Forest (FPPF) land – all outside of the Tasmanian Wilderness World Heritage Area (TWWHA) – created as a 'wood bank' in 2014 to provide for future sustainable forestry production (DSG 2020). Currently no FPPF land has been harvested. Native forest harvesting can only occur in accordance with the *Forestry (Rebuilding the Forest Industry) Act 2014* (Tas) via the following mechanisms:

- an exchange of FPPF land with PTPZ land is made, with the overall stock of FPPF land remaining constant
- after 8 April 2020, conversion (without replacement) of areas of FPPF land into PTPZ land.

The process for exchange or conversion is triggered if the Minister for Resources requests the Crown Lands Minister to consider the change. For either option to progress, consideration must be given to a variety of factors such as environmental and heritage values on FPPF land, balanced against the economic opportunities.

Both mechanisms – exchange and conversion – require the acceptance of both Houses of the Tasmanian Parliament.

Special species timber harvesting can occur on FPPF land, but only by partial harvest techniques as specified in the *Tasmanian special species management plan 2017* and the *Rainforest silvicultural guidelines*, and is subject to approvals.

Classification of land available to private landowners

The FP Act (Part II) makes provision for private timber reserves (PTRs), which are a means by which private landholders can ensure the security of their forest resources without requiring permits under the *Land Use Planning and Approvals Act 1993* (Tas). In June 2012, 475,321 ha of private property was dedicated as PTRs. This had decreased to 434,181 ha as of 30 June 2021. The gradual decline in area under PTRs since 2012 can be attributed to the harvesting of many former managed investment scheme plantations and subsequent conversion of the land to agricultural uses, and some landowners putting native forest into conservation covenants.

Landowners may enter into a conservation covenant to manage defined areas specifically for nature conservation to contribute to Australia's network of protected areas, the National Reserve System. Conservation covenants are legally binding under the *Nature Conservation Act 2002* (Tas) (NC Act) and are registered on the land title. Although a conservation covenant is usually in perpetuity, it may be registered for a fixed term.

During the reporting period, 10,870 ha of land was newly registered under conservation covenants. This area includes both forest and non-forest vegetation. Forest areas within the private covenant estate are required to be managed in accordance with the individual covenant terms and associated management plans, which typically place restrictions on the clearing of native vegetation and require land management issues such as weeds to be addressed.

A landowner who is refused certification of an FPP wholly or partially by reason of protecting a threatened species or protecting a threatened native vegetation community from clearance and conversion may be eligible for government compensation in exchange for entering a conservation covenant over the land. This removes duplication of regulatory systems. Any forest harvesting within PTRs is subject to compliance with the forest practices system.

Changes in forest cover

During the previous reporting period (July 2011 to June 2016), there was a decrease in native forest cover of 22,000 ha. The SoFR estimated that over the 2016 to 2021 period there was a 9,600 ha (0.3%) decrease in the mapped extent of native forest in the RFA vegetation communities (FPA 2022). It should be noted that these figures related to total forest loss, not just forest loss authorised under an FPP. Forest loss can be for a range of reasons, including authorised and unauthorised clearing. Forest loss authorised under an FPP totals approximately 400–500 ha per year. The rate of forest loss has decreased since the previous reporting period due to a number of factors, including a significantly reduced rate of native forest conversion to plantations.

The native forest communities with the largest total area decreases over the reporting period were coastal *Eucalytpus amygdalina* dry sclerophyll forest (1,600 ha or 0.9%); tall *E. obliqua* forest (1,200 ha or 0.3%); *E. amygdalina* forest on dolerite (1,000 ha or 0.6%) and dry *E. obliqua* forest (800 ha or 0.5%).

The figures reported in the SoFR differ from figures reported on the permanent native forest estate by the FPA, which uses data from FPPs that cover areas authorised for clearance. Due to issues with reporting mechanisms, aerial photography has been used to verify existing datasets and a new forest extent map was developed as at 2020. This should streamline reporting in the future.

Tasmania's current extent of native forest is 94.9% of the area that was first reliably reported in 1996. In the revision of the PNFEP (2017) the 95% threshold was removed and a limit was placed on broadscale clearance and conversion of native forest except in limited prescribed circumstances.

2.2.2 Planning tools

Numerous planning tools support the forest practices system. Small changes and improvements are made to many of these tools on a continual basis, as required. These modifications can include updating species range boundaries and adjusting management recommendations to improve clarity. More substantial improvements to planning tools require a more involved endorsement process and are reported in the FPA annual report, the annual effectiveness monitoring report, the annual report on the implementation of procedures for the management of threatened species under the forest practices system (agreed procedures report) and the SoFRs (every 5 years). A summary of major changes to key planning tools is provided below.

Biodiversity Values Database

The BVD is a publicly available online tool that allows users to identify threatened species that need to be considered when conducting a forest practice. It does this by providing information on locality data for threatened flora and fauna species, range boundaries and habitat descriptions. These data are updated by NRE Tas and the FPA as new information becomes available.

A new version of the Biodiversity Values Database was released in 2020, providing improved user experience and increased access to spatial information to assist with planning.

Threatened Species Adviser

The Threatened Species Adviser is an online decision support tool delivering species-specific management recommendations that are developed and agreed between the FPA and NRE Tas, and are designed to mitigate potential impacts of specific operations. Historically, this planning tool delivered advice for fauna species only (the tool was then known as the Threatened Fauna Adviser). In 2021, the tool was updated to also deliver management advice for flora, and was renamed the Threatened Species Adviser.

Minor changes to the Threatened Species Adviser are made regularly to improve clarity and are not reported here. Major changes to the management recommendations for specific species are addressed in Section 3.1.

FPA technical notes

The FPA delivers technical notes that provide additional information to assist planners to identify and manage natural and cultural values. During the reporting period, the FPA:

- conducted a major review of *Fauna Technical Note No. 1: Eagle nest searching, activity checking and nest management*
- updated the text relating to hard rock quarries in *Flora Technical Note No. 8: Management of* Phytophthora cinnamomi *in production forests*
- released *Flora Technical Note No. 13: Threatened Flora Habitat Suitability Models (HSM)*, which provides a brief overview of the threatened flora habitat suitability models and explains how the models should be used to aid on-ground flora surveys during the development of FPPs
- updated the description of significant habitat to improve clarity in *Fauna Technical Note No. 18: Threatened frogs*

- made minor changes to habitat description and other minor edits in *New Holland mouse (*Pseudomys novaehollandiae*) Tasmanian Threatened Fauna Listing Statement*.

The outcome of changing the information delivered through a technical note is that the added information is then considered in the development of an FPP. For example, updates to species' habitat descriptions based on new information will, in theory, improve the outcome for the species as management becomes more targeted to the requirements of that species. Monitoring the implementation of the new information happens to some degree in the FPA annual audit program. The effectiveness of the change is monitored as part of the FPA effectiveness monitoring program, subject to resources and priorities as discussed earlier in this report.

Spatial planning tools

The Tasmanian Reserve Estate spatial layer (updated annually at 30 June) has been created by NRE Tas to be used as the authoritative source of information on the extent, type and distribution of the reserve system in Tasmania. This reserve system extends over land, inland waters, estuaries and marine areas. The Tasmanian Reserve Estate spatial layer supports natural resource management planning, prioritisation, reporting and decision-making, and has been explicitly created to provide the basis of reporting statistics for:

- the CAR reserve system
- state and national state of the environment and state of the forests reports
- the forest practices system.

All Tasmanian vegetation communities are spatially mapped and monitored through TASVEG – a comprehensive digital map of Tasmanian vegetation communities used for biodiversity research and monitoring. A subset of mapping derived from TASVEG is the Threatened Native Vegetation Community 2020 layer, which shows the indicative extent of threatened native vegetation communities listed under NC Act across Tasmania. Although the vegetation communities mapped by TASVEG and the Threatened Native Vegetation Community 2020 layer are not consistent with threatened ecological communities listed under EPBC Act, the ongoing monitoring of equivalent TASVEG communities and threatened native vegetation communities enables effective tracking of threatened ecological communities into the future.

Special Species Management Plan

The *Tasmanian Special Species Management Plan* (2017) provides guidance as to where special species harvesting is provided for under existing statutory land management provisions and the terms on which harvesting may be permitted. Further detail relating to the harvesting of special species is in Part 5.3.4.

Rainforest silvicultural guidelines

The *Rainforest silvicultural guidelines* (2017) provides guidance on the selection and application of appropriate silvicultural practices in rainforests in Tasmania subject to special species timber harvesting.

2.2.3 Contemporary issues

Key current issues for adaptive forest management include carbon and climate change, wildfire, planned burns and pest and weed management.

Carbon and climate change

Section 2.1 described changes in the legislative, regulatory and policy framework during the reporting period. Various changes were made to the forest practices system during the period of the review:

- Some forest certification bodies, including the Forest Stewardship Council (FSC), acknowledge that forests provide an important ecosystem service in the sequestration and storage of carbon to mitigate climate change. Many timber production companies in Tasmania are FSC certified.
- Natural capital accounting is being increasingly explored/adopted by the forest industry. Natural capital accounting is a means by which forest managers are more transparent about their impacts and dependencies. Climate change is one of the biggest factors that can impact the industry and which the industry can also impact. STT manages the public production forest and is considering producing a natural capital report.
- The Tasmania Forestry Hub developed a plan to help the Tasmanian industry meet the key objective in the Australian Government's national forest industries plan *Growing a better Australia: A billion trees for jobs and growth*.
- The Tasmania Forestry Hub has released an expression of interest to develop a Tasmanian forest carbon index. This reporting tool will be a live system that can be interrogated to obtain a current carbon balance for Tasmania.

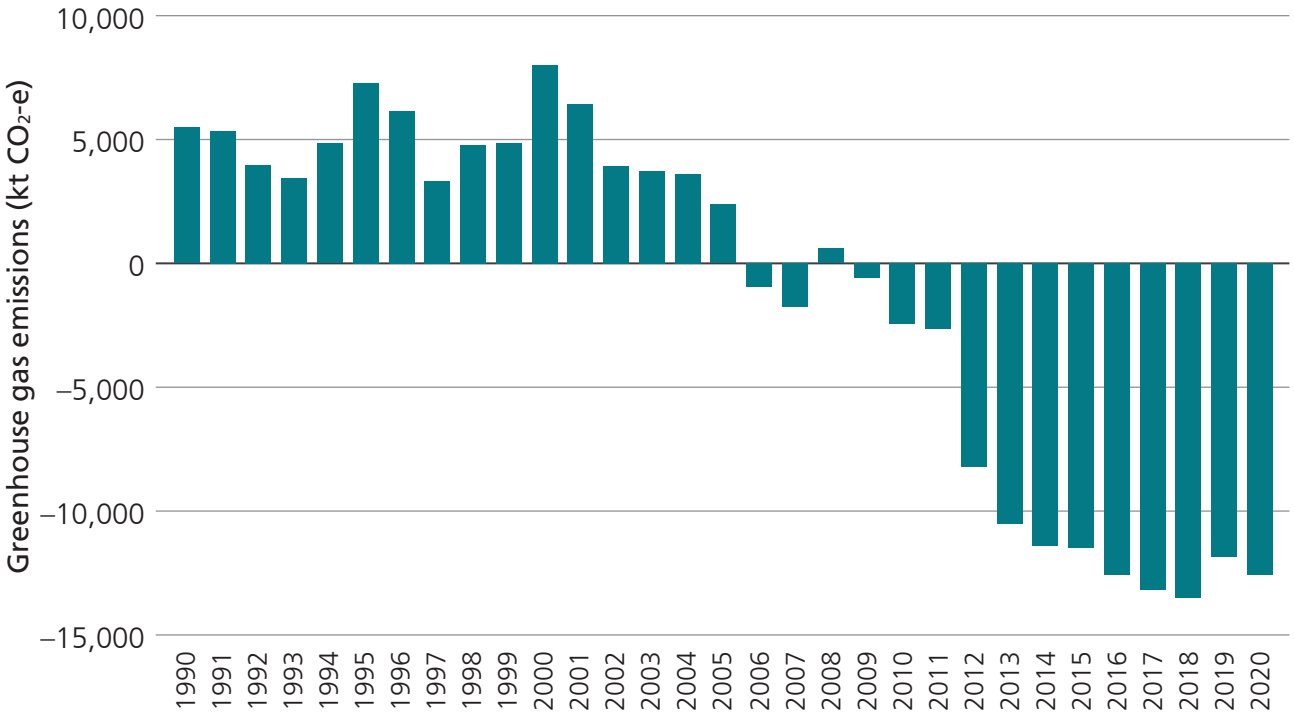
The carbon content of major vegetation groups and their sum have remained relatively constant over the four reporting periods (see Table 5.1.a.1 in the SoFR).

Data from the State and Territory Greenhouse Gas Inventories (STGGI) report released in 2022 indicated that, under the new spatial modelling, Tasmania's land use, land use change and forestry (LULUCF) sector had been carbon negative first in 2006 (–938 Mt carbon for total forest land emissions) and has been consistently carbon negative since 2009 (see Figure 3).

The RFA (clause 64A) requires the state to manage its forests in accordance with the National Forest Policy Statement objectives and policies as they relate to climate change, adaptation and carbon. Forest management practices and nature conservation will continue to be challenged by climate change into the future. The exact nature of the changes that continued climate change will bring about is uncertain but potentially major, including:

- changes to the growth rates of forests
- a range of changes in forest communities and the species that live within them
- increased risk of bushfires
- changed rates of carbon sequestration, which is compounded by other potential impacts of climate change
- increased risk of pest invasions.

In 2020, the STGGI data for Tasmania's LULUCF was –11.644 megatonnes of carbon dioxide equivalent (Mt CO_2-e). Tasmania is considered carbon negative by international accounting rules (FPA 2022). Net emissions have declined by 127.8% from 2005 levels, due to lower emissions from the land sector.



kt CO_2-e: kilotonnes carbon dioxide equivalent

Figure 3: Tasmania's forest land emissions based on spatial data provided by the STGGI from 1990 to 2020

Tasmania's net emissions have decreased by 120.9% from 1990 levels, as fossil fuel emissions have been offset by the sequestration of carbon in Tasmanian forests (FPA 2022). The largest contributor to this change is the LULUCF sector. This has come about primarily due to several key changes:

- Large areas of forest of an appropriate age class to sequester large amounts of carbon (that is, in a significant growth phase) have been put into the reserve system.
- Broadscale clearance and conversion has reduced because of the PNFEP.

The production forestry industry plays an important role in climate change mitigation by:

- sequestering carbon for the long term in timber products (such as house framing and flooring/decking)
- supplying timber for uses that displace higher-carbon-intensity products in construction, particularly steel and cement
- maintaining steady standing biocarbon stocks by regrowing forests after harvesting
- actively managing bushfire risk to reduce the incidence and severity of bushfire
- using production forests that have trees in the younger phase of their lifecycle, which sequester the largest amount of carbon dioxide as they grow.

Some areas of forest are now managed primarily for carbon, subject to private market regulatory mechanisms as part of off-market carbon trading schemes (see Section 5).

Wildfire

Fire is a natural and important part of forest ecosystems in Australia. It may have a positive or negative impact on forest health and vitality depending on how it occurs and the characteristics of the area.

In Tasmania, wildfire is managed cooperatively by land managers including PWS, STT and the Tasmania Fire Service under an InterAgency Fire Management Protocol.

Tasmania experienced large-scale wildfires in 2019, with the major fires being the Riveaux Road, Gell River and Great Pine Tier bushfires. Collectively these fires burned approximately 229,000 ha (forest and non-forest land) including significant parts of the TWWHA. The total area of fires on PTPZ land was approximately 39,800 ha, of which approximately 33,100 ha was forested. The Riveaux Road fire damaged several plantations in the south of the state (see SoFR 2022 Indicator 3.1.b). A total of 25,000 ha of privately managed forest and plantation was also burned in the fires (FPA 2022).

Although CAR values would have changed in areas with severe damage, certain Australian vegetation communities are adapted to fire and it is assumed that their CAR values will be regenerated and restored.

Tasmania's forests are exposed to risks from climate change and increased wildfire risks created by a warming planet. It is already being reported that Tasmania's forest ecology is changing (Wardlaw 2022). Altered fire regimes and temperatures could place species and ecosystems at higher risk of becoming endangered or going extinct. There is ongoing work outside of the reporting period to adapt the forest management system to deal with changes in fire frequency and severity.

Planned burns

Planned fires are defined as those started in accordance with a fire management plan or some other type of planned burning program. Reasons for such fires include:

- fulfilling the ecological requirements of flora and fauna
- protecting life and property
- maintaining and promoting sustainable production values
- maintaining cultural resources and practices.

Both STT and PWS maintain records of areas burned by planned and unplanned fires. Tables 3.1.b.1 and 3.1.b.2 in the SoFR summarise area burned by planned burns conducted by STT and PWS over the reporting period, including multiple-tenure fuel-reduction burning completed in cooperation with other land managers. Data for burnt areas are primarily sourced from STT, PWS and Tasmania Fire Service records, and other entities such as local councils, private landholders and researchers provide additional information where available.

Pest and weed management

Pests and weeds can adversely affect the health and vitality of both plantation and native forests. Generally, it is viewed that occasional outbreaks of native pests and pathogens are part of a normal ecosystem; however, when coupled with significant stresses (drought or ongoing hot weather), these occasional outbreaks can cause widespread mortality and may result in long-term change to affected native forests (FPA 2022). Active management of pests and weeds is directed heavily towards protecting the economic values in Tasmania's commercial forests.

Limiting the establishment of additional exotic pests and pathogens through effective biosecurity and quarantine measures is an ongoing priority for all forest managers. Changes outside of the legislation

and policy space that have resulted in improvements to pest and weed management during the reporting period are noted below:

- The capacity to respond to and manage pests and diseases has been improved in Tasmania through the addition of the industry-led Tasmanian Integrated Pest Management Group in 2019. Current activities include coordinating a tenure-blind statewide invertebrate monitoring program for the plantation hardwood sector and implementing an early field trial of a nonlethal systemic foliar spray as a vertebrate browsing deterrent for use in forest establishment.
- For PTPZ land, the area of eucalypt plantations experiencing insect pest outbreaks has continued to decrease as the plantation estate has aged; consequently, the use of pesticides has declined over the reporting period (FPA 2022).
- Although myrtle rust (*Austropuccinia psidii*) was detected in Tasmania in 2015, it has not since been found in eucalypt plantations or native forest. The Tasmanian Government maintains a ban on the importation of all Myrtaceae species to prevent the introduction of the disease.
- The Australian Government *Threat abatement plan for disease in natural ecosystems caused by* Phytophthora cinnamomi came into force in 2019. The goal of this plan is to identify and protect environmental assets from the impacts of the pathogen.
- The Tasmanian Government is investing $5 million over 5 years into the Tasmanian Weeds Action Fund. As at the end of the reporting period, approximately $690,000 has been rolled out to 71 projects, seeking to address serious weeds impacting the natural environment as well as agricultural land, including through weed risk assessments, weed definition and prevention and control measures. Associated with this, Biosecurity Tasmania has developed a mapping application to track the status of individual weed species.

2.2.4 Soil and water resource management

The protection of soil and water is fundamental to maintaining the productivity of forests and the sustainability of ecosystem processes. The Forest Practices Code comprehensively sets out practical guidelines and standards for the protection of soil and water quality and flows across all land tenures during forest planning and operations (FPA 2022).

Under the Code, protection of soils is carried out through 'control and prevention of unacceptable rates of erosion, nutrient loss, and landslides; and prevention of excessive compaction, puddling and mixing of topsoils and subsoils' (Forest Practices Code 2020, p. 58). A range of management prescriptions apply to forestry operations to help achieve this.

The Code provides a range of management prescriptions for forestry operations for water quality and flow management, such as minimum streamside reserve or machinery exclusion zone widths for the four classes of watercourse, and restrictions on forestry activities near water supply catchments. The principles and approaches in the Code are consistent with the State Policy on Water Quality management.

The FPA's annual compliance assessment revealed consistently high scores for compliance inspections concerning soil and water issues on all tenures.

NRE Tas maintains an extensive stream gauging and river health monitoring network in Tasmania's major rural catchments. The results of a statewide analysis of river health data for 1994 to 2018 were reported in 2020 (DPIPWE 2020). This assessment included an analysis of temporal trends at 85 sites that had sufficient data to derive 6 indicators based on the composition of aquatic macroinvertebrate communities. Thirty-five (41%) of the 85 sites examined had declining trends in 1 to 5 river health indicators, and 51 sites (60%) had stable trends in 1 to 4 of the indicators. Sites with stable trends were

typically located in the upper reaches of rivers where upstream catchments are in near-natural condition or minimally disturbed, whereas sites with declining trends were typically located in lower reaches where catchments are more developed. The 2020 assessment concluded that declines in river health appear to be associated with several factors, including degradation of habitats, poor water quality and changes in flow conditions.

The 2020 assessment found that when examining high-level aggregated land uses (conservation, production from forested land, agriculture, urban and mining) along with other environmental factors (for example, water quality, riparian habitat condition), conservation land use, agricultural land use, electrical conductivity (water salinity) and water use all had strong influences on river health. Production from forested areas (forestry and grazing) and urban land use were influential to a lesser extent, and mining had minimal influence at a broad scale.

During the reporting period, water quality in rivers across Tasmania was monitored by a range of organisations (for example, NRE Tas, Hydro Tasmania, TasWater) for various purposes (for example, environmental assessments, potable water testing). As at the end of the reporting period, the results of this monitoring, which has limited spatial coverage, have not been collated or analysed. Therefore, it is not possible to comment on recent trends in water quality at a broad scale.

In recent years, localised management activities that aim to protect or restore river health and water quality have been undertaken in some catchments in Tasmania. For example, NRM North's Tamar Estuary and Esk Rivers Program has invested significantly in riparian fencing in the South Esk Basin (North Esk, South Esk and Meander rivers). However, it is likely that it will take several years to detect measurable improvements in river health and water quality associated with these management interventions.

3 Matters of national environmental significance and state priority species

Criterion b for the 5-yearly review requires demonstration of how parties have provided for the protection of matters of national environmental significance (MNES) and environmental values including trends and status of MNES. This section outlines how these provisions have been incorporated into Tasmania's forest management system.

The trends and status of relevant MNES and other environmental values are addressed comprehensively in the SoFR. In particular, Criterion 1 Conservation of Biological Diversity and Criterion 4 Conservation and Maintenance of Soil and Water Resources of the SoFR address criterion b of the 5-yearly review.

As the time frame for the data in the SoFR is 2016–2021, this section provides additional information to address any changes to the trend and status of MNES and environmental values that occurred in 2022 as well as any relevant information on MNES and environmental values that is not included in the SoFR.

The MNES that relate to the Tasmanian RFA are:

- nationally threatened species and ecological communities
- migratory species
- wetlands of international importance ('Ramsar' wetlands)
- world heritage properties
- national heritage places.

Although only nationally listed threatened species and ecological communities are considered MNES, the forest practices system also manages all threatened species and threatened vegetation/ecological communities, including those listed at a state level under the TSP Act and the NC Act. There is significant overlap of protection between the national and state classes of threatened species. Most species listed under the EPBC Act that occur in Tasmania are also listed under the TSP Act, but not all threatened species listed under the TSP Act are listed nationally under the EPBC Act (see Table 5). Likewise, not all species listed under the EPBC Act are considered threatened in Tasmania. An example of this is the eastern barred bandicoot, which is widespread in Tasmania but listed as vulnerable under the EPBC Act.

The forest practices system requires MNES that may be impacted by forestry operations to be considered and managed in a protective manner. A variety of desktop assessment and planning tools are available for FPOs to assist with the identification of MNES and the management of risks to such values when preparing FPPs. The occurrence of MNES habitat can be verified by on-ground surveys conducted by forest planners, FPOs, FPA specialists or consultants.

Section 3 outlines the management actions that have been incorporated into the forest management system to protect MNES and environmental values during the reporting period.

Threatened ecological communities listed under the EPBC Act are covered in the SoFR (Box 1.2.b, p. 54).

3.1 Threatened species

Under the EPBC Act, there are 224 listed threatened species in Tasmania. Of these, 147 are of relevance to the Tasmanian RFA (that is, the species use forest); 107 are flora species and 40 are fauna species. Table 5 provides a high-level breakdown of the threatened species listed under the EPBC Act and the TSP Act.

Table 5: Threatened species in Tasmania, EPBC Act and TSP Act

Species	EPBC Act (found in Tasmania)	EPBC Act	Tasmanian forest-associated EPBC Act listed species	TSP Act	Listed under both Acts
Plants	108	1,427	107	491	105
Birds	51	176	9	36	27
Fish	25	73	10	19	17
Invertebrates	18	73	15	119	18
Mammals	14	149	5	12	10
Reptiles	5	73	0	7	5
Frogs	1	46	1	2	1

EPBC Act: *Environment Protection and Biodiversity Conservation Act 1999* (Cth) TSP Act: *Threatened Species Protection Act 1995* (Tas)

During the reporting period, one species relevant to Tasmania's forest practices system was removed from the EPBC Act list of threatened species: the common wombat (Bass Strait) (*Vombatus ursinus ursinus*). None of the additions to the EPBC Act list of threatened species (including category changes) was relevant to the Tasmanian RFA.

At the state level, there have been several changes to the listing status of species under the TSP Act over the reporting period. Table 6 outlines the changes to listed status that occurred from November 2021 to November 2022 and Table 1.2.b.2 of the SoFR provides data for changes to listing status from 2016 to 2021. The changes in the listing status of these species are primarily due to improved information generated by research and field data, enabling more accurate population analysis to be completed for each species.

Table 6: Details of changes in listing status of RFA priority species under the TSP Act, November 2021 to November 2022

Scientific name	Common name	Change	Date in force	Reason
Epilobium pallidiflorum	Showy willowherb	Delisted from rare	Nov 2021	Improved information
Hierochloe rariflora	Cane holygrass	Delisted from rare	Nov 2021	Improved information
Chiloglottis valida	Large bird-orchid	New listing, now endangered	Nov 2021	Small population, small area of occupancy Listed under categories D1 and D2 (2018 *Guidelines for using the IUCN Red List categories and criteria*)
Senecio extensus	Subalpine fireweed	New listing, now endangered	Nov 2021	Small population, small area of occupancy Listed under categories D1 and D2 (2018 *Guidelines for using the IUCN Red List categories and criteria*)
Senecio longipilus	Longhair fireweed	New listing, now endangered	Nov 2021	Small population listed under category D1
Senecio tasmanicus	Tasmanian fireweed	New listing, was previously presumed extinct	Nov 2021	Previously presumed extinct – had not been recorded in 50+ years, linked to historical land clearing and changes to hydrology

Source: NRE Tas 2023a

3.1.1 Monitoring

Monitoring for threatened species has occurred at a range of scales and complexities during the reporting period. Detailed information regarding the monitoring program for threatened species is outlined in Section 1.2.c of the SoFR. Population-level monitoring has been undertaken for focal species such as the critically endangered swift parrot (*Lathamus discolor*) and the endangered Tasmanian devil (*Sarcophilus harrisii*). Targeted monitoring activities have also continued across a range of other species to determine the extent and condition of populations or subpopulations and support improved understanding of management requirements.

Tasmania's high number of threatened species relative to geographic area and human population size necessitates prioritisation of monitoring activities. Monitoring is undertaken across a suite of species and species groups, prioritised in consideration of the category of species listing and the information required.

Examples of species for which targeted surveys occurred in the reporting period are the critically endangered plant species shy susan (*Tetratheca gunnii*); the endangered species Miena jewel beetle (*Castiarina insculpta*), chaostola skipper (*Antipodia chaostola* subsp. *leucophaea*), pretty leek-orchid (*Prasophyllum pulchellum*) and Arthur River greenhood (*Pterostylis rubenachii*); and the vulnerable species green-lined ground beetle (*Catadromus lacordairei*). These surveys were conducted to confirm

presence of the species within a known area, or to scope new potential sites for the species, and as such may not contain enough information to support assessment of trend at the population or subpopulation level.

3.1.2 Protection

The Forest Practices Code states that threatened species must be managed in accordance with the *Agreed procedures for the management of threatened species under the forest practices system* (Agreed Procedures). Management approaches for threatened species are developed jointly by the FPA and NRE Tas under the Agreed Procedures and delivered through online planning tools, or through the provision of case- or site-specific advice through the FPA. Forest planners use these planning tools and advice to develop species management prescriptions for FPPs that are tailored to their forestry operation. These procedures are a joint responsibility of both agencies.

In practice, the Agreed Procedures are achieved through the cooperation of FPA and NRE Tas on the development of procedures, habitat descriptions, range boundaries, management objectives and endorsed management recommendations for threatened species. Endorsed habitat descriptions, range boundaries and management recommendations are delivered via FPA planning tools (specifically the BVD and Threatened Species Adviser), which are used by forest planners when developing FPPs. FPA and NRE Tas also conduct training to ensure planners understand and correctly implement the FPA planning tools and threatened species management recommendations.

When new species are listed under the EPBC Act or the TSP Act, the FPA and NRE Tas work together to develop a management approach that can be incorporated into existing planning tools.

Changes are made to all aspects of species management, including habitat definitions, range boundaries and management recommendations. Information on these changes over the reporting period are outlined in Section 2.

3.2 Migratory species

Under section 209 of the EPBC Act, migratory species are defined as:

- migratory species that are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II)
- migratory species included in annexes established under the Japan–Australia Migratory Bird Agreement (JAMBA) and the China–Australia Migratory Bird Agreement (CAMBA)
- native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the Republic of Korea – Australia Migratory Bird Agreement (ROKAMBA).

No migratory species listed under the EPBC Act are of relevance to the RFA. The white-throated needletail (*Hirundapus caudacutus*) is a migratory species that includes Tasmania in its distribution, but the species is rarely sighted in Tasmania and does not use Tasmanian forest for breeding so is not managed under the forest practices system.

3.3 Wetlands of international importance

Ramsar Convention of Wetlands listed sites are important wetland ecosystems that support breeding and resting ground for approximately 100 resident and migratory bird species. Between 2017 and 2022, 2 certified harvest operations and 1 incident of unauthorised clearing occurred within 1 km of a Ramsar wetland.

Under the forest practices system, wetlands have protection as a threatened native vegetation community and through the soil and water provisions of the Forest Practices Code.

The two authorised plantation operations that occurred in the vicinity of a Ramsar wetland were managed in accordance with legislative requirements and in close consultation with the FPA. One operation was 100 m from the wetland and no special management was needed. The second involved felling of a pine plantation that had been established on farmland prior to 2000 and before the Forest Practices Code governed management practices. The previous rule set for managing impacts on waterbodies allowed plantations to be established closer to a wetland than is now permitted. In this case, the plantation extended to the edge of a tidal wetland. Under advice from the FPA, the pine trees were harvested within the 40-m wide coastal reserve, but no machinery tracked within 10 m of the high tide mark. Native vegetation was retained to help minimise soil erosion. The 40-m-wide coastal reserve was not replanted with pines to facilitate revegetation of native forest adjacent to the wetland.

In 2019, the FPA identified unauthorised clearing on private land adjacent to the Lavinia State Reserve on King Island, a Ramsar-listed wetland. Upon investigation, the landowner was required by the Australian Government Department of Environment and Energy to rehabilitate unauthorised drainage works and accepted a substantial prescribed fine from the FPA.

No change to Ramsar-listed sites has occurred during the reporting period.

3.4 World Heritage properties

The TWWHA is a mixed cultural and natural World Heritage property covering more than 1.58 million ha. It is one of the world's largest temperate wilderness areas and is a precious cultural landscape for Tasmanian Aboriginal people, who have lived there for approximately 40,000 years.

Forest operations do not directly impact the TWWHA. Where forest operations border the TWWHA, a buffer is required to minimise any indirect impacts.

This report focuses on the production forest estate requirements of the RFA and therefore only a synopsis of key changes to TWWHA management is provided below.

- The *Tasmanian Wilderness World Heritage Area Management Plan 2016* is a statutory document that forms the basis for management of the property and its Outstanding Universal Value. The plan and other management arrangements play an integral role in decision-making and providing specific policies on how the Outstanding Universal Value of a property is to be managed and conserved.
- A *Retrospective Statement of Outstanding Universal Value* for the TWWHA was approved by the World Heritage Committee on 16 September 2023. This is now the key reference for ongoing and effective protection and management of the World Heritage property.
- The Tasmanian Government is implementing a process for the reservation of 942 ha of PTPZ land within the TWWHA. Once these areas have been regenerated to native forest, they will be proclaimed as reserved land under Tasmania's NC Act. PTPZ land is covered by the statutory management plan in the *Tasmanian Wilderness World Heritage Area Management Plan 2016*. Management of this PTPZ land, and other tenures not subject to the statutory management plan, are described in chapter 10 of the *Tasmanian Wilderness World Heritage Area Strategic Management Statement* (a non-statutory part of the 2016 Management Plan).

3.5 National Heritage places

The National Heritage List documents places of outstanding natural, Indigenous or historic value to the nation. The sites listed on the National Heritage List with potential relevance to the RFA are:

- the TWWHA (listed in 2007)
- the Western Tasmania Aboriginal Cultural Landscape (listed in 2013)
- the Jordan River Levee site (listed in 2011)
- the Recherche Bay area (listed in 2005).

All Aboriginal cultural heritage and historic (colonial and post-colonial) cultural heritage is subject to management provisions of the Forest Practices Code 2020, as outlined in Sections 3.5.1 and 3.5.2.

3.5.1 Aboriginal heritage

Procedures for managing Aboriginal cultural heritage when preparing forest practices plans was released by the FPA in 2017, and updated in 2018, after extensive consultation with members of the Aboriginal Heritage Council and other stakeholders. The Procedures have been adopted by the Minister responsible for Aboriginal heritage as a Guideline as defined in section 21A of the *Aboriginal Heritage Act 1975* (Tas). The Procedures set out the actions foresters must undertake to identify, manage and protect Aboriginal heritage during forestry operations. These actions include:

- planning – taking account of sites recorded on the Aboriginal Heritage Register, scheduling Aboriginal cultural heritage site surveys, and minimum management prescriptions for different site types
- post-harvest – conducting a post-harvest survey
- before, during or after an operation – reporting newly found artefacts.

All FPOs are required to attend an Aboriginal heritage course in which they learn about Aboriginal culture, different types of Aboriginal heritage, and how to incorporate heritage management provisions into FPPs and operations. During the reporting period the FPA collaborated with members of the Aboriginal community to run courses on Aboriginal heritage in 2019, 2021 and 2022.

The FPA continues to provide advice on protection of Aboriginal heritage in the forest estate. However, all newly found sites (mostly stone artefacts or rock shelters) are referred to Aboriginal Heritage Tasmania for formal identification and for recording on the Aboriginal Heritage Register. During the reporting period, 40 new Aboriginal heritage sites were identified during surveys undertaken as a requirement of the Forest Practices Code 2020 and the Procedures (FPA 2022).

Tasmanian Aboriginal people have formal use and rights by virtue of land title over areas identified under the *Aboriginal Lands Act 1995* (Tas). This Act provides for the transfer of specified areas of Crown land to the Aboriginal community. The Act established the Aboriginal Land Council of Tasmania as a statutory body to hold and manage land on behalf of the Aboriginal community in perpetuity. No areas were transferred during the reporting period.

Australia's State of the Forests Report 2018 reported Tasmania's total Indigenous estate to be 1.624 million ha, of which 874,000 ha is forest. Approximately 11,000 ha of forest in Tasmania is under Indigenous ownership and management, and 863,000 ha of forest is under Indigenous co-management (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2018). Indigenous co-managed land was defined in that report as 'lands that are owned and managed by other parties, but have formal, legally binding agreements in place to

include input from Indigenous people in the process of developing and implementing a management plan (for example, nature conservation reserve memorandums of understanding)' (Montréal Process Implementation Group for Australia and National Forest Inventory Steering Committee 2018, p. 398).

Formal and informal management regimes that recognise Aboriginal values have been established under the *Aboriginal Heritage Act 1975* (Tas), the *National Parks and Reserves Management Act 2002* (Tas), and the Forest Practices Code 2020 made pursuant to the FP Act.

As at 30 June 2021, approximately 20,200 ha of PTPZ land was allocated for Indigenous and non-Indigenous cultural heritage special management; approximately 5,900 ha of this land was allocated for Indigenous cultural heritage value (FPA 2022). Special management zones for Aboriginal cultural heritage are designed to protect sites from impacts by forestry activities. Management prescriptions vary depending on the site and could include the limited use of machinery or the exclusion of timber harvesting.

Approximately 110 ha of private forest on Tasmania's east coast was returned to Aboriginal ownership in 2019. Additionally, 335 ha of coastal vegetation, including dry forest, in the north-west was purchased by the Aboriginal Land Council of Tasmania through a collaborative funding arrangement in the same year (FPA 2022).

To date, 15 areas have been returned and title transferred to the Aboriginal Land Council of Tasmania. One of these areas, truwana/Cape Barren Island, contains large areas of forest.

There are 8 national Indigenous Protected Areas (IPA) in Tasmania. No new Tasmanian IPAs were added over the reporting period.

The Tasmanian Government continues to support Aboriginal cultural land management and burning practices, awarding a total of 10 grants to 5 Aboriginal community organisations as part of a $100,000 pilot program to help engage and build capacity in Aboriginal cultural burning practices. In 2018–2019, PWS initiated a cultural burning program employing 2 Aboriginal Fire Rangers and an Aboriginal Burning Project Officer. The program delivered a cultural burn on the west coast of Tasmania and the development of a cultural burning policy and procedures to guide future cultural burning on PWS-managed land.

3.5.2 Historic heritage

Until 2021, historic heritage sites in the forestry estate were recorded in a database curated by STT (formerly Forestry Tasmania) and site management was determined by the document *Procedures for managing historic cultural heritage when preparing forest practices plans*. In 2021, the information was transferred to a new database administered by the FPA called the Historic Sites Register.

Under the Code and the Agreed procedures, any non-Indigenous heritage sites found during the preparation of FPPs are reported and recorded on the Historic Sites Register. FPOs can access this register to find whether there are historic sites in coupes they are managing or nearby. Most sites are protected by vegetation buffers or machinery exclusion zones of various widths, depending on the sites' significance.

During the reporting period, 140 new non-Indigenous cultural heritage sites were detected and recorded in the Historic Sites Register (FPA 2022).

4 Implementing relevant statutory conservation planning documents

Under clause 29A of the RFA, the state agrees that the forest management system will consider relevant Australian Government plans and principles, as amended from time to time, to manage MNES. The purpose of this section is to report on how relevant statutory conservation planning documents have been implemented as part of the forest management system in accordance with RFA reporting criterion c.

Statutory conservation planning documents include conservation advice, recovery plans, threat abatement plans and wildlife conservation plans made in accordance with the EPBC Act, and listing statements, recovery plans and threat abatement plans made in accordance with the TSP Act. For the purposes of this report, relevant statutory conservation planning documents are taken to be those that are relevant to forest or forest-dependent species that interact with Tasmania's forest management system.

Information provided in statutory conservation planning documents is considered during the development of management planning tools for threatened species and threatened ecological communities. For many of the statutory conservation planning documents listed in Table 7, this process happened outside the reporting period. For those documents, a broad statement is applicable to the effect that information was taken into account during the development of planning tools implemented under the forest practices system. Implementation of the planning tools in FPPs is audited and reported on, as described in Section 2. Where changes occurred during the reporting period, details are provided in Table 5. Please note, there is some overlap between this section and Section 2, and in these cases Table 7 will direct the reader to the relevant table on threatened species in Section 2.

4.1 Commonwealth conservation advice, recovery plans and threat abatement plans

Table 7 lists statutory conservation planning documents that have been updated or implemented during the reported period and describes how the forest management system responded to the changes.

Table 7: Examples of how the forest management system has accounted for the updates/ implementation of statutory conservation planning documents over the reporting period

Document	Actions to account for updates to the planning document during reporting period
Threatened Tasmanian orchids: flora recovery plan (2017)	Updated habitat descriptions and survey guidelines for all species included in the recovery plan published by the FPA in 2016 following peer review by an expert reference group (FPA 2016) Development of the Threatened Plant Adviser (now Threatened Species Adviser), an expert-derived decision support system, providing recommendations on the management of habitat and known localities for threatened flora species (including all orchid species included in the recovery plan) in areas subject to forestry activities Targeted research to inform the conservation status of threatened orchid *Pterostylis atriola* (Wapstra & Chuter 2019)
*Recovery plan for the giant freshwater crayfish (*Astacopsis gouldi*)* (2017)	Species specialists and industry representatives were consulted, and management approaches were adjusted in 2021 to better reflect the risk of different operations on potential habitat Changes included refinement to the potential range boundaries, the creation of a core range and modifications to survey requirements for plantation operations (FPA & NRE Tas 2022)
*Approved conservation advice (incorporating listing advice) – Tasmanian forests and woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata/E. brookeriana*)* (2019)	Following the release of the conservation advice, the FPA reviewed the management of this community; changes were made to the FPA's evaluation sheets (primary tool for recording the biodiversity values on site) to take account of the patch size and condition thresholds for management of this community For example, the forest practices system usually requires forest planners to disseminate forest communities down to a minimum mapping unit of 1 ha. This was adjusted to 0.5 ha for this community in line with the conservation advice. As a threatened native vegetation community, clearing and conversion of this community is not to be certified under the FP Act, except in exceptional circumstances. The effectiveness of the conservation advice will be ensured through the inclusion of ongoing monitoring of the vegetation community
Threatened Tasmanian eagles recovery plan (2006–2010)	See information on eagles in Section 2
Tasman Peninsula dusky antechinus (*Antechinus vandycki*)	See information on Tasman Peninsula dusky antechinus in Section 2 of this report
King Island Biodiversity Management Plan (adopted as recovery plan for King Island birds)	The King Island bird project was completed, including extension surveys, additional records and improving the understanding of habitat requirements The Board of the FPA considers the certification of FPPs for clearing of trees on King Island, unlike other FPPs, for which the certification decision is delegated to authorised officers. In considering an FPP application on King Island, the Board of the FPA takes account of updated information on habitat for threatened King Island birds New high-resolution imagery of King Island was captured in 2022 and will be used to revise the vegetation mapping for the Island, which will assist with habitat identification for threatened bird species
Hydrobiid snails (various)	Changes were made to management recommendations to recognise data deficiencies and higher-risk species according to expert knowledge

Continues

Table 7 *continued*

Document	Actions to account for updates to the planning document during reporting period
Green and gold frog (*Litoria raniformis*)	Training was provided to the forest industry on the identification of habitat, and the value of retaining vegetation remnants for the green and gold frog
Tasmanian chaostola skipper (*Antipodia chaostola leucophaea*)	Information on range, known locations and habitat preference are considered during the development of planning tools implemented under the forest practices system
Burrowing crayfish (various)	Information on range, known locations and habitat preference are considered during the development of planning tools implemented under the forest practices system. Surveys in accordance with approved survey techniques are required in high-risk areas
Swift parrot	See information on swift parrot in in Section 2
Forty-spotted pardalote (*Pardalotus quadragintus*)	Information was considered during the development of planning tools implemented under the forest practices system For operations involving clearing of trees on Bruny Island, the Board of the FPA considers the FPP application and the latest information available for the forty-spotted pardalote
Stag beetles (various)	Information on range, known locations and habitat preference is considered during the development of planning tools implemented under the forest practices system
Southern sandstone cave cricket (*Micropathus kiernani*)	Information on range, known locations and habitat preference is considered during the development of planning tools implemented under the forest practices system
Tasmanian masked owl (*Tyto novaehollandiae castanops*)	Information considered during the development of planning tools implemented under the forest practices system FPA initiated a review of the implementation of the masked owl management recommendations delivered through FPA planning tools
Marrawah skipper (*Oreisplanus munionga larana*)	See information on Marrawah skipper in Section 2
Ptunarra brown butterfly (*Oreixenica ptunarra*)	See information on ptunarra brown butterfly in Section 2
Galaxias (various)	Information considered during the development of planning tools implemented under the forest practices system See information on Clarence galaxias in Section 2
Spotted-tail quoll (*Dasyurus maculatus maculatus*)	Information considered during the development of planning tools implemented under the forest practices system
Eastern quoll (*Dasyurus viverrinus*)	Information considered during the development of planning tools implemented under the forest practices system
Eastern barred bandicoot (*Perameles gunnii gunnii*)	Information considered during the development of planning tools implemented under the forest practices system
New Holland mouse (*Pseudomys novaehollandiae*)	See information on New Holland mouse in Section 2

Continues

Table 7 *continued*

Document	Actions to account for updates to the planning document during reporting period
Tasmanian devil (*Sarcophilus harrisii*)	See information on Tasmanian devil in Section 2
Grassland paperdaisy (*Leucochrysum albicans subsp. tricolor*)	Updated habitat descriptions and survey guidelines for all species included in the recovery plan published by the FPA in 2016 following peer review by an expert reference group (FPA 2016) Development of the Threatened Plant Adviser (now Threatened Species Adviser), an expert-derived decision support system, providing recommendations on the management of habitat and known localities for threatened flora species in areas subject to forestry activities
Swamp paperdaisy (*Xerochrysum palustre*)	Updated habitat descriptions and survey guidelines for all species included in the recovery plan published by the FPA in 2016 following peer review by an expert reference group (FPA 2016) Development of the Threatened Plant Adviser (now Threatened Species Adviser), an expert-derived decision support system, providing recommendations on the management of habitat and known localities for threatened flora species in areas subject to forestry activities
Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomi (2018)	Hygiene surveys and controls such as vehicle wash-down procedures and quarry hygiene for roading activities have been implemented through the Forest Practices Code

FPA: Forest Practices Authority; FP Act: *Forest Practices Act 1985* (Tas)

4.2 State listing statements and recovery plans

The Tasman Peninsula dusky antechinus (*Antechinus vandycki*) was listed as vulnerable under the TSP Act in November 2020. As per the listing statement, the management objectives are to decrease the risk of extinction by maintaining the integrity of habitat at known sites through appropriate land management, and improve understanding of the ecology, population dynamics and threatening processes. Recommended actions included increasing understanding and awareness of species distribution, populations, ecology and threats, improving the protection and management of habitat, and implementing a cat management plan for the Tasman and Forestier peninsulas.

The *Tasmanian Cat Management Plan 2017–22* was published in 2017 and will help achieve some of the actions in the listing statement.

After release of the listing statement, the FPA conducted a series of expert workshops to review literature, assimilate species knowledge and design a management approach for the species. In 2020–21, new draft recommendations were developed for the Tasman Peninsula dusky antechinus and delivered via the Threatened Species Adviser tool. FPA initiated a student project to investigate the distribution and ecological requirements of the species, with the intent to use ecological data to refine the range boundary and habitat definition. However, despite intensive effort, no animals were trapped (Koch & Gardner 2022).

5 Social and economic benefits of forestry and other forest uses

Criterion d for the 5-year review requires demonstration of how social and economic benefits of forestry and other forest uses are being achieved. Criterion 6 in the SoFR addresses this criterion in comprehensive detail. As such, this section only provides a high-level summary of the outcomes during the reporting period and information that is not provided within the SoFR.

Tasmania's forests continue to be maintained for multiple uses to the benefit of all of Tasmania and contribute to national and regional economies, benefit personal and community wellbeing, and support cultural values. Key benefits include employment within Tasmania, the production of timber-derived products, and associated industries such as tree fern harvesting and apiary. The forest industry also benefits Tasmania indirectly by providing access to the forest for other forest users and industries, and environmental benefits.

The forestry industry in Tasmania has been recovering strongly over the past 5 years, experiencing increased production of hardwood plantation fibre, robust demand for timber construction materials, and heightened interest in the carbon capture markets associated with forests.

Over the reporting period, Australian forests and wood products statistics data (published quarterly by the Australian Bureau of Agricultural and Resources Economics and Sciences) indicates that the value of logs harvested has increased by 10.7% from 2016–17 ($357.2 million) to 2020–21 ($395.5 million). The consumer price index increased by 8% over the reporting period, so the increase in real terms was 2.7%.

Over the reporting period the Tasmanian Government employed an economist to ensure accurate, up-to-date information was available to the community on the social, economic and environmental value of the forest industry.

Key social and economic outcomes are reported against Criterion 6 in the SoFR. This included several highlights:

- Tasmania's forests and reserves are used for recreational activities such as mountain biking and bushwalking. In the 12-month period to September 2021, around 19,300 visitors participated in mountain biking at some point during their trip and an estimated 316,400 visitors engaged in bushwalking (FPA 2022).
- Twelve vegetation carbon abatement projects in Tasmania were registered with the Clean Energy Regulator under the Australian Carbon Credit Unit Scheme. A total of 729,606 units were issued up to April 2022 (FPA 2022).

5.1 Employment

The forestry sector in Tasmania provides employment opportunities across a range of primary, secondary and tertiary (service) sectors. Employment levels remained steady over the reporting period (see Table 6.5.a.1 in the SoFR for figures). Associated service providers include suppliers, manufacturers and maintenance providers of harvesting and wood-processing equipment, fuel and fertiliser suppliers, financial service providers and training providers. Increased spending from wages earned also creates

and supports jobs in other sectors, including retail, hospitality, education and health. Without this indirect employment, many regional communities would be disadvantaged both socially and economically.

In May 2018, Dr Jacki Schirmer released the *Socio-economic impacts of the forestry industry: Tasmania* report, based on data from the Australian Bureau of Statistics Census of Population and Housing from 2006, 2011 and 2016 and a survey conducted in 2017 and 2018.

The Schirmer report estimated direct employment associated with the Tasmanian timber industry to be 2,714 people. Indirect employment generated by the forestry industry was estimated to be 2,651 people, implying 5,365 direct and indirect jobs were generated in the Tasmanian forest industry up to and including primary processing in 2017.

Further detail on the social and economic benefits of the forest industry can be found in the SoFR Criterion 6 (pp. 114–163).

5.2 Forest certification

All professional forest management organisations undertake in-house programs to assess standards achieved before, during and after forest operations. All of Tasmania's PTPZ land, and the majority of private industrial forests, are now certified under at least one of a number of voluntary certification systems. These systems recognise environmental, economic, social and cultural forest management performance and sustainability in the forest industry. Tasmania's commercial forest managers are able to demonstrate their sustainable management credentials through independent certification under national and international standards such as the 'Responsible Wood' Australian Forestry Standard (AS 4708, now AS/NZS 4708:2021), FSC and the International Standard on environment management systems (ISO 14001).

PWS maintains an environmental management system for public reserves managed under the *National Parks and Reserves Management Act 2002* (Tas) that is consistent with ISO 14001. The PWS environmental impact assessment process, the reserve activity assessment process, is fully documented and functional.

The National Forest Policy Statement and RFAs continue to provide the basis for management of forests to achieve economic, social and environmental outcomes.

5.3 Timber-derived products and associated outcomes

The volume of timber produced from the public forest estate remained consistent over the reporting period. However, whole log exports have declined since 2018–2019 to be almost 27% lower in 2020–2021. The primary reason for the decline was a decrease in trade with China (FPA 2022). Despite this, the value of logs harvested has increased by 10.7% (2.7% in real terms) during the reporting period.

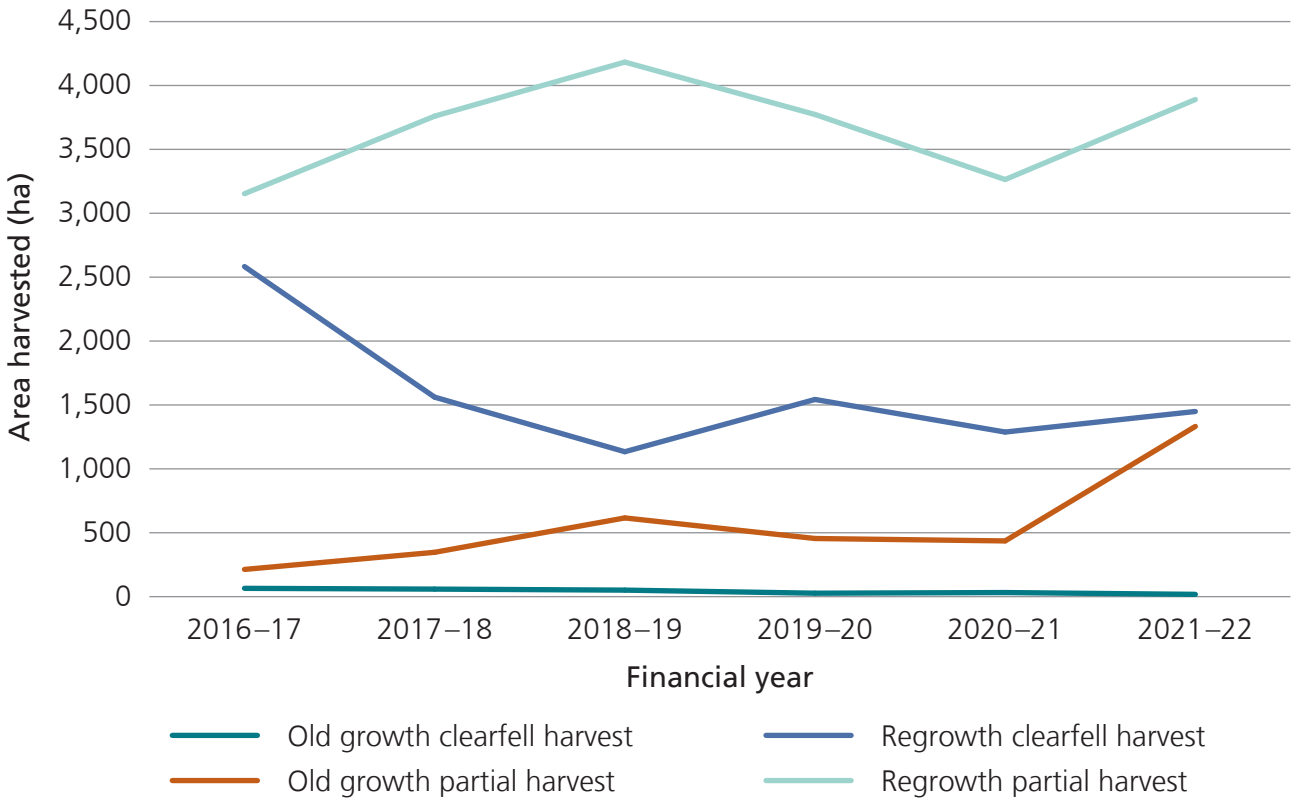
5.3.1 Sustainable Timber Tasmania native forestry

The relative HQSL yield has remained consistent over the reporting period (Figures 4 and 5), but there has been a slight decrease in HQSL harvested per hectare (see Table 8). There continues to be a mix of regrowth and mature forest harvested to make available the HQSL minimum aggregate quantity defined in the *Forest Management Act 2013* (Tas) (see Table 9). While Table 9 indicates that the supplied volume does not match the minimum aggregate quantity, the required amount has been made available and customer demand has been met for HQSL over the reporting period.

The fifth and sixth sustainable yield reviews (SY5 and SY6, respectively) released in 2017 and 2022, respectively, showed that STT could continue to supply the legislated quota of 137,000 m³, but that from 2027 there would be a steep decline of native hardwood yield, which will be supplemented by *Eucalyptus nitens* plantation (STT 2022).

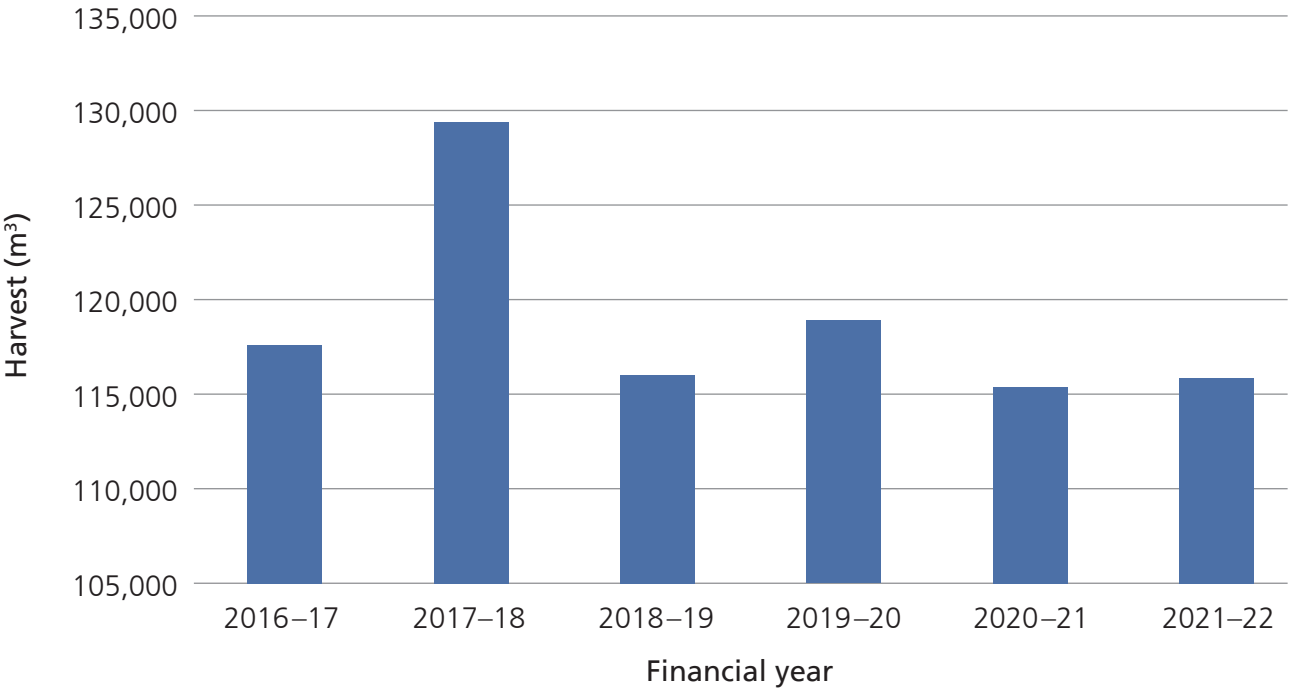
Each sustainable yield review uses the latest data-derived information about expected yields. For native forest, area discount and log product recovery analyses are conducted every 5 years, prior to each review, to update expected yields. Operational adjustments to the wood production coupes due to forest practice changes are also incorporated. As a result, and evident in SY6, less HQSL is expected from the remaining mature and unaged regrowth forest types at the start of the 90-year planning horizon. However, more HQSL is expected in later years in SY6, so overall there is a higher total forecast for native sawlog in SY6 compared with SY5.

STT has not yet harvested significant areas of high pruned and thinned eucalypt plantation, and so it is not possible to undertake a robust yield reconciliation exercise, comparing predicted and actual yields.



Source: Data from STT annual reports

Figure 4: HQSL source from PTPZ land in hectares, 2016–17 to 2021–22



Source: Data from STT annual reports

Figure 5: Harvest quantities of HQSL, 2016–17 to 2021–22

Table 8: Relative HQSL yield over area harvested, 2017–18 to 2021–22

Year	Total harvest area (ha)	HQSL (m^3)	HQSL/area harvested (m^3/ha)
2017–18	5,727	129,403	22.59
2018–19	5,984	116,025	19.38
2019–20	5,798	118,893	20.50
2020–21	5,020	115,375	22.98
2021–22	6,689	115,869	17.32

Source: Data from STT

Table 9: Area harvested from PTPZ, method of harvest and forest class, 2016–17 to 2021–22

Year	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22
Old Growth Partial harvest area (ha)	213	347	616	455	436	1,332
Regrowth Partial harvest area (ha)	3,153	3,760	4,183	3,773	3,264	3,890
Old Growth Clearfell harvest area (ha)	65	59	51	27	32	18
Regrowth Clearfell harvest area (ha)	2,583	1,561	1,134	1,543	1,288	1,449
Total area of native forest harvested (ha)	6,014	5,727	5,984	5,798	5,020	6,689

Source: Data from STT annual reports

5.3.2 Private Forests Tasmania

Private Forests Tasmania (PFT) is a statutory authority established by the *Private Forests Act 1994* (Tas) with the objective of facilitating and expanding the development of Tasmania's private forest resource in a manner consistent with sound forest and land management practices. PFT is the only government-funded authority established in Australia to specifically promote, foster and assist the private forestry sector on forestry matters.

The breakdown of native, plantation hardwood and plantation softwood products harvested from private forest is set out in Tables 10, 11 and 12, respectively.

Table 10: Native forest products harvested from the private forest estate, 2017–18 to 2021–22

Native timber type	2017–18 (tonnes)	2018–19 (tonnes)	2019–20 (tonnes)	2020–21 (tonnes)	2021–22 (tonnes)
Hardwood sawlog, veneer and ply	22,713	46,899	25,528	63,789	18,634
Hardwood pulp	100,503	94,899	246,243	211,999	194,599
Minor native timber log products	58	59	25	23	23

Source: PFT annual reports

Table 11: Plantation hardwood products harvested from the private forest estate, 2017–18 to 2021–22

Plantation hardwood	2017–18 (tonnes)	2018–19 (tonnes)	2019–20 (tonnes)	2020–21 (tonnes)	2021–22 (tonnes)
Sawlog, veneer and ply	643,437	617,739	259,696	467,927	426,546
Pulpwood	2,208,720	2,337,202	2,099,427	1,559,854	1,949,862
Minor log products	656	476	0	0	0

Source: PFT annual reports

Table 12: Plantation softwood products harvested from the private forest estate, 2017–18 to 2021–22

Plantation softwood	2017–18 (tonnes)	2018–19 (tonnes)	2019–20 (tonnes)	2020–21 (tonnes)	2021–22 (tonnes)
Sawlog, veneer and ply	688,636	649,761	736,432	630,936	556,230
Pulpwood	565,704	592,190	672,822	512,699	719,073
Minor log products	2,685	1,956	3,555	7,503	4,491

Source: PFT annual reports

5.3.3 Plantation

Over the reporting period, there was an increase in total harvested hardwood plantation sawlogs (from both public and private forests) from 363,834 m^3 in 2016–17 to 503,695 m^3 in 2020–21. There was a substantial drop in the hardwood plantation pulpwood from 2,292,301 t to 1,720,004 t. The softwood plantation sector saw a small decrease in total harvested softwood plantation sawlog (from both public and private forests) over the reporting period from 698,076 m^3 to 644,195 m^3 and an increase in softwood pulp from 576,226 t to 722,718 t.

5.3.4 Special species

Clauses 78A–78D in the 2017 RFA relate to the special species timber industry.

Tasmania has a long history of special species timber production, and this is recognised in the RFA. The parties agreed in the 2017 RFA variation that selected areas of public land will continue to be accessible for the long-term production of special species timber, consistent with relevant statutory management objectives and statutory management plans.

Special species timber harvesting can occur on a range of land tenures and, unlike other forms of native forest harvesting, is not restricted to PTPZ and private land. Special species timber can additionally be harvested from regional reserves, conservation areas, FPPF land and other public land (such as Crown land and land managed by Hydro Tasmania).

Special species timber is predominantly sourced from harvest of blackwood (*Acacia melanoxylon*) swamp forests in north-west Tasmania and arisings of rainforest timber (for example, sassafras, celery top pine) from native forest hardwood harvest. STT acknowledges the considerable resource of special

species timbers present on PTPZ land. Some of these resources are located within informal reserves on PTPZ land and some are located in areas known as Special Timbers Management Units.

Identification of Special Timbers Management Units commenced in the mid-1990s and later became a requirement of the RFA. Currently, STT has identified 52,600 ha of Special Timbers Management Units on PTPZ land. This area is considered the primary source of special species timber and comprises blackwood forests, rainforests and eucalyptus forests rich in special species timbers.

Special species have largely been sourced as arisings from eucalypt production areas on PTPZ, except blackwood, which is predominantly sourced from blackwood swamps in Tasmania's north-west. Special species timber harvest is anticipated from the FPPF land, but no operations were conducted in the reporting period. Figure 6 shows the harvest of special species timber from PTPZ. There is a notable reduction in some timbers from 2010.

As STT has transitioned from harvesting old-growth forests to harvesting regrowth, the amount of special species timber harvested as part of an integrated harvest has declined. STT acknowledged that as it transitioned to harvesting regrowth forest the amount of certain special species would decline, predominantly celery top pine and Huon pine; this is illustrated in Figure 6.

STT salvages small quantities of Huon pine from the Teepookana Plateau on the west coast of Tasmania.

An indication of planned special species timbers arising from eucalypt harvesting operations is available in STT's *Three Year Wood Production Plan*.

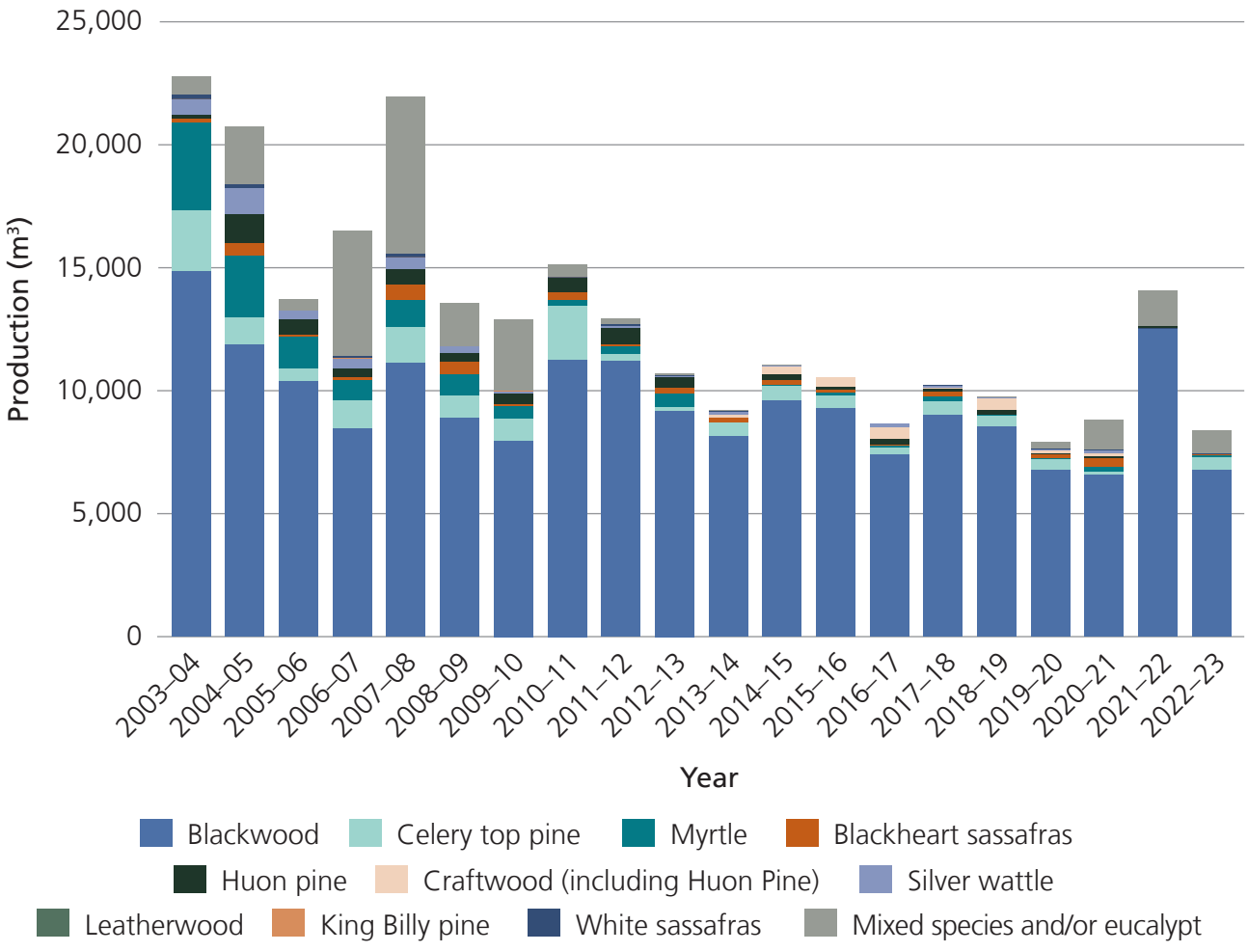


Figure 6: Special species timber harvested, 2003–04 to 2022–23

5.3.5 Wooden Boat Board Bank

The Wooden Boat Board Bank was established in 2009 to implement clause 28 in the RFA and establish a trading house and permanent storage facility for wooden boat boards, such that irregular supply and demand patterns could be optimised to manage long-term recovery of boards suited to Tasmanian wooden boat building. The Wooden Boat Board Bank is currently managed by STT at Island Specialty Timbers in Geeveston and contains Huon pine, celery top pine and King Billy pine. There is approximately 24.6 m^3 of sawn timber in the Wooden Boat Board Bank.

5.3.6 Wood and wood products exported from Tasmania

See Table 6.1.d.1 in the SoFR for data on the export of wood and wood products from Tasmania over the reporting period.

Since 2018–19, whole log exports declined to be almost 27% lower in 2020–21. Between early 2021 and 18 May 2023, China imposed an import ban on whole logs from Australia. The ban impacted trade of whole logs from Tasmania. Prior to the ban, export of whole logs was consistent.

China was the largest destination for Tasmanian log exports, and China was prepared to pay higher prices than other countries. When the ban was active, some timber products from Tasmania were exported to Malaysia. The Malaysian market is not of the same scale as the Chinese market and the prices achieved were lower. There were some exports of timber products from Tasmania to the Indian market as exporters sought to find alternatives to the Chinese market. Woodchips were not impacted by the trade restrictions imposed on other Australian products.

Imports of finished timber products and construction timber materials to the domestic markets continue to be high. This highlights the opportunities for expanded local timber processing to replace imported timber products and add value to Tasmanian-produced timber.

5.3.7 Domestic processing

To support Tasmanian timber businesses to benefit from the expected increase in demand for timber products, the Tasmanian Government announced the $10 million On-Island Processing Program in 2021. The program aims to obtain greater value from Tasmania's forest resources, including forest residues, reduce exposure to market volatility, and improve industry self-sufficiency.

The projects will add value to the current timber harvest and better utilise wood waste, reducing the need for imported wood products. To date, 7 grants have been approved, with a further round of funding expected to be announced in 2024.

6 Key findings and recommendations from preceding reviews

As an outcome of previous reviews, governments have agreed to undertake the actions described in this section in response to recommendations made, in line with clause 9C(e) in the RFA.

This section describes the governments' agreed actions and the current status of implementation, including proposed timeline and future actions for completion where recommendations have not been finalised, as well as any potential impediments to finalisation or changes in government position in the intervening period.

Recommendations arising from the previous review are available at: Tasmanian RFA third 5-yearly review. The 2016 government responses are included here and are available in the *Joint Australian and Tasmanian Government response to the review of the implementation of the Tasmanian Regional Forest Agreement for the period 2007–2012*.

Recommendation 1: The parties review outstanding commitments in relation to reserve establishment and determine those that should be included in a renewed/extended Tasmanian Regional Forest Agreement

Joint Government Response 2016: The Parties agree to review outstanding commitments in relation to reserve establishment and will consider those that should be included in the Comprehensive, Adequate and Representative Reserve System, which is a fundamental element of the Tasmanian Regional Forest Agreement.

The Parties note the substantial area of Tasmania contained within its Comprehensive, Adequate and Representative Reserve System, which increased from 44.1% of the total land area of Tasmania in 2007–08 to 50.1% in 2015–16. Any outstanding commitments from previous reviews will be considered in this context.

Status update: This response is considered complete by the parties due to the actions over the reporting period.

There were several key actions and statistics:

- The Tasmanian Reserve Estate spatial layer indicated that Tasmania had a total reserved area of 3,622,200 ha as at 30 June 2022, including formal and informal reserves on public land, reserves on private land and marine protected areas.
- The terrestrial reserved area is 3,429,000 ha or 50.4% of the area of Tasmania. This is an increase of 16,500 ha of terrestrial reserves since the previous review report.
- Sustainability indicator 1.1c (FPA 2022) provides details on reservation status of forest types on public and private land by International Union for Conservation of Nature category of reservation.
- In 2016, the Tasmanian Government released the TWWHA management plan.

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

Joint Government Response 2016: 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.

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.

Status update: This recommendation is partially complete.

The parties remain committed to ongoing work to improve transparency in the development of FPPs.

Various actions have been taken:

- The Forest Practices Code was reviewed (2020).
- The FPA developed a new website to facilitate better access to information (2021).
- The Land Information Systems Tasmania map has an FPP layer that provides details on the FPP, including applicant, Interim Biogeographic Regionalisation for Australia bioregion, certification year and land tenure.
- Information on the development of an FPP is available on the FPA's website.
- The 'Check before you chop' campaign was launched on the FPA website to improve public awareness of the forest practices system (2021).
- The FPA developed a communication strategy and has dedicated communication officers (2021–22).
- The FPA runs training days that are available for non-industry participants, including explanations of how FPPs are prepared.
- The FPA launched an updated version of the publicly available Threatened Species Adviser planning tool, providing an enhanced user experience.
- STT will make FPPs available for specific coupes upon request.

Future actions:

- Development of a new FPP data warehouse to provide improved access and user experience. The level of development will be resource-dependent.
- STT will make its FPPs available online.

It is estimated that these actions will be finalised in the next 12–24 months.

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

Joint Government Response 2016: 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.

Status update: This response is currently not completed.

It is noted that this recommendation relates to management plans for National Parks in the state outstanding from the original RFA commitment. Since this initial commitment, management plans for all other National Parks in the state have been completed.

Various actions have been taken:

- A draft general management plan is available to be used to offer guidance in providing advice and decision-making. The Reserve Management Zoning Policy spatially identifies the conservation policy across the national parks for which management plans were completed during the reporting period. The completion of these management plans was considered a higher priority due to the environmental values of these sites and the higher risk presented by multiple uses and visitor numbers.
- General Reserves Zoning has recently been developed for all reserves in Tasmania that do not currently have a statutory management plan with zoning. The General Reserves Zoning is currently available for internal use to inform management activities and decision-making consistent with the management objectives of the reserve class. The General Reserves Zoning is a suitable interim measure for the Savage River National Park in the absence of a statutory management plan.

The remaining body of work is to review the management actions of the general management plan with a view to updating and combining it with the Tasmanian Reserves Code of Practice to create one contemporary document for managing reserves without their own management plan.

The desire for the Tasmanian Government to work with the Aboriginal community to agree on management of land within Rocky Cape National Park and Mount William National Park has delayed the development of management plans for these National Parks. If a management planning process were to proceed, a co-design process would need to be agreed with the Aboriginal community to ensure that it is inclusive and achieves the objective of a management plan as outlined in the *National Parks and Reserves Management Act 2002* (Tas).

The timeline for completion of this work would be developed in consultation with the Aboriginal community.

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

Joint Government Response 2016: The Parties are committed to meaningful consultation on forest management, including consultation with Aboriginal community members who have relevant interests.

The Parties invited public comments during the third 5-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 5-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.

Status update: This recommendation is ongoing.

This recommendation was considered as part of the 2017 extension process and implemented as part of the varied RFA. Both parties are committed to further involvement of the Aboriginal community in forest management.

Various actions have been taken:

- PWS continues its Aboriginal ranger trainee program, which commenced in 2010. The Aboriginal trainee program aims to provide Indigenous people with training and competencies to enable them to move into ranger positions.
- In 2018–19, PWS initiated a cultural burning program employing two Aboriginal Fire Rangers and an Aboriginal Burning Project Officer for the initial program.
- The Tasmanian Government amended the *Aboriginal Relics Act 1975* (Tas) in 2017.
- The latest version of the *Procedures for managing Aboriginal cultural heritage when preparing forest practices plans* was issued on 23 November 2017. This is an 'agreed procedure' between FPA and NRE Tas.
- 106 foresters have been trained in Aboriginal cultural protection procedures in 4 courses run jointly by FPA and members of the Aboriginal community; courses were held on 19 July 2019, 23 April 2021 and 13 May 2022.
- In 2021, STT began developing a Reconciliation Action Plan. This includes working collaboratively to implement opportunities to engage with local Aboriginal people.

The Tasmanian and Australian governments remain committed to meaningful consultation on forest management and consultation with members of the Aboriginal community where relevant forest

practices are occurring. While there has been substantial progress made, the parties remain committed to continually improving involvement of the Aboriginal community in management and stewardship of the forested landscape.

This will be an ongoing commitment.

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

Joint Government Response 2016: The Parties recognise that a statewide 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 statewide 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.

Status update: This recommendation is partially complete.

Various actions have been taken:

- The FPA's annual monitoring of compliance assessed a sample of FPPs every year between 2017 and 2022. The number of FPPs assessed and the assessment results are published in the FPA annual report. Results from the annual monitoring have been used to inform the standard of implementation of management prescriptions for natural values, to provide opportunity for education, and as a driver for continuous improvement.
- Results of an assessment of the effectiveness of monitoring and research in relation to the Forest Practices Code were presented at an annual research review and published in the annual report each year from 2017 to 2022.
- A forest resource characterisation of Tasmania (2018 to 2020) was completed. The lead researcher was Associate Professor Julianne O'Reilly-Wapstra, University of Tasmania.
- The FPA has produced the 2022 SoFR. This completes an assessment against the Montréal Process indicators, provides detailed information on forest health, trends and status, and compares the forest extent and cover with previous periods.
- PFT completed a 5-year private forest resource review (2020).
- The FPA monitors the extent of the native forest estate across Tasmania based on 1996 forest area and forest loss under authorised FPPs.

Into the future, the state has an ongoing commitment to continue to proactively identify opportunities to improve on its monitoring capacity and effectiveness. This will include exploring opportunities for better integration of existing monitoring actions to provide a holistic picture of forest condition across forest tenures.

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

Joint Government Response 2016: 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 Australian 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 state 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.

Status update: This recommendation is partially complete.

Various actions have been taken:

- The FPA supports a range of student research projects that investigate aspects of threatened species issues relevant to forestry and contribute to evaluating the effectiveness of biodiversity management under the forest practices system.
- The FPA publishes the results of effectiveness monitoring and research presented at an annual research review and in an annual report. This reports on whether management recommendations delivered by the FPA are working effectively or if they need to be updated/amended to provide adequate protection for the values in question.
- The Threatened Species Adviser is a decision support tool which combines the previous Threatened Fauna Adviser and the new Threatened Plant Adviser into one. The Threatened Species Adviser is maintained and updated as new information becomes available. Conservation measures for threatened species are continuously developed, refined and implemented following the *Agreed procedures for the management of threatened species under the forest practices system*.

- Predictive habitat models for approximately 50 threatened flora species are now available to assist with targeted surveys (2021).
- A new version of the BVD has improved user experience and increased access to spatial information to assist with planning (2020).
- The FPA met with NRE Tasmania regularly throughout the reporting period to assess changes to the conservation status and threat to threatened species relevant to the forest practices system.

More actions will be taken:

- The parties will continue to review and adapt the mechanisms in place for this recommendation, in line with the adaptive management framework.
- As opportunities arise to improve the research, evaluation and communication of outcomes for protection of threatened species and biodiversity, these will be acted upon wherever possible.
- This report and future reports at subsequent 5-yearly reviews will continue to provide a mechanism for demonstrating how outcomes are measured and reported on.
- The FPA will continue to support research and monitoring efforts assessing the effectiveness of the provisions for threatened species.
- The FPA and NRE Tasmania will continue to operate under the Agreed procedures to assess changes to risks for threatened species, and amend protection measures according to the continual improvement framework.
- The parties will continue to publish research results on threatened species projects and make these publicly available where relevant.

These actions will be ongoing.

Recommendation 7: The parties consider the development of a resourced and prioritised research and development plan as part of the Tasmanian Regional Forest Agreement renewal/extension

Joint Government Response 2016: 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 (FWPA) 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 Australian Government provides matching funding to FWPA for their spending on eligible research and development activities. In 2014–15, the Australian Government 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.

Status update: This recommendation is considered complete.

Actions taken include:

- In 2017, the Tasmanian and Australian governments each committed $2 million towards the establishment of the NIFPI research hub in Launceston to provide additional forestry research and development. The funding is administered by Forest and Wood Products Australia under a Tasmanian Government grant deed.
- The Tasmanian NIFPI is hosted by the School of Architecture and Design at the University of Tasmania. NIFPI commenced in 2017 and most projects were completed by 30 June 2022. The 2017 NIFPI funding commitment was fully allocated through 2 rounds providing a total project investment of almost $10 million, including funding and in-kind contributions from the forestry industry and research agencies.
- The Australian Government committed to providing almost $220 million to, among other things, expand the work of NIFPI. The funding will lead to the identification of a set of key research priorities for industry and government across the forestry sector.
- PFT has led the Agroforestry Project. Supported by the Agrivision 2050 initiative of the Tasmanian Government. PFT partnered with UTAS and the CSIRO to quantify the benefits of farm forestry.
- PFT has developed the 'Perennial Prosperity program: building natural capital on farms through the adoption of agroforestry'. This is an ongoing project (2020 to 2023). The project will demonstrate how ecosystems services derived from a range of different agroforestry configurations can be included in a set of farm accounts to positively and profitably contribute to the financial and natural capital bottom line of the enterprise.
- In 2022, the FPA released a report prioritising effectiveness monitoring for the forest practices system: Monitoring the effectiveness of the biodiversity provisions of the Tasmanian Forest Practices Code.
- The Australian Forest and Wood Innovation Centre was officially launched on 12 March 2024.

More actions will be taken:

- Australian Forest and Wood Innovation projects will be reported on its webpage as they are undertaken and completed.

Recommendation 8: The Parties ensure any further prescriptions for harvesting non-merchantable biomass from native forest coupes are developed and monitored using the available scientific knowledge

Joint Government Response 2016: 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.

Status update: This recommendation has commenced.

Various actions have been taken:

- The varied RFA notes in clause 9D of the SoFRs provide an ongoing mechanism to monitor implementation of ESFM, including across key environmental, social and economic principles. These principles include the productive capacity of the ability of a forest to produce biomass (Principle 3) and maintaining forest contribution to global carbon cycles (Principle 6). Scientific data from Australia's National Inventory System informs estimates of forest biomass and is reported in SoFRs.
- In 2018, a report was provided to the Tasmanian Government offering strategic advice on options to maximise the value of forest resource opportunities from the southern Tasmania forest region (Rolley 2018).
- The Tasmanian Government, in conjunction with others, undertook an operational trial to further understand how to maximise the recovery of timber products from forestry operations in Tasmania's southern forests. This included a trial of log merchandiser and of forest residues (DSG 2020).

More actions will be taken:

- The Tasmanian Government released its bioenergy vision in 2023. The vision sets out how Tasmania can unlock private sector investment in bioenergy in Tasmania, increasing employment, and reducing waste and greenhouse gas emissions. Bioenergy can be produced from almost any organic matter, including forestry origin waste that is not being utilised. There are already companies using forestry by-products for bioenergy.
- The 2022–23 Tasmanian Budget committed $10 million over 4 years to implement renewable energy solutions for the 60 government-owned fossil fuelled boilers identified. This will advance the government's objectives in relation to climate change, renewable energy production, waste management, regional employment and economic development.
- The Tasmanian Government is developing an emissions reduction and resilience plan for the energy sector as part of Tasmania's action to achieve its legislated net zero obligation.
- The land use, land use change and forestry plan is due to be completed in November 2024.

Recommendation 9: The state considers matters raised in submissions to this review, in relation the Permanent Native Forest Estate Policy (PNFEP), as part the 2015 state PNFEP review and the outcomes be incorporated in any revised PNFEP and recognised in a renewed/extended Tasmanian Regional Forest Agreement

Joint Government Response 2016: The Parties acknowledge that maintaining an extensive and permanent native forest estate is a key conservation goal identified in the *National Forest Policy Statement* (1992) 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, 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 4-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 5-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.

Status update: This recommendation has commenced.

Action has been taken:

- The Policy for Maintaining a Permanent Native Forest Estate was last updated 30 June 2017 (see Section 2.1.1). This review updated a range of measures in the PNFEP to continue the downward trend in clearing and conversion of forested land in the state.

Further action will be taken:

- A further review of the policy commenced in December 2022 in conjunction with the RFA 5-yearly review. This review seeks to amend issues with implementation to ensure the policy remains fit for purpose in achieving its core objective of maintaining a permanent native forest estate in Tasmania. The updated policy will be released in 2024. It is anticipated that this will be completed by December 2024.

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 Tasmanian Regional Forest Agreement renewal/extension process.

Joint Government Response 2016: 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.

Status update: This response is complete.

Action has been taken:

- The forest practices system requires that heritage values are considered in forest practices planning.

The Department of Agriculture, Fisheries and Forestry led this with support from the Tasmanian Government. This recommendation was considered as part of the RFA extension process in 2017. No further action is required.

Recommendation 11: The parties continue to include regular reviews of the sustainable sawlog yield as an element of a renewed/extended Tasmanian Regional Forest Agreement

Joint Government Response 2016: 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.

Status update: This recommendation is complete.

Various actions have been taken:

- The fifth sustainable yield review was published by STT in 2017.
- The sixth and most recent sustainable yield review was released in 2022 and indicated that STT can continue to meet the legislated quota, but there will be a shift away from native HQSL, which will be supplemented with plantation from 2027.

More action will be taken:

- The sustainable yield review will continue to be produced by STT. This will be done every 5 years as required under the RFA.

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 Tasmanian Regional Forest Agreement

Joint Government Response 2016: 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.

Status update: This recommendation is complete.

Various actions have been taken:

- The Special Species Management Plan was released 21 October 2017. It was developed in accordance with the requirements of the *Forestry (Rebuilding the Forest Industry) Act 2014* (Tas).
- The Tasmanian Government released the Rainforest Silviculture Guidelines (2017) to provide guidance on the selection and application of appropriate silvicultural practices in rainforests in Tasmania subject to special species timber harvesting. These guidelines are a practical document intended for use in forest practices planning and are not prescriptive.

Recommendation 13: If the Australian Government should implement any significant future Tasmanian Regional Forest Agreement funding program it should establish clear performance and evaluation measures

Joint Government Response 2016: The Australian Government commits to establishing clear performance and evaluation measures for any future Tasmanian Regional Forest Agreement related expenditure. The Australian Government uses robust government funding frameworks to guide these monitoring and evaluation measures, including the *Public Governance, Performance and Accountability Act 2013* (Cth), the *Commonwealth Grants Rules and Guidelines* (2014) and the Australian National Audit Office's *Implementing Better Practice Grants Administration* (2013). The Australian Government notes that the legislation and guidelines were released after the review period.

Status update: This recommendation is complete.

The Australian Government remains committed to establishing clear performance and evaluation measures for any future RFA-related expenditure.

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

Joint Government Response 2016: 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.

Status update: This recommendation is considered complete.

Various actions have been taken:

- Dr Jacki Schirmer released the report *Socio-economic impacts of the forest industry: Tasmania* in May 2018.
- In 2017, the Tasmanian Budget included new initiative funding to implement the *Strategic growth plan for the Tasmanian forests, fine timber and wood fibre industry.* It was established in response to the need to better understand the full suite of social, economic and environmental considerations required for decision-making in forest practices. To date it has delivered or is in the process of delivering more than 15 separate projects.
- The growth plan projects funded are aligned with the key initiatives developed in consultation with industry, academic and government stakeholders. These are
  - socio-economic analysis of environmental regulation in the forest practices system
  - cost-effectiveness testing of environmental provisions in the forest practices system

  - ongoing capacity building in the area of environmental, resource and forestry economics
  - the applicability of natural capital accounting to forest management in Tasmania.
- Four PhD students are either fully funded or co-funded by the program and are working on the issues of sustainable firewood, natural capital accounting, forest residues and the value of informal reserves on public and private land.
- The 2022 SoFR documents socio-economic data from 2016 to 2021.

Socio-economic data will continue to be analysed under the SoFR process. This will be an ongoing commitment.

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

Joint Government Response 2016: 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 5-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 5-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.

Current status: This recommendation is ongoing.

Various actions have been taken:

- The Government has committed to replacing the *Aboriginal Heritage Act 1975* (Tas) with new Tasmanian legislation. The current comprehensive review and redrafting process commenced in December 2019 and is ongoing. This involves extensive public and stakeholder consultation phases, including with Tasmanian Aboriginal people and key forest industry and regulatory stakeholders.
- Procedures for managing Aboriginal cultural heritage when preparing forest practices plans was released by the FPA in 2017, and updated in 2018.
- FPA collaborated with members of the Aboriginal community to run courses in the identification and management of Aboriginal heritage in 2019, 2021, 2022 and 2023.

More actions will be taken:

- While there has been substantial progress, the parties remain committed to continual improvement of identification and protection of Aboriginal cultural heritage across the forested landscape.

This recommendation will be ongoing.

Recommendation 16: The parties consider the simplification of a renewed/extended Tasmanian Regional Forest Agreement by dealing with fewer areas at a higher strategic level and with a greater emphasis on measuring and reporting outcomes

Joint Government Response 2016: The Parties agree to consider the simplification of the Tasmanian Regional Forest Agreement as part of the extension process, noting that much of the current agreement contains commitments that have now been completed, are redundant or have been superseded.

The Parties support 5-yearly reviews of the Tasmanian Regional Forest Agreement as the appropriate mechanism to measure and report outcomes, and agree to examine options to better measure and report on outcomes.

Status update: This recommendation is complete.

Various actions have been taken:

- The parties have agreed to produce an outcomes-based report for the 2017–2022 review. Officials have agreed to a set of principles to guide the production of the report. This report is the first since the RFA extension in 2017.
- The parties will review the process for the development of the 2017–2022 outcomes report and identify lessons learned that may improve future outcomes reporting.

Appendix 1: Montréal Process criteria

Clause 9C of the RFA establishes reporting criteria for the 5-yearly review. Tables A1 to A7 map the alignment between the RFA criteria and indicators and the criteria established by the Montréal Process.

Table A1: RFA criteria and indicators aligned to Montréal Process criterion 1, conservation of biological diversity

Montréal Process criterion or indicator grouping	RFA indicator	RFA clause 9C (a) adaptive forest management	RFA clause 9C (b) matters of national environmental significance	RFA clause 9C (c) statutory conservation planning documents	RFA clause 9C (d) social and economic benefits of forestry	RFA clause 9C (e) recommendations from preceding 5-yearly reviews
1.1 Ecosystem diversity	Indicator 1.1.a Extent of area of forest types	Yes	No	No	No	No
	Indicator 1.1.b Area of forest by growth stage	Yes	No	No	No	No
	Indicator 1.1.c Extent of area by forest type and reservation status	Yes	No	No	No	No
	Indicator 1.1.d Fragmentation of forest cover	Yes	No	No	No	No
	Indicator 1.1.e Area of old growth by forest type by reservation status	Yes	Yes	Yes	No	No

Continues

Table A1 *continued*

Montréal Process criterion or indicator grouping	RFA indicator	RFA clause 9C (a) adaptive forest management	RFA clause 9C (b) matters of national environmental significance	RFA clause 9C (c) statutory conservation planning documents	RFA clause 9C (d) social and economic benefits of forestry	RFA clause 9C (e) recommendations from preceding 5-yearly reviews
1.2 Species diversity	Indicator 1.2.a Forest-dwelling species for which ecological information is available	No	Yes	No	No	No
	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	No	Yes	No	No	No
	Indicator 1.2.c Representative species from a range of habitats monitored at scales relevant to regional forest management	No	Yes	No	No	No
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	No	Yes	Yes	No	No
	Indicator 1.3.b Native forest and plantations of indigenous timber species which have genetic resource conservation mechanisms in place	No	Yes	Yes	No	No

Table A2: RFA criteria and indicators aligned to Montréal Process criterion 2, maintenance of productive capacity of forest ecosystems

Montréal Process criterion or indicator grouping	RFA indicator	RFA clause 9C (a) adaptive forest management	RFA clause 9C (b) matters of national environmental significance	RFA clause 9C (c) statutory conservation planning documents	RFA clause 9C (d) social and economic benefits of forestry	RFA clause 9C (e) recommendations from preceding 5-yearly reviews
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	Yes	No	No	Yes	No
	2.1b Age class and growing stock of plantations	Yes	No	No	No	No
	2.1c Annual removal of wood products compared to the volume determined to be sustainable for native forests and future yields for plantations	Yes	No	No	Yes	No
	2.1d Annual removal of non-wood products compared to the level determined to be sustainable	Yes	No	No	Yes	No
	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	Yes	No	No	No	Yes

Table A3: RFA criteria and indicators aligned to Montréal Process criterion 3, maintenance of forest ecosystem health and vitality

Montréal Process criterion or indicator grouping	RFA indicator	RFA clause 9C (a) adaptive forest management	RFA clause 9C (b) matters of national environmental significance	RFA clause 9C (c) statutory conservation planning documents	RFA clause 9C (d) social and economic benefits of forestry	RFA clause 9C (e) recommendations from preceding 5-yearly reviews
3 Maintenance of forest ecosystem health and vitality	3.1a Scale and impact of agents and processes affecting forest health and vitality	Yes	No	No	No	No
	3.1b Area of forest burnt by planned and unplanned fire	Yes	No	No	No	No

Table A4: RFA criteria and indicators aligned to Montréal Process criterion 4, conservation and maintenance of soil and water resources

Montréal Process criterion or indicator grouping	RFA indicator	RFA clause 9C (a) adaptive forest management	RFA clause 9C (b) matters of national environmental significance	RFA clause 9C (c) statutory conservation planning documents	RFA clause 9C (d) social and economic benefits of forestry	RFA clause 9C (e) recommendations from preceding 5-yearly reviews
4 Conservation and maintenance of soil and water resources	4.1a Area of forest land managed primarily for protective function	Yes	Yes	Yes	No	No
	4.1b Management of the risks of soil erosion and the risks to soil physical properties, water quantity and water quality in forests	Yes	No	No	No	No

Table A5: RFA criteria and indicators aligned to Montréal Process criterion 5, maintenance of forest contribution to global carbon cycles

Montréal Process criterion or indicator grouping	RFA indicator	RFA clause 9C (a) adaptive forest management	RFA clause 9C (b) matters of national environmental significance	RFA clause 9C (c) statutory conservation planning documents	RFA clause 9C (d) social and economic benefits of forestry	RFA clause 9C (e) recommendations from preceding 5-yearly reviews
5 Maintenance of forest contribution to global carbon cycles	5.1a Total forest ecosystem biomass and carbon pool	Yes	No	No	No	No

Table A6: RFA criteria and indicators aligned to Montréal Process criterion 6, maintenance and enhancement of long-term multiple socio-economic benefits

Montréal Process criterion or indicator grouping	RFA indicator	RFA clause 9C (a) adaptive forest management	RFA clause 9C (b) matters of national environmental significance	RFA clause 9C (c) statutory conservation planning documents	RFA clause 9C (d) social and economic benefits of forestry	RFA clause 9C (e) recommendations from preceding 5-yearly reviews
6.1 Production and consumption	6.1a Value and volume of wood and wood products	No	No	No	Yes	No
	6.1b Values, quantities and use of non-wood forest products	No	No	No	Yes	No
	6.1c Value of forest-based services	No	No	No	Yes	No
	6.1d Production and consumption and import/export of wood, wood products and non-wood products	No	No	No	Yes	No
	6.1e Degree of recycling of forest products	No	No	No	Yes	No
6.2 Investment in the forest sector	6.2a Investment and expenditure in forest management	No	No	No	Yes	No
	6.2b Investment in extension and use of new and improved technologies	Yes	No	No	Yes	No

Continues

Table A6 *continued*

Montréal Process criterion or indicator grouping	RFA indicator	RFA clause 9C (a) adaptive forest management	RFA clause 9C (b) matters of national environmental significance	RFA clause 9C (c) statutory conservation planning documents	RFA clause 9C (d) social and economic benefits of forestry	RFA clause 9C (e) recommendations from preceding 5-yearly reviews
6.3 Recreation and tourism	6.3a Area of forest available for general recreation/tourism	No	No	No	Yes	No
	6.3b Range and use of recreational/tourism activities available	No	No	No	Yes	No
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 recognised through formal and informal management regimes	No	Yes	No	Yes	No
	6.4b Registered places of non-Indigenous cultural values in forests that are formally managed to protect those values	No	Yes	No	Yes	No
	6.4c The extent to which Indigenous values are protected, maintained and enhanced through Indigenous participation in forest management	No	Yes	No	Yes	No
	6.4d The importance of forests to people	No	Yes	No	Yes	No

Continues

Table A6 *continued*

Montréal Process criterion or indicator grouping	RFA indicator	RFA clause 9C (a) adaptive forest management	RFA clause 9C (b) matters of national environmental significance	RFA clause 9C (c) statutory conservation planning documents	RFA clause 9C (d) social and economic benefits of forestry	RFA clause 9C (e) recommendations from preceding 5-yearly reviews
6.5 Employment and community needs	6.5a Direct and indirect employment in the forest sector	No	No	No	Yes	No
	6.5b Wage rates and injury rates within the forest sector	No	No	No	Yes	No
	6.5c Resilience of forest-dependent communities to changing social and economic conditions	No	No	No	Yes	No
	6.5d Resilience of forest-dependent indigenous communities to changing social and economic conditions	No	No	No	Yes	No

Table A7: RFA criteria and indicators aligned to Montréal Process criterion 7, legal, institutional and economic framework for forest conservation and sustainable management

Montréal Process criterion or indicator grouping	RFA indicator	RFA clause 9C (a) adaptive forest management	RFA clause 9C (b) matters of national environmental significance	RFA clause 9C (c) statutory conservation planning documents	RFA clause 9C (d) social and economic benefits of forestry	RFA clause 9C (e) recommendations from preceding 5-yearly reviews
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	Yes	No	Yes	No	No
	7.1b Extent to which the institutional framework supports the conservation and sustainable management of forests	Yes	No	No	No	No
	7.1c Extent to which the economic framework supports the conservation and sustainable management of forests	Yes	No	No	No	No
	7.1d Capacity to measure and monitor changes in the conservation and sustainable management of forests	Yes	Yes	Yes	No	No
	7.1e Capacity to conduct and apply research and development aimed at improving forest management and delivery of forest goods and services	Yes	No	No	No	No

Appendix 2: Summary of Forest Practices Authority Earth sciences research program outcomes

- *Aboriginal landscapes*. The timing and extent of Aboriginal effects on the ecology of northern Tasmania was studied by analysis of peaty deposits. The research provided evidence of Aboriginal use of fire to manage and transform the natural vegetation pattern and showed how the vegetation patterns have changed over the past 10,000 years.
- *Landslides*. Radiocarbon dating of charcoal layers found in the backwalls of several landslides in the Oldina plantation after the unusually heavy rain of June 2016 found that the area had experienced severe erosion previously, but mostly under a glacial climate when vegetation cover was limited. The research highlights the importance of establishing wide streamside reserves to prevent soil loss as extreme weather events become more frequent because of climate change.
- *Sinkholes*. In 2018–19, karst development in plantations with active sinkholes in the Florentine Valley was monitored. No effect of pine harvest on sinkhole development was noted. Joint research between the FPA and the University of Queensland on large sinkholes, which have rapidly and intermittently developed in a Railton plantation since 2011, established that the sinkholes formed (and continue to expand) as a result of watertable lowering and stream diversion caused by deep limestone quarrying south of the plantation.
- *Karst surveys*. A survey in north-western Tasmania has updated the karst map of the Blackwater and Sumac karst systems in dolomitic rocks, identified 'new' caves and established subsurface stream pathways of some streams. This knowledge allows forest planners to identify areas of higher risk when harvesting forests.
- *Weathering*. A research project with the University of Tasmania established that deep weathering of dolerite in the Tasmanian highlands is a product of the climate in the Tertiary period about 40 million years ago. The soils are especially prone to erosion.
- *Glacial deposits*. FPA research has established that glacial outwash in the lower Mersey River catchment was deposited about 240,000 years ago and filled tributary catchments.
- *Geoconservation*. Both FPA Earth scientists are members of the Tasmanian Geoconservation Database (TGD) working group, which meets annually to determine whether newly identified geological sites of special scientific interest should be recorded in the database. FPA has nominated an average of 3 to 4 sites each year and most nominated sites have been listed. Sites include karst springs, aeolian deposits, dated periglacial screes and deep peats containing pollens recording an area's vegetation history. Sites listed in the database do not have legal protection; however, foresters planning forest harvest are encouraged to manage them to conserve their scientific values.
- *Soil carbon*. A project undertaken with researchers from Germany compared soil carbon under mature tall eucalypt forests and rainforest to understand whether soil carbon stocks change as the eucalypts transition to rainforest. Another project compared soil carbon stocks under native forests and eucalypt plantations. Key findings include that
  - mature wet eucalypt forests are emitting carbon rather than absorbing carbon during their transition to rainforest

  - soil carbon concentrations drop under plantation land use but, because soils are more compact under plantations, total carbon stocks do not differ significantly between the two land uses.

  With the support of Forest and Wood Products Australia and industry partners, the soil carbon studies are being extended to several sites in Tasmania and on the mainland.

- *Historic sites*. European cultural heritage sites found during the preparation of FPPs are recorded on the FPA-curated Historic Sites Register and managed according to protocols agreed with NRE Tas. Between 20 and 30 newly found sites are recorded every year, ranging from tramway remnants to old harvest machinery and trappers' huts. The register is a valuable tool for researchers investigating Tasmania's forest history.

Appendix 3: Summary of forest products and innovation research projects

Australian Research Council Centre for Forest Value research outputs

Forest production

Understanding the variation in wood quality properties

Important wood quality characteristics for solid wood products, such as density and stiffness, vary due to environmental conditions, genetics, silvicultural management and by position within the tree. Across multiple Centre for Forest Value (CFV) research projects, we increased the understanding of how and why these wood quality traits differ in *Eucalyptus nitens*, in relation to these factors. Results showed a correlation between tree and board stiffness, indicating that early nondestructive predictions of stiffness in standing trees may be used to segregate logs into different product streams. This research helps inform forest managers as to which parts of the estate are most suitable for production of particular wood quality characteristics, how management practices will affect wood quality and from what parts of the tree different products can be sourced. Using this information can help match the wood characteristics of logs to their optimum final product and therefore help maximise value.

Genetic variation in important wood quality traits

Wood traits such as basic density, microfibril angle, modulus of elasticity, kraft pulp yield, stem straightness and acoustic wave velocity are common breeding objectives in trees in order to produce logs suitable for solid wood products and pulpwood. Results from CFV studies showed strong genetic control of the majority of these traits. Results also showed that many traits were correlated, for example microfibril angle, a wood stiffness trait for solid wood products, was correlated with modulus of elasticity and pulp yield. These results indicate that previous breeding to increase pulp yield is unlikely to have negatively impacted traits important for solid wood production. The work highlights the potential for using plantation *E. nitens* for solid wood products and may also aid in future breeding efforts to improve *E. nitens* and *E. globulus* genetic stock for both solid wood and pulp products.

Predicting basic density using drilling

Measuring the resistance of tree stems to drilling using the IML Resistograph (RESI) is a nondestructive sampling technique used to calculate basic density in standing trees. Basic density is correlated with strength and stiffness, and is a good indicator of wood quality. A comparison of drilling resistance to actual density measurements has allowed the nonlinear response of the friction correction to be included in future predictions of basic density.

The use of natural capital accounting to value trees

Natural capital accounting is normally undertaken at larger landscape scales, but this project evaluated existing tools and provided guidelines for measuring ecosystem services at smaller scales more relevant to individual farms. This work highlighted some of the key gaps in taking natural capital accounting to smaller scales, such as the capacity to measure the condition of the asset and the role of species choice

on the services provided. Results showed that species choice altered the types of services provided by agroforestry assets; for example, commercial monocultures provided greater carbon storage and wood production, but native shelterbelts provide better shelter and diversity.

Effect of trees on microclimate in agriculture landscapes

Trees in agricultural landscapes can serve a range of purposes from providing wood products to carbon storage and increasing biodiversity. Trees can also help increase agricultural productivity by mitigating extreme environmental conditions such as wind and extreme temperature. Studies examined the impacts that windbreaks and native forest woodlands can have on microclimates in agricultural landscapes. In both types of systems, the trees reduced the windspeed by around 50% and had significant impacts on reducing extremely hot temperatures during the day and limiting extremely cold temperatures at night. These results have important implications for agricultural productivity by reducing the risk of extreme environmental conditions impacting crops and livestock and through the potential to increase yields by providing better growing conditions.

Understanding species and genetic performance in restoration plantings

The performance of species mixes and genetic stock across diverse environments is a major issue in restoration plantings as it impacts how successful restoration will be in both the short and long terms. Researchers have developed and tested other strategies, such as climate-adjusted provenancing, in which genotypes from non-local populations are mixed with local genotypes. Many of these strategies are 'climate adjusted'; that is, they involve sourcing seed from areas that have current climates analogous to those expected in Tasmania in the future. Results across the studies show that climate-adjusted strategies may be beneficial in the future and should be considered along with contemporary growing conditions for restoration plantings.

Monitoring restoration success and the use of drones

There is a clear need to monitor the success of restoration plantings to provide information about their success and to inform future management. The results showed significant differences in traits due to species and genetics. Results of this project demonstrated the importance of species and genetic variation in determining the structure and productivity of restoration plantings. Importantly, this project also showed that drone-based data collection can accurately depict structural attributes at the tree level and is a useful technique for monitoring the success/effectiveness of restoration plantings. This technique could be used in place of traditional field surveys, which are often costly and time consuming.

Informing revegetation policy and practice with research

Equipping practitioners with the latest research to enable informed decision-making is critical to ensure revegetation plantings survive and eventually create sustainable populations in the face of climate change. The learnings from establishing a network of field trials in the Midlands were developed into guidelines that assist with designing, planning and implementing 'climate-ready' revegetation plantings across Australia, and included multiple workshops for researchers, practitioners and policymakers across Victoria. Research from the CFV has also been used in the second edition of the FloraBank guidelines, the premier document used to guide and train Australia's ecological restoration community. This included informing best practices along the seed supply chain, from seed sourcing, seed collection and seed testing to seed production areas and database management. Research from the CFV has also been used to inform practical policy for the forestry sector. This included refining and creating a new seed zone map for Tasmania. This modelling work enabled a broader scope for seed sourcing for forest revegetation, leading to more efficient forest management practices.

Response of leaf area to application of nitrogen fertiliser to *Eucalyptus nitens* plantations

Leaf area index plays an important role in forest growth and development as it influences growth rates through photosynthesis and other critical physiological responses such as water use. Forest management techniques such as fertiliser application have significant consequences for leaf area. Results of a project testing nitrogen uptake in plantation eucalypt sites after fertiliser application showed that the response of leaf area to nitrogen was nonlinear with peaks typically exhibited at fertiliser application rates of 450–600 kg/ha. Information from this project can be used to guide the application of fertiliser in forestry coupes, particularly in dry sites where an overuse of nitrogen could result in increased water stress.

Products and manufacturing

Characteristics of plantation-grown hardwood timber

Interest in the use of fast-growing plantation hardwoods (eucalypts) for structural and solid wood products has increased recently. Researchers identified the potential of this plantation-grown resource for applications such as mass engineered timber products. However, there was a lack of knowledge surrounding the physical, mechanical and machinability properties of this resource. Results showed that the visual characteristics of boards such as knots, grain slope, checks, clearwood and insect traces were strong predictors of structural characteristics such as modulus of elasticity and modulus of rupture. Information from these studies can be used to estimate structural performance of this resource and develop visual grading systems that reflect the structural characteristics.

Optimising mass laminated timber product from plantation hardwoods

Developing mass laminated timber products from the plantation eucalypt resource provides a useful product and diversifies the potential product stream. Results from this project highlight that there is strong potential to produce high-value products from the plantation eucalypt resource.

Selection and grading strategies for plantation *Eucalyptus nitens* sawn boards

Stiffness is considered one of the most important structural properties for sawn timber used in buildings and laminated structures, including mass timber components. The successful development of a plantation timber supply chain for structural products will depend on the accurate selection and grading of the resource. A project assessing stiffness of 268 sawn boards, traced from the tree through to final processing stages, shows strong, positive correlations between stiffness measured at each board processing stage through nondestructive testing) using acoustic wave velocity and the actual board stiffness measured through mechanical testing of dressed boards. Position of the board in the stem and sawn board processing treatment significantly impacted board stiffness, indicating that early selection of logs would allow larger yield of stiffer boards. The grading of boards using both the traditional Australian Standards visual grading system and nondestructive testing identified a classification error of 82.5% and 45.2%, respectively. The visual grading system is not suitable for plantation-grown *E. nitens* timber. A linear model was developed to reclassify the boards, providing a smaller classification error, including fewer boards being over-graded. This work shows nondestructive testing acoustics can be used as an early selection method for structural boards and can also be employed to satisfactorily grade *E. nitens* plantation boards to be used in building structures and mass laminated elements.

Quantifying the appearance of solid wood plantation-grown eucalypts

Using sawn boards from plantation-grown eucalypts provides opportunities to diversify the products coming from this resource. This project developed a method to digitally capture the distribution of natural growth characteristics in plantation eucalypts. Results from this project could be used to create grading standards for appearance plantation eucalypts as well as providing methods for millers to sort and cut boards for optimum value.

Thermo-hydro-mechanical treatment of eucalypts

Thermo-hydro-mechanical and thermo-treatments are used to improve the properties of wood and diversify the potential uses of different species without the application of chemicals. This research showed that thermo-hydro-mechanical treatment can densify *E. nitens* timber by 53%, thereby improving stiffness and strength. This work highlights the potential of thermo-hydro-mechanical treatments to densify lower-grade plantation timber, raising the possibility of it being used for structural and other higher-value applications.

Low-cost off-the-shelf drones for high-resolution forest maps

Drones are powerful tools for capturing forest measurements efficiently and safely. This project developed techniques to use low-cost and easily available drones to collect extremely high-resolution point clouds of complex forest environments. This project also developed methods of automatically extracting detailed and complex measurements directly from these point clouds. A Python package called the Forest Structural Complexity Tool was developed, which applies deep learning and computer vision techniques to the problems of point cloud analysis. These developments in remotely sensed forest measurement techniques could provide forestry and forest restoration organisations with an additional tool to capture forest measurements and enhance our capability to monitor forest structure in greater detail compared with traditional forest mensuration techniques.

Canopy sampling drones

Sampling of forest canopies (for example, for foliage or seed capsules) is often required for research and forest management. This project assessed the feasibility and development of drones for safely and efficiently sampling from the crowns of forest trees. This project developed and tested a series of novel drone designs to safely and efficiently collect samples from almost any location on a tree. This step forward in forest sampling will likely enable the sampling of forest trees to be more efficient and safer, and in some situations may replace the use of traditional methods such as the use of tree climbers and cherry pickers.

Decision-making for port congestion mitigation

Factors leading to congestion at ports were identified using transport data, weighbridge data and surveys of organisations operating in the woodchip supply chain. The project identified major potential congestion issues including the lack of coordination across transport operators. Results from this work have already been implemented in some ports through booking systems and regular coordination meetings, resulting in a 20% reduction in congestion at a woodchip export terminal.

Optimising locations of biomass energy facilities

Forest biomass is potentially a valuable resource for energy generation; however, it is widely distributed across timber harvesting and processing sites. This makes the economic collection of the resource difficult and requires detailed planning and understanding of the key limitations in logistics. To optimise

decision-making about suitable locations for biomass energy plants in Tasmania, CFV projects used multicriteria analysis and geographical information systems to develop models of where biomass plants could be located based on the distribution of the resource and supply chain cost analysis, as well as factors such as environmental and social considerations. Studies also reviewed the impact of key transport constraints such as bulk density, water content and energy content, and highlighted the importance of primary transport costs that could be reduced with techniques such as in-field drying. Studies highlighted the potential for the utilisation of biomass for energy generation in Tasmania, particularly from logging residues. Additionally, results identified some key potential locations and provided a decision-making framework that can be adjusted based on the relative importance of numerous factors. This project developed a program using harvester head data that tracked residue generation within forestry coupes to accurately predict where high densities of biomass were available.

Forestry socio-economics

Identification of the value of off-reserves in Tasmanian production forests

Off-reserves are areas outside the formal reserve system. These areas are negotiated with forest owners when developing FPPs. This project aims to utilise ecosystem service valuation techniques and natural capital accounting to identify and account for the values associated with off-reserves. The focus of the research is on the value of the protection and enhancement of biodiverse ecosystems, cultural heritage, water resources and visual amenity which is provided by protection within production forests.

Investigating alternative for the utilisation of forest residues

Forest residues are an underutilised resource. These residues play an important role in improving biodiversity in recently harvested production forests, but may also have economic uses. This project investigates public willingness to pay and forester willingness to accept compensation for the outcome of alternative management of forest residues. The project investigates how smoke, health impacts, biodiversity outcomes and employment within the supply chain impact upon public and forester preferences for alternative management of forest residues in Tasmania.

The use of natural capital accounting in forestry

The theory of the use of natural capital accounting is well developed but in the forest sector very few real-world applications can be identified outside broadbrush national applications. This project aims to develop upon Tasmania's position at the forefront of applied natural capital accounting to develop appropriate and applicable natural capital accounting frameworks for the forest industry. It will also identify data gaps and other barriers that limit the application of natural capital accounting and aim to fill these gaps in the context of the Tasmanian forest sector.

NIFPI research project outcomes

NIFTI research project outcomes were as follows:

- NT010 – Conceptualise and develop a functioning model for collaborative integrated pest management within the Tasmanian forest industry. This project saw the establishment of the Tasmanian Integrated Pest Management Steering Committee and a guiding framework was developed.

- NT011– Unlocking financial innovation in forest products with natural capital. The final report was released in 2022. Results from project outcomes are expected to be achieved in the 2–3 years following the project end.
- NT018 – A forest resource characterisation of Tasmania – Stage 1 of 2: Feasibility. This project assessed the feasibility of developing models to characterise the wood volume and quality of the Tasmanian hardwood estate. Outcomes of the project recommend that a focus on a single silvicultural type and species (*Eucalyptus nitens*) would be the most feasible approach, and 3 alternative approaches for wood properties assessments were suggested.
- NT042 – Eagle Eye – applying the internet of things to landscape-scale wedge-tailed eagle nest assessments and management. This project has the potential to increase economic activity and animal welfare outcomes, and reduce worker safety concerns and costs associated with current nest activity checking practices that use a helicopter. Before this approach is considered for operational deployment, the limitations of the project need to be addressed. An economic analysis indicated a strong financial case in favour of this management approach. This project has provided a springboard into the application of internet of things technologies across landscape management functions.
- NT043 – Short log supply chain impacts in hardwood plantations. This study found that expected net revenues would reduce when adding short saw logs to the current basket of log grades.
- NT048 – Implementation of single-step genomic selection in eucalypts. This project achieved its main objectives of building foundational datasets and developing and testing methodologies for the Australian hardwood breeding programs. This project enabled further adoption of genomics technology into tree breeding through the generation and addition of datasets for the *Eucalyptus nitens* and *E. globulus* breeding programs.

Appendix 4: Legislative and regulatory changes over the reporting period

Forest Practices Amendment Act 2019

Most of the changes made in the *Forest Practices Amendment Act 2019* (Tas) were administrative. The changes made for the purpose of improving the forest practices system were as follows:

- Provide for the development and issuance of a code of conduct for FPOs. A code of conduct has been prepared but is not yet in force. In the absence of the code of conduct, the FPA has administrative procedures for disciplining FPOs.
- Clarify that the Chief FPO (CFPO) and an FPO can direct a person who has contravened the Act, or not complied with an FPP, to make good any damage the person's act has caused to land (including rehabilitation and revegetation).
- Provide for the FPA to recover unpaid fees where the fee for an FPP application has not been paid, or not paid in full.
- Provide for the assignation of the responsibility for an FPP from the original applicant to another person.
- Remove the requirement that nominations for appointment to the Forest Practices Tribunal be made by specific bodies, and in place provide the Minister with the authority to nominate persons who possess the required expertise.
- Provide for 3 additional members to the Forest Practices Advisory Council – one person with knowledge and expertise in the administration of forest policy who is nominated by the Secretary of the Department; one person with knowledge and expertise in relation to natural heritage or cultural heritage who is nominated by the Secretary of the department that is responsible for the administration of the NC Act; and one to be a FPO who is not the CFPO.
- Provide a consistent approach regarding the authority of the CFPO to direct all FPOs in the performance and exercise of their delegated functions and powers under the FP Act. Directions must be reasonable, state a time frame for compliance and relate to the FPO's delegated functions and powers.
- Provide the CFPO with the authority to directly recover costs incurred in undertaking repair works (or by engaging a suitably qualified person) from the person responsible for noncompliance with an FPP or a breach of the FP Act.
- Provide consistency with other provisions in the FP Act and with contemporary legislation in relation to requirements for service of notices.
- Provide powers to the FPA to direct monies received from fines for activities that contravene the FP Act directly to an aggrieved third party, where works are required to make good loss or damage as a result of that noncompliance.
- Action minor amendments and update references required through due diligence.

Forest Practices Amendment (Validation) Act 2022 (Tas)

The purpose of the amendment was to:

- retrospectively validate delegations issued by the FPA under section 43 of the FP Act
- clarify the scope of the CFPO's power to issue directions.

Forest Practices Code – 2020 amendments

- The scope and applicability of the Forest Practices Code was clarified, to allow for its application where an FPP is required, whether or not the FPP has been certified. Where a certified FPP is not required, persons carrying out forest practices are encouraged to apply the provisions of the Code where practicable.
- An interpretation and explanation of the term 'forest practices' consistent with the meaning of the term in the FP Act was included.
- A mandatory statement was included to be placed in all FPPs that references the Code and thus clearly links the Code to an enforceable instrument (the FPP).
- The requirement for a map to be included in an FPP was added and the standard of the map expected was described.
- An expanded section describing and illustrating native forest silvicultural systems and native forest stocking standards was included.
- New sections were added on restoration of riparian zones and rehabilitation of degraded forest landscapes.
- A section was added on stand management that covers routine, low-impact stand maintenance activities that do not require an FPP.
- Exemptions for small scale or low-impact forest maintenance operations where an FPP is not needed were made clear.
- A statement was included that forest practices should be conducted in a manner that maintains the sequestration and storage of carbon in a reasonably practical manner.
- The Guiding Policy was replaced with a preamble and an expanded section A, with some of the commitments made in the Guiding Policy dealt with elsewhere in the Code.
- Numerous technical updates were made to remove uncertainty and bring the Code up to date with contemporary practices and technology, such as contemporary harvesting equipment and use of electronic maps and real-time geolocation.
- Other applicable legislation is referred to, such as that covering fire management, smoke, quarries, pesticide use and noise, without reiteration of the regulatory requirements.

Permanent Native Forest Estate Policy

In June 2017, the PNFEP was modified to move from a threshold-based approach to a prohibition on broadscale clearing and conversion of native forest, other than in limited prescribed circumstances.

The prescribed circumstances include:

- for the construction of new significant infrastructure, or the maintenance of existing infrastructure
- for the purposes of undertaking routine management activities
- to facilitate any development, which, in its entirety demonstrates substantial public benefit including the conservation benefits that will arise from the proposal through secured actions to improve biodiversity, water quality, soil or other environmental outcomes
- for agricultural purposes where it amounts to less than 40 ha on a property in a 12-month period. The land subject to the application is in particular management zones, under a current local government planning instrument. The native forest is not a threatened vegetation community and an FPP is obtained
- otherwise as authorised by the FPA in accordance with clause 4 of the PNFEP.

Biosecurity

The *Biosecurity Act 2019* (Tas) commenced in part on 1 January 2020 with other provisions commencing on 31 March 2021 and 17 May 2023. It provides a regulatory framework for managing biosecurity and aims to help protect Tasmania from pests, diseases and other biosecurity matters.

In 2019, the Tasmanian Integrated Pest Management Group (IPMG) was established to improve the management of pests and diseases in production forests through a coordinated approach to pest management and surveillance, setting priorities for research and development. Current activities include coordinating a tenure-blind statewide invertebrate monitoring program for the plantation hardwood sector and implementing early field trials of a nonlethal systemic foliar spray as a vertebrate browsing deterrent for use in forest establishment.

Carbon and climate change

The *Climate Change (State Action) Act 2008* (Tas) was amended in 2022. The revised Act now sets a net zero emissions or lower target from 2030 and requires a climate change action plan be developed every 5 years.

Climate action 21: Tasmania's climate change action plan committed $3.25 million towards taking practical action to reduce emissions. *Climate Action 21* concluded in June 2021 and a draft plan for 2023–25 has been released for comment.

In 2020, the Tasmanian Government commissioned a review of Tasmania's emissions pathways, to model Tasmania's future emissions pathways to 2050 and identify net zero target pathway options available to Tasmania (Point Advisory & Indufor 2021). This analysis revealed the important role that forests play in climate change mitigation.

In relation to renewable energies, the *Tasmanian Renewable Energy Action Plan* was released in 2020, detailing the Tasmanian Government's vision for renewable energies in the future. Timber harvesting and processing residues can be used as feedstock for bioenergy production. The Tasmanian Government legislated a renewable energy target for Tasmania of 200% by 2040. The Draft Bioenergy

Vision for Tasmania (2021) provides a bioenergy vision and outlines a method for facilitating investment in bioenergy adoption.

A strategic assessment of how climate change and Australia's carbon policy impacts upon Tasmania's forestry sector, with an assessment of opportunities and barriers, was done by Keenan, Ryan & Stewart (2020).

In the revised version of the Forest Practices Code (2020), a statement was included that forest practices should be conducted in a manner that maintains the sequestration and storage of carbon in a reasonably practical manner.

See Section 2.2.3 for other changes relating to carbon and climate change over the reporting period.

Legal challenges

Over the reporting period there were two legal actions against the FPA concerning the management of the forest practices system.

Tasmania Conservation Trust Incorporated v Forest Practices Authority [2022] TASSC 29 (16 May 2022)

Tasmania Conservation Trust Inc v Forest Practices Authority was an application pursuant to the *Judicial Review Act 2001* (Tas) for review of a decision of the FPA certifying an FPP. In 2009, the FPA had initially refused an application to certify an FPP on the grounds that it did not provide adequate protection for threatened species and threatened native vegetation communities. The Forest Practices Tribunal affirmed that decision on appeal and the applicant submitted an application for compensation under the NC Act. The Minister refused to pay compensation pursuant to Part 5 of that Act on the grounds that the FPP did not provide adequate protection to threatened native species communities, pursuant to section 41A of the NC Act. In 2015, the applicant resubmitted an application for approval of the FPP in accordance with section 44(7) of the NC Act. The FPP was approved by the FPA in accordance with section 44(8) of the NC Act. The court considered whether the resubmitted FPP was the 'relevant forest practices plan' such that the provisions of section 44 of the NC Act were engaged, whether the delegate of the FPA held an appropriate delegation, whether the delegate was acting on the direction or behest of another, and whether the correct legislative provisions were applied by the FPA in its decision to certify the resubmitted FPP. The court found that the FPP submitted in 2015 was not the same as the FPP submitted in 2009 such that section 44 of the NC Act ought not to have been engaged, the FPP ought not to have been approved and the decision of the FPA was quashed. While it was not necessary to determine, the court found in any case that the delegate acted beyond the scope of their delegation and was acting on the direction of the CFPO and not independently.

Blue Derby Wild Inc v Forest Practices Authority [2022] TASSC 67 (9 December 2022)

STT was undertaking timber harvesting on two coupes of land near Derby in accordance with an FPP certified by a delegate of the FPA. The applicant, Blue Derby Wild Inc, challenged the certification of FPPs on the basis that the delegates who certified the FPPs were not validly delegated the power to do so, or in the alternative, that the decisions to certify were invalidated by apprehended bias in that the delegates were subject to any directions given by the CFPO.

The court found that the instruments of delegation were validly made despite the *Forest Practices Amendment (Validation) Act 2022* (Tas) which conclusively determined this issue. Additionally, the court found that the delegates did not act outside their scope of authority in certifying the FPPs and that

their decisions were not invalidated by apprehended bias. The application for review was dismissed and a further application to reopen the case was refused. An appeal has been heard by the Full Court of the Supreme Court of Tasmania but as of 22 April 2024, no decision had been handed down.

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